# CERTIFICATE

It is to be certified that the proposed IWMP-XVII Project comprising ten micro-watersheds of district Jhansi, Uttar Pradesh has been selected for its sustainable development on watershed basis under Integrated Watershed Management Programme. The land is physically available for proposed interventions and is not overlapping with any other schemes. It will be developed as per Common Guidelines for Watershed Development Project-2008, GOI, New Delhi. The significant results will be achieved through proposed interventions on soil and water conservation, ground water recharge, availability of drinking and irrigation water, agricultural production systems, live stock, fodder availability, livelihoods of asset less, capacity building, etc. The proposed **Detailed Project Report** of **IWMP-XVII,** for financial year 2011-12 is submitted for its approval and implementation.

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# CHAPTER-1

## 1.1 Introduction

The economy of Uttar Pradesh continuous to be pre-dominantly agricultural with about 30% of income derived from agriculture in the year 2009-10 .According to the census report 2001 the agricultural sector employs more than 60% labor force. Thus, the growth of agriculture sector determines the income and level of living, particularly the vast majority of rural people in the various region of the state.

It is widely recognized that in increase in crop output was, by and large, recorded in paddy and wheat crops while other crops witnessed either stagnation or deceleration ever during post-technological period, i.e., 1966-67 and onwards. Further, the strategy of agricultural growth characterizing the "Green Revolution'' no doubt proved quite effective in bringing about relatively fast in increase in crop output could no longer be sustained over years. Besides, this the benefits of Green Revolution'' has remain confined to already well of regions of the state and thus, given rise to the disparities in crop output and thereby income and prosperity of the people at various levels i.e., inter-regional, intra-regional and at form levels.

Besides, regional difference in productivity new strategy has also degraded the natural bases on which this system rests. The ultimate costs of this degradation are born by the farmers themselves and there by the region and finally state and country. Some of these farm impacts are soil erosion, low water availability, salinization and genetic erosion.

Over fast one decade agriculture has become a non-profitable activity due to low productivity in general and with small holdings in particular, higher costs of production and lack of post harvest management and processing in various region of the state. Farmers are forced to migrate to urban areas in search of alterative profitable activities in place of agriculture.

The regional disparities may arise because of heterogeneous distribution of natural resources, climatic conditions and socio-economic frame work. The physical and climatic conditions are the natural endowments of a region which cannot be changed through human efforts, much less in short-run on one hand and the socio-economic frame-work, on the other hand, also cannot be altered in short-run planning horizon. However, these region disparities are more conspicuous in the rain fed and semi-arid pockets, viz., Bundelkhand part of the state. The value of total agricultural productivity is lower as compare to the other regions and the state as well which is shown on the Fig. (1) through Bar Chart.

The Bundelkhand contributes about 7 % in terms of cultivated area and 3% in food grains production of the state. Hence, the fluctuations in the output disturb the rhythm and mutual balance among its many inter-dependent allied sub-sectors of the region and their dependents. Therefore, the sustainability of 3.2 to 3.5 % the fluctuations overall agricultural production system in order to stabilize the income and level of livings of the people in this region is of utmost importance

**1.2 Problem:**

In the rain fed region of Bundelkhand, instability in agricultural production caused by weather is considered as the most pronounced and perennial problem in decision making. Farmer face production risk because of natural phenomenon occurring overtime whereas they face market risk because of price fluctuations occurring over time. If the entire relevant variable is known with certainty farmers will face classical production problem.

However, once decisions are made natural and economic conditions change and the previous optimal decision based on old information become sub-optical with changed information. These facts lead to the hypothesis that in rain fed areas weather risks affects both production and optimal resource use and hence the economic efficiency and ultimately causing the agricultural production to fluctuate with varying degree at an aggregate district, region and state level.

The fluctuation in the rainfall as well as productivity of Kharif and Rabi cereals pulses and oilseed Jhansi district is shown on Fig. (1) on10 years data i.e., from 2001-02 to 2009-10.. The estimated trend lines are clearly showing, by and large, similar trend in the productivity of major crop groups in both seasons except kharif oilseeds kharif showing declining trend during good monsoon year also. (Since the present work is related to the watershed project of district Jhansi, therefore, fluctuations are presented only of the District of Jhansi.)

**1.3 Previous efforts:**

In the early seventies, rain fed areas received attention on the research based result of the National Agriculture Research System (NARS) by the Government agencies but no results were visualized except that it benefited to some farmers. In the eighties several agencies, viz., World Bank, Indo-British program, Indo-German program and Government agencies started integrated crop, soil and water components for working on area and/or community basis. But finally it was found that results were accruing to only those who owned some land. In the late nineties NWDPRA was started by Department of Agriculture and Co-operation, Government of India and implemented by State Governments. The major observations were that it has created large numbers of Water Harvesting Structures and community plantation with no post project maintenance.

At the same time Ministry of Rural Development (MoRD), Government of India started DPAP and IWMP on the area basis to uplift the living of the poor people involving local communities the Self Help Group (SHG), User Group (U.G.) and Watershed Committee (WC) were formed but fail to provide result up to the expected level.

Thus, in order to evolve a demand driven, environment friendly, on farm research oriented, location specific and as per need of the all stakeholders of the area in an integrated way on watershed basis is called for.

Therefore, considering the agriculture situations and other parameters like infrastructural facilities, natural resources and farming system an integrated watershed approach has been taken into consideration based on the Common Guidelines-2008 issued by Government of India. In order to exploit the multidimensional potential of agriculture, it is imperative to prepare a suitable plan in view of securing food and nutrition for need of all stakeholders of W.S. area on one hand and resource conservation on the other in such a way that it will increase income and generate additional employment to the land less communities on sustainable basis.

Based on the Guidelines issued by Government of India, the present Detail Project Report (DPR) is IWMP-17 prepared for implementation in the Jhansi District allotted by SLNA (State Level Nodal Agency) of U.P.State to B.S.A. Chirgaon, Jhansi, as project implementation Agency (PIA) to infill the following objectives in the Watershed area:-

1. To optimize the productivity of agriculture and its allied activities.
2. To narrow down the gap in technical adoption at farmers level.
3. To narrow down the gap between income level of resource rich and resources poor families.
4. To create of income and employment to the landless communities.
5. Capacity building/skill up gradation of farmers and other stakeholder of W.S.

The ensuring document in the form of Detailed Project Report (DPR) has emerged through Participatory Rural Appraisal (PRA) of the concerned watershed area by community participation with the trained and experienced officials in project formulation and implementation of soil and water conservation work. The activities proposed to be undertaken are demand driven, location specific, multidisciplinary in system, bottom-up approach with its practical implications as per expectation.

**1.4 Plan of Presentation:**

In the following chapter the Back Ground information, project implementing agency, basic information of the project area, socio-economic project, livelihood pattern, watershed activities, capacity building, Budgeting, expected out comes (cost-benefit analyses), Quality and Sustainability issues and mapping are prompted in Chapter no. II, III, IV, V, respectively.

# 1.2 Project background

## 2.1 Need of the watershed development programme

The Watershed development programme is prioritized on the basis of Fifteen parameters namely, ranking was developed on the basis of these parameters. the criteria were taken with total of 175 weightage points. The criterion taken are availability of drinking water, irrigation, degree of soil erosion, water holding capacity, area under rainfed agriculture, status of field bund/contour bund/graded bund, presence of hard rock below the land, options for livelihood ,percentage of small and marginal farmers, degraded lands, ground water status , status of technical knowledge for improved farming systems, weather conditions, poverty index(%of poor population),virginity of land, productivity potential of land and soil organic carbon status .the weightage for project is about 90 percent.

**Table 1.1 Criteria and weightage for selection of watershed**

| S. No. | Criteria | Maximum Score | Range & Score | | | |
|---|---|---|---|---|---|---|
| 1 | Drinking water | 15 | **Very poor** Dependence on water supply through tanker (15) | **Poor** Partial availability within the periphery of 3-4 km (10) | **Good** Round the availability within the periphery of 3-4 km (5) | **Very Good** Round the year availability in watershed (0) |
| 2 | Irrigation | 10 | No irrigation (10) | Life saving irrigation (7.5) | Partial life saving irrigation (5) | Fully covered (0) |
| 3 | Degree of soil erosion | 10 | Severe (10) | Medium (7.5) | Low (5) | No erosion (0) |
| 4 | Water holding capacity | 10 | Very poor (10) | Poor (7.5) | Good (5) | Very Good (0) |
| 5 | Area under rain fed agriculture | 15 | More than 80% (15) | 70 to 80 % (10) | 60 to 70 % (5) | Below 60% (Reject) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | (0) |
| 6 | Status of field bund/contour bund / graded bund | 10 | Below 20 % (10) | 50 to 20 % (7.5) | 80 to 50 (5) | Above 80% (2.5) |
| 7 | Presence of hard rock below the land | 15 | Hard rock starts from 5 to 20 feet (15) | Hard rock starts from 21 to 50 feet (10) | Hard rock starts from 51 to 100 feet (5) | Deep soil depth (0) |
| 8 | Options for livelihood | 10 | Very poor (10) | Poor (7.5) | Good (5) | Very Good (0) |
| 9 | % of small and marginal farmers | 10 | More than 80% (10) | 50 to 80 % (5) | Less than 50% (3) | |
| 10 | Ground water status | 10 | Very poor (10) | Poor (7.5) | Good (5) | Very Good (0) |
| 11 | Status of Technical Knowledge for improved farming systems | 10 | Very poor (10) | Poor (7.5) | Good (5) | Very Good (0) |
| 12 | Poverty index (% of poor population) | 10 | Above 80% (10) | 80 to 50 (7.5) | 50 to 20 % (5) | Below 20 % (2.5) |
| 13 | Virginity (No treatment /intervention in last five years) | 10 | Above 80% (10) | 80 to 50 (7.5) | 50 to 20 % (5) | Below 20 % (2.5) |
| 14 | Productivity potential of 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) | - |
| 15 | Eco-sustainability | 15 | Very low (15) | Low (10) | Medium (5) | Normal (0) |

**Table 1.2 Weightage of the project**

| S. No. | Criteria | Weightage points |
|---|---|---|
| 1 | Drinking water | 10 |
| 2 | Irrigation | 5 |
| 3 | Degree of soil erosion | 10 |
| 4 | Water holding capacity | 10 |
| 5 | Area under rainfed agriculture | 7.5 |

| | | |
|---|---|---|
| 6 | Status of field bund/contour bund / graded bund | 7.5 |
| 7 | Presence of hard rock below the land | 10 |
| 8 | Options for livelihood | 7.5 |
| 9 | % of small and marginal farmers | 10 |
| 10 | Ground water status | 7.5 |
| 11 | Status of Technical Knowledge for improved farming systems | 10 |
| 12 | Poverty index (% of poor population) | 10 |
| 13 | Virginity vis-à-vis previous treatment | 10 |
| 14 | Productivity potential of land | 7.5 |
| 15 | Eco-sustainability(IPM,IPNM) | 15 |
| | **Total Weightage (Out of total 175)** | **137.5** |
| | **Weightage Percentage** | **78.57** |

**2.2 Ongoing schemes in watershed area**

The reason being very backward, it has been on the top priority of a number of development projects and programme. These Programmes are MNREGA, SGSY, Indra Awas Yojna, RIDF- 8, 12, 13and 16. Besides previously part of the most of the villages were previously treated on watershed basis in DPAP on 500 ha project area basis. The projects ongoing in the watershed area are as follows:-

1. MNREGA : Village Panchayat and other departments with its convergence engaged in soil and water conservation work.
2. NWDPRA: By Deptt. Of agriculture, Govt of India.
3. ATMA: Agriculture Tecnology Development Agency run by Deptt. Of Agriculture primerly dissementing agriculture production techniques amongs farmers through demonstrations, farmers tranning and revalidation of local innovative techniques in agriculture production.
4. Agriculture Development Schemes- Accelerated Pulse Production Programme, RKVY, Food Security Mission, Soil Health Programme, and a number of Technology dissemination training Programmes are ongoing in these areas.

# CHAPTER-2

## 2.1 Basic Project information

The project IWMP XVII is located in the two sub-divisions namely, Sadar and Moth of Jhansi District in the state of Utter Pradesh. The boundaries of the project area are intersection of 32 adjoining villages which is cluster of seven micro-watersheds with 2C2A7a2c, 2C2A8d1c,2C2A8e1a,2C2A8e1d ,2C2A8e2a,2C2A8e2b and 2C3A5h1a being their respective codes. The project area of the watershed is 7402.72.00 hectare out of which 4413.13 hectare area is proposed for treatment by ntegrated watershed management programme (IWMP) starting from year 2011-12 and onwards. In Fig. (2) representing the location of the project.

The nearest town is Jhansi which is about 15 to 30 km. from the villages of the watershed area and well connected with rural pucca road and touching the boundaries of M.P state. The majority of the population belongs to Backward SC/ST communities. The families of the watershed are dependent mainly on agriculture and its allied activities for their income and livelihood.

The watershed area falls in agro-climatic zone of central plateau hill region based on all-India classification of DoLR. The climate is tropical sub-humid to semi-arid and comes in hot moist semi-arid ecological sub-region. The elevation of the project varies from158 to 205 above mean sea level. The general topography of the watershed is mild to gentle in slope.

Rain fed agriculture is widely practiced; seasumum, red gram, green gram and black gram in Kharif and gram, pea, wheat, linseed, rapeseed and mustard in Ravi are the major crops grown along with dairying, goat rearing with a very meager area under vegetables mainly to fulfill the family consumption requirements.

The details of micro-watershed along with their treatable area and total geographical, census codes, gram panchayat area presented in the table no.1.

**Table-2.1: Details of village wise treatable area in the IWMP-XVII**

| Name of Gram panchayat | Code of microwatershed | Name of villages | Treatable area(ha) | Total geographical area(ha) |
|---|---|---|---|---|
| Barata | 2C2A7a2c | Barata | 240.60 | 263.66 |
| | | Baragaon(NP) | 168.00 | 261.49 |

| | | | | |
|---|---|---|---|---|
| | | Bachaoli Bujurg | 20.30 | 48.22 |
| | | Bachaoli Khurd | 0.00 | 0.14 |
| | | Daun | 0.00 | 0.33 |
| | | Bhupnagar | 10.50 | 47.89 |
| | | Dunara | 60.30 | 81.04 |
| | | Marora | 0.00 | 6.99 |
| | | Sujataa | 130.00 | 147.32 |
| | | Tor Barata | 120.30 | 133.21 |
| | **Total** | | **750.00** | **990.29** |
| | | Kolwan | 10.00 | 18.6 |
| Tilaetha | 2C2A8d1c | Tendol | 270.00 | 334.76 |
| | | Tilaetha | 400.00 | 551.11 |
| | **Total** | | **680.00** | **904.47** |
| Nohatachhir | 2C2A8e1a | Kolwan | 160.80 | 250.87 |
| | | Tendol | 0.00 | 0.01 |
| | | Nohatachhir | 180.60 | 290.50 |
| | | Barethi | 7.60 | 10.35 |
| | | Banguwan | 371.00 | 422.34 |
| | **Total** | | **720.00** | **974.07** |
| Phu.Bar.Sa,Kolwan | 2C2A8e1d | Kolwan | 15.57 | 28.90 |
| | | Nohatachhir | 20.00 | 37.96 |
| | | Barethi | 104.15 | 185.98 |
| | | Banguwan | 30.56 | 49.66 |
| | | Phu.Bar.Sa | 280.00 | 406.03 |
| | | Barua sa(MB) | 0.00 | 37.00 |
| | **Total** | | **450.28** | **745.53** |
| Tendol | 2C2A8e2a | Kolwan | 0.00 | 3.37 |
| | | Tendol | 206.45 | 600.36 |
| | | Barethi | 80.20 | 105.84 |
| | | Sanora | 10.20 | 27.52 |
| | **Total** | | **296.85** | **737.09** |

| | | | | |
|---|---|---|---|---|
| Phu.Bar.Sa | 2C2A8e2b | Tendol | 0.00 | 0.01 |
| | | Barethi | 84.00 | 128.79 |
| | | Phu.Bar.Sa | 210.00 | 376.26 |
| | | Barua sa(MB) | 80.50 | 186.65 |
| | | Sanora | 85.80 | 152.68 |
| | | Ghughuwa | 0.00 | 14.55 |
| | | Harpura | 0.00 | 2.75 |
| | | Talarmanna | 25.70 | 92.07 |
| | **Total** | | **486.00** | **953.76** |
| Bithari | 2C3A5h1a | Atpei | 60.70 | 157.35 |
| | | Bithari | 260.00 | 454.81 |
| | | Gangawali | 110.20 | 367.37 |
| | | Khiriyapali | 0.00 | 15.42 |
| | | Lewa | 0.00 | 14.79 |
| | | Madguwan | 170.00 | 319.96 |
| | | Mudei | 35.00 | 65.40 |
| | | Paliparsar | 160.00 | 210.98 |
| | | Parsar | 120.00 | 260.16 |
| | | Rankuwan | 114.10 | 231.27 |
| | **Total** | | **1030.00** | **2097.51** |

## 2.1.2Area and Land use:

Proposed for treatment by IWMP started from year 2011-12 are on The total geographical area of the all micro-watershed is 7402.72 ha, out of which 4413.13 ha is the treatable. The entire watershed is rainfed and about 10 per cent area has life saving irrigation mainly through open shallow dug wells. General topography of the watershed is mild to gentle (<1%). It has the general appearance of a plain dotted with isolated low and undulated area. The details of each MWS in respect of land use are presented in Table 2.2:

**Table no.2.2 Area under major land uses**

| S N | Name of Project | Cultivated and wasteland area of the village (ha) | | | Area details (ha) (falling within the projects) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cultivat-ed rainfed area | Cultivated irrigated | Uncultivated wasteland/ | Pvt. Agri. Land | Forest Land | Com munit | Others(Pl. | Total area (ha) |

| | | | area | fallow | | | | | | | | y land | specify) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Temp. | Permanent | Gen | SC | ST | OBC | Total | | | | |
| 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | IWMP-XVII | 2824 | 1547 | 1112.3 | 476.83 | 1490 | 894 | 0 | 3576.13 | 5960.73 | 120 | 225 | 1097.59 | 7402.72 |

**2.2Physiography:**

The IWMP-XVII watersheds are situated at an elevation of some 153 to 313 m above mean sea level and have relief from 160 m. The watershed has a general slope of less than 1 per cent. General topography of the watershed is mild to gentle. The recharge of wells is very slow as it depends on perched water. Most of the area is mono-cropped due to lack of irrigation facilities. In the absence of effective field/contour/graded bunding area is affected by miled to severe soil erosion and thereby nutrient loss. Heavy erosion in the absence of bunds is the major reason for the development of multi-directional slopes in the watershed. The details of Digital Elevation Model, slope and drainage pattern of the micro-watershed are described in subsequent section.

**2.3Digital Elevation Model (DEM)**

A DEM is a digital file of terrain elevations for ground positions. It is a raster representing the elevations of the ground and objects. Besides providing a source of elevation, the DEM may be used for topographic information, flow pattern, flood risk areas identification and to determine accessibility. The DEM of IWMP-XVII micro-watershed is shown in map section. Outlet of the watershed was located at 158 m above msl,

**2.3.1Elevation**

| Name of MWS | Minimum | Maximum | Relief |
|---|---|---|---|
| IWMP-XVII | 158 | 205 | 47 |

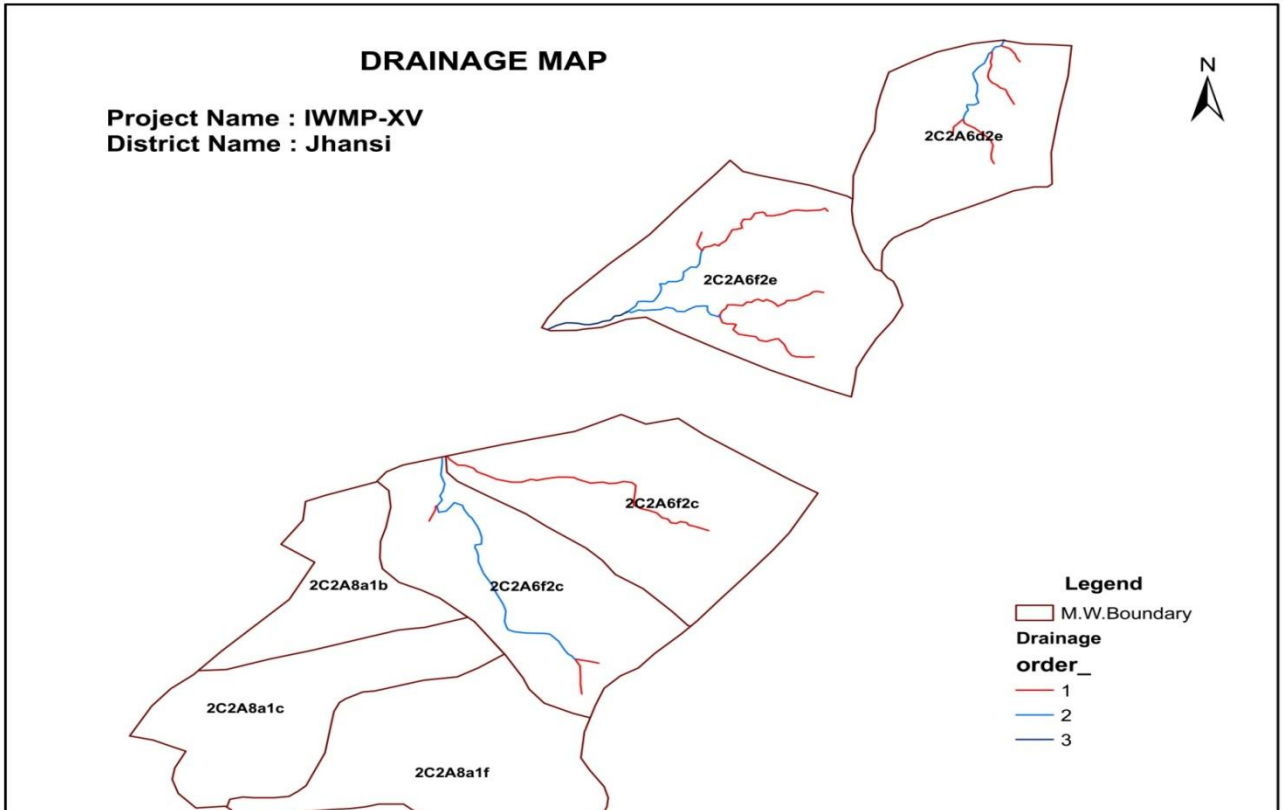
**2.3.2 Slope Map** Slope and aspect of a region are vital parameters in deciding suitable land use, as the degree and direction of the slope decide the land use that it can support. Slope is also very important while determining the land irrigability and land capability classification and has direct bearing on runoff.

Spatial distribution of different slope classes was prepared using Arc GIS and is shown in map section. Slope was divided into three classes viz. 0-3, 3-5, and more than 5 per cent. Per cent areal extent of different slope classes in IWMP-XVII micro-watershed is shown in Table 2.2. The dominant slope category in the micro-watershed were 0-5 per cent (99.22 %) followed by 5-8 per cent (0.78%). It was also noticed that slope of major area of agricultural land varied from 0-8 per cent.

| Slope categories (%) | Area (ha) | Percent of total area |
|---|---|---|
| 0-0.5 | 3217.72 | 43.46 |
| 0.5-1 | 2868.96 | 38.75 |
| 1-3 | 728.10 | 9.83 |
| 3-5 | 531.82 | 7.18 |
| >5 | 56.12 | 0.78 |
| **Total** | 7402.72 | **100.00** |

### 2.3.3 Drainage Map

Drainage of the watershed was digitized in GIS environment (Fig. 2.1). Maximun order of micro-watersheds varied from IWMP-XVII. The detailed description of the drainage network is gven in section 2.5.



**2.3 Average monthly rainfall of last five years and Temperature :-**

| Month | Year/Rainfall in mm. | | | | | | Temperature c | |
|---|---|---|---|---|---|---|---|---|
| | 2006 | 2007 | 2008 | 2009 | 2010 | Average | Max. | Min. |
| January | 0 | 0 | 0 | 0 | 0 | 12.40 | 19.00 | 6.5 |
| February | 0 | 0 | 0 | 0 | 0 | 11.40 | 25.2 | 9.2 |
| March | 0 | 0 | 0 | 0 | 0 | 7.60 | 34.7 | 15.1 |
| April | 0 | 0 | 0 | 0 | 0 | 3.78 | 40.90 | 21.9 |
| May | 0 | 0 | 0 | 0 | 0 | 5.60 | 42.90 | 26.6 |
| June | 0 | 158.90 | 620.30 | 16.20 | 22.80 | 73.30 | 40.60 | 26.7 |
| July | 163.60 | 117.5 | 270.10 | 174.60 | 354.90 | 296.40 | 34.80 | 25.1 |
| August | 117.50 | 174.70 | 137.10 | 107.60 | 176.70 | 278.60 | 32.1 | 24.80 |
| September | 44.50 | 79.90 | 105.80 | 131.30 | 179.90 | 148.90 | 32.30 | 23.3 |
| October | 0 | 0 | 0 | 0 | 0.20 | 24.60 | 33.36 | 18.75 |
| November | 0 | 0 | 0 | 0 | 31.74 | 10.20 | 26.70 | 16.5 |
| December | 0 | 0 | 0 | 0 | 0 | 6.30 | 23.50 | 7.0 |

**Table 2.4: Details of drought in the project area**

| Sr. No. | Particular | Villages | Years | Intensity |
|---|---|---|---|---|
| 1. | Drought | IWMP-XVII | 2004-05 | Severe |

| | | | | |
|---|---|---|---|---|
| | | | 2005-06<br>2006-07<br>2007-08<br>2008-09<br>2010-11 | Severe<br>Severe<br>Severe<br>Normal<br>severe |

## 2.4 Soil and Land Capability Classification

The total area of the project is 7402.72 ha, out of which 4413.13 ha is under treatment. Most of the soil is black (*Mar, Kabar* & *Mar Kabar* mixed). The nutritional health of soil is very poor due to severe erosion from the watershed. The nutrient status of the micro-watershed is depicted in Table 2.8. The land capability classification of each micro-watershed was also studied and presented in individual DPR of micro-watershed.

**Table 2.5: Nutrient status of soils in IWMP-XVII project**

| S. No. | Name of Village | Type of Soil | pH | Organic Carbon<br>% | Available Phosphorus<br>kg/ha | Available Potash<br>kg/ha |
|---|---|---|---|---|---|---|
| 1 | **IWMP-XVII** | Mar/Kabar mixed | 7.8 | 0.36 | 22.30 | 301.10 |
| | | Rakar | 6.8 | 0.23 | 14.70 | 252.85 |
| | | Purwa | 7.5 | 0.24 | 18.75 | 262.89 |

# CHAPTER-3

**3.1Baseline Survey**

The socio-economic condition along with resource availability is critically assessed through Participatory Rural Appraisal (PRA) of all the villages in the watershed. The spatial data were collected by trained and experienced personnel's with the active participation of the villagers. The data regarding the population, land use and climatic conditions were obtained from the concerned State Government Department of the district.

**Table no. 3.1 Demographic Features with Ethnographic Details of Communities**

| SN | Code of Micro Watershed | Name of village | Total Population | | | Population of SC/ST | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total | Male | Female | Total | Male | Female |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **1** | 2C2A7a2c | Barata | 7911 | 4168 | 3743 | 1797 | 970 | 827 |
| **2** | 2C2A8d1c | Tilaetha | 2476 | 1334 | 1142 | 558 | 311 | 247 |
| **3** | 2C2A8e1a | Nohatachhir | 3377 | 1737 | 1640 | 857 | 444 | 413 |
| **4** | 2C2A8e1d | Phutera &Kokwan | 2191 | 1186 | 1005 | 98 | 48 | 50 |
| **5** | 2C2A8e2a | Tendol | 2690 | 1419 | 1271 | 621 | 331 | 290 |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 2744 | 1450 | 1294 | 105 | 49 | 56 |
| **7** | 2C3A5h1a | Bithari | 8444 | 4451 | 3993 | 1785 | 941 | 844 |
| | Total of Project | | 29833 | 15745 | 14088 | 5821 | 3094 | 2727 |

**Tableno3.2 Details of seasonal migration from Project area: Pre-project status**

| Sl. No. | Names of Watershed | Name of village | No. of persons migrating | No. of days per year of migration | Major reason(s) for migrating | Distance of destination of migration from the village (km) | Occupation during migration | Income from such occupation (Rs. in lakh) |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 |
| **1** | 2C2A7a2c | Barata | 90 | 180 | Unemployment | 2 to 5 | Daily wages | 32.40 |
| **2** | 2C2A8d1c | Tilaetha | 62 | 98 | | 2 to 5 | | 12.76 |
| **3** | 2C2A8e1a | Nohatachhir | 120 | 105 | | 2 to 5 | | 25.20 |
| **4** | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 110 | 110 | | 2 to 5 | | 24.20 |
| **5** | 2C2A8e2a | Tendol | 106 | 120 | | 2 to 5 | | 25.44 |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 85 | 110 | | 2 to 5 | ,, | 18.70 |
| **7** | 2C3A5h1a | Bithari | 179 | 120 | | 2 to 5 | ,, | 42.96 |
| | Total of Project | | 752 | 843 | | | | |

**Tableno3.2 Soil Texture:-**

| Sl. No. | Names of Watershed | Name of village | Area in different Soil Group (ha) | | | |
|---|---|---|---|---|---|---|
| | | | Light textured soil (sand, loamy sand) | Medium textured soil (Sandy loam, loam, silt loam) | Heavy textured soil (Clayey) | Others specify …….. |
| 1 | 2C2A7a2c | Barata | 150.00 | 280.00 | 370.00 | 0.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 | 2C2A8d1c | Tilaetha | 115.00 | 272.00 | 293.00 | 0.00 |
| 3 | 2C2A8e1a | Nohatachhir | 168.00 | 275.00 | 277.00 | 0.00 |
| 4 | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 75.00 | 235.28 | 140.00 | 0.00 |
| 5 | 2C2A8e2a | Tendol | 120.00 | 111.85 | 65.00 | 0.00 |
| 6 | 2C2A8e2b | Phu.Bar.Sa | 137.00 | 196.00 | 153.00 | 0.00 |
| 7 | 2C3A5h1a | Bithari | 430.00 | 346.00 | 254.00 | 0.00 |
| | Total of Project | | 1195.00 | 1716.13 | 1552.00 | 0.00 |

**Tableno3.3 Details of land holding pattern in the project areas**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
|---|---|---|---|---|---|---|---|---|
| **S. No.** | **Names MWS with code** | **Name of Village** | **Type of Farmer** | **No. of households** | **No. of BPL households** | **Land holding (ha)** | | |
| | | | | | | **Irrigated** | **Rainfed** | **Total** |
| 1 | 2C2A7a2c | Barata | (i) Large farmer | 40 | 0 | 20 | 140 | 160 |
| | | | (ii) Small farmer | 510 | 80 | 130 | 320 | 450 |
| | | | (iii) Marginal farmer | 666 | 90 | 60 | 80 | 140 |
| | | | (iv) Landless person | 120 | 50 | 0 | 0 | 0 |
| | | | Sub-Total | 1336 | 220 | 210 | 540 | 750 |
| 2 | 2C2A8d1c | Tilaetha | (v) Large farmer | 40 | 0 | 55 | 65 | 120 |
| | | | (vi) Small farmer | 239 | 42 | 76 | 380 | 456 |
| | | | (vii) Marginal farmer | 130 | 53 | 46 | 58 | 104 |
| | | | (viii) Landless person | 22 | 15 | 0 | 0 | 0 |
| | | | Sub-Total | 431 | 110 | 177 | 503 | 680 |
| 3 | 2C2A8e1a | Nohatachhir | (ix) Large farmer | 58 | 0 | 72 | 53 | 125 |
| | | | (x) Small farmer | 135 | 130 | 30 | 210 | 240 |
| | | | (xi) Marginal farmer | 372 | 189 | 128 | 227 | 355 |
| | | | (xii) Landless person | 10 | 8 | 0 | 0 | 0 |
| | | | Sub-Total | 575 | 327 | 230 | 490 | 720 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 2C2A8e1d | Kolwan | (xiii) Large farmer | 16 | 0 | 10 | 25 | 35 |
| | | | (xiv) Small farmer | 166 | 40 | 85 | 165 | 250 |
| | | | (xv) Marginal farmer | 170 | 50 | 20 | 145.28 | 165.28 |
| | | | (xvi) Landless person | 35 | 35 | 0 | 0 | 0 |
| | | | Sub-Total | 387 | 125 | 115 | 335.28 | 450.28 |
| 5 | 2C2A8e2a | Tendol | (xvii) Large farmer | 40 | 0 | 65 | 67 | 132 |
| | | | (xviii) Small farmer | 86 | 26 | 32 | 62 | 94 |
| | | | (xix) Marginal farmer | 280 | 82 | 33 | 37.85 | 70.85 |
| | | | (xx) Landless person | 52 | 46 | 0 | 0 | 0 |
| | | | Sub-Total | 458 | 154 | 130 | 166.85 | 296.85 |
| 6 | 2C2A8e2b | Phu.Bar.Sa | (xxi) Large farmer | 30 | 0 | 6 | 138 | 144 |
| | | | (xxii) Small farmer | 105 | 0 | 14 | 174.5 | 188.5 |
| | | | (xxiii) Marginal farmer | 172 | 32 | 10 | 143.5 | 153.5 |
| | | | (xxiv) Landless person | 193 | 162 | 0 | 0 | 0 |
| | | | Sub-Total | 500 | 294 | 30 | 456 | 486 |
| 7 | 2C3A5h1a | Bithari | (xxv) Large farmer | 125 | 0 | 100 | 225 | 325 |
| | | | (xxvi) Small farmer | 660 | 240 | 400 | 305 | 705 |
| | | | (xxvii) Marginal farmer | 600 | 385 | 100 | 270 | 370 |
| | | | (xxviii) Landless person | 98 | 42 | 0 | 0 | 0 |
| | | | Sub-Total | 1483 | 667 | 600 | 800 | 1400 |
| | Total | | | 5170 | 1897 | 1492 | 3321.13 | 4813.13 |

**Tableno3.4 Major Crops, their Productivity and Production**

| S.No | Crop. | Area in(Ha.) | | Productivity Qtl,/Ha | | Production (Qtl.) | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Grain/Main product | | Fodder/Fuel/ other Product. | | |
| | | Irrigated | Rainfed | Irrigated | Rainfed. | Irrigated | Rainfed | Irrigated | Rainfed | |
| A | **Kharif** | 0 | **0** | - | - | - | - | - | - | |
| 2 | Maize | 0 | 0 | - | - | - | - | - | - | |
| 3 | Arhar | 0 | 0 | - | - | - | - | - | - | |
| 4 | Urd/Mung | 0 | 1190 | - | 5.8 | - | 6902 | - | - | |
| 5 | vegetables (Crop wise) | 3 | 15 | 2.5 | 1.7 | 7.5 | 25.5 | - | - | |
| 6 | Fodder | 0 | 15 | - | 1.5 | - | 22.5 | - | - | |
| **B** | **Rabi** | | | | | | | | | |
| 1 | Wheat | 925 | 844 | 22 | 17 | 203.56 | 143.48 | 10175 | 7174 | |
| 2 | Barley | 62 | 21 | 6 | 4.9 | 372 | 102.9 | 0 | 0 | |
| 3 | Masoor | 108 | 427 | 4.8 | 4.5 | 518.4 | 1921.5 | 50 | 20 | |
| 4 | Gram | 98 | 366 | 6.7 | 6.5 | 656.6 | 2379 | 60 | 100 | |
| 5 | Pea | 196 | 246 | 7.1 | 6.9 | 1392 | 1697.4 | 0 | 0 | |
| 6 | Mustard | 60 | 188 | 3.9 | 3.2 | 234 | 601.6 | 90 | 280 | |
| 7 | Potato | 21 | 0 | 290 | 0 | 6090 | | | | |
| 8 | vegetables (Crop wise) | 0 | 0 | - | 0 | - | - | - | | |
| 9 | Fodder | 0 | 10 | - | 30 | - | 300 | - | - | |
| **C** | **Zaid** | 0 | 0 | | 0 | | | | | |
| 1 | vegetables (Crop wise) | 2 | 0 | 1.5 | 0 | 3 | - | - | - | |
| 2 | Fodder | 0 | 0 | 0 | 0 | 100 | - | - | - | |
| 3 | Urd/Mung | 17 | 0 | 5.9 | 0 | 750 | - | - | - | |
| 4 | Sugarcane | 3 | 0 | 250 | 0 | 0 | - | - | - | |
| | **Total** | 1492 | **3322** | | | | | | | |

## Tableno3.5 Horticulture Status

| S. N. | Name of micro watershed with code | Name of village | Name of Important horticultural crop | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Whole Fruit Crop | | | | Scattered Fruit Crop | | |
| | | | Name | Area ha. | Productivity qtl/ha | Production qtls | No. | Productivityqtl/No. | Production qtls |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 2C2A7a2c | Barata | Guava And Amanlan | 4.00 | 73.5 | 288 | 0 | 0 | 0 |
| 2 | 2C2A8d1c | Tilaetha | | 3.00 | 70 | 210 | 0 | 0 | 0 |
| 3 | 2C2A8e1a | Nohatachhir | | 10.00 | 75 | 750 | 0 | 0 | 0 |
| 4 | 2C2A8e1d | Phu.Bar.Sa,Kolwan | | 2.00 | 72 | 144 | 0 | 0 | 0 |
| 5 | 2C2A8e2a | Tendol | | 3.50 | 65 | 227 | 0 | 0 | 0 |
| 6 | 2C2A8e2b | Phu.Bar.Sa | | 5.00 | 68 | 238 | 0 | 0 | 0 |
| 7 | 2C3A5h1a | Bithari | | 4.00 | 70 | 280 | 0 | 0 | 0 |
| | Total of project | | | 31.50 | | 2137 | 0 | 0 | 0 |

## Tableno3.6 Forest, Vegetative Cover/Grass Land

| S. No. | Name & Code of Micro watershed | Name of Village | Forest (Area ha) | | | Grass Land (Area ha) | | Other vegetative cover (Area ha) | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Reserve | Gram Samaj (Natural/Planted) | Total | Gram Samaj | Private | Gram Samaj | Private |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 |
| 1 | 2C2A7a2c | Barata | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 20.23 | 40.00 |
| 2 | 2C2A8d1c | Tilaetha | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 56.52 |
| 3 | 2C2A8e1a | Nohatachhir | 120.00 | 12.00 | 132.00 | 2.00 | 0.00 | 3.00 | 0.00 |
| 4 | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 0.00 | 0.00 | 0.00 | 1.60 | 3.10 | 2.60 | 3.70 |
| 5 | 2C2A8e2a | Tendol | 0.00 | 20.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6 | 2C2A8e2b | Phu.Bar.Sa | 0.00 | 11.50 | 11.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | 2C3A5h1a | Bithari | 101.00 | 61.00 | 162.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total of project | | 221.00 | 104.50 | 325.50 | 3.60 | 3.10 | 35.83 | 100.22 |

## Tableno3.7 Livestock Population

| S. N. | Name of Micro watershed with code. | Name of Village | Cow | | Buffalow | | Ox/Bull | Goat | Sheep | Piggeries | Poultry | | | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Desi | Crossed | Desi | Murrah | | | | | Broiler | Layers | Total | specify |
| 1 | 2 | 3 | 4 | 5 | 5 | 6 | 7 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 1 | 2C2A7a2c | Barata | 50 | 0 | 100 | 0 | 30 | 200 | 40 | 20 | 50 | 50 | 100 | |
| 2 | 2C2A8d1c | Tilaetha | 200 | 0 | 100 | 10 | 0 | 360 | 0 | 25 | 0 | 100 | 100 | |
| 3 | 2C2A8e1a | Nohatachhir | 310 | 20 | 150 | 20 | 190 | 1200 | 80 | 0 | 280 | 220 | 500 | |
| 4 | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 348 | 0 | 130 | 0 | 137 | 500 | 90 | 0 | 0 | 200 | 200 | |
| 5 | 2C2A8e2a | Tendol | 300 | 0 | 260 | 50 | 120 | 47 | 0 | 0 | 0 | 60 | 60 | |
| 6 | 2C2A8e2b | Phu.Bar.Sa | 163 | 0 | 76 | 0 | 26 | 91 | 0 | 0 | 0 | 15 | 15 | |
| 7 | 2C3A5h1a | Bithari | 92 | 0 | 311 | 0 | 110 | 890 | 510 | 102 | 20 | 55 | 75 | |

**Tableno3.8** **Details of Livestock Productivity**

| SN | Name of Micro watershed with code | Name of Village | Milk Production (Litter Per day) | | | | Goatry | Poultry | | Piggeries weight Kg/Pig |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Cows | | Buffalos | | Weight in Kg/goat | Broiler Weight in Kg/ Brl | Layers No. of eggs/day | |
| | | | Desi | Crossed | Desi | Murrah | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **1** | 2C2A7a2c | Barata | 600 | 0 | 150 | 0 | 15 | 1 | 15 | 30 |
| **2** | 2C2A8d1c | Tilaetha | 300 | 0 | 250 | 50 | 26 | 0 | 17 | 55 |
| **3** | 2C2A8e1a | Nohatachhir | 330 | 150 | 500 | 150 | 18 | 1 | 140 | 70 |
| **4** | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 480 | 0 | 400 | 0 | 15 | 0 | 150 | 0 |
| **5** | 2C2A8e2a | Tendol | 1050 | 0 | 2500 | 500 | 25 | 0 | 40 | 0 |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 450 | 0 | 650 | 0 | 20 | 0 | 15 | 0 |
| **7** | 2C3A5h1a | Bithari | 340 | 0 | 230 | 0 | 30 | 0 | 110 | 55 |
| | Total of Project | | 3550 | 150 | 4680 | 700 | | | 487 | |

## Tableno3.9 Present Livelihood Status (No. of households/Income per year)

| S. No | Name of MWS with code | Name of village | Activities | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dairy | | Poultry | | Goatry | | Piggeries | | Fisheries | | Black Smithy | | Carpentry | | Stitching/ knitting | | Wages | | Others (Specify) | |
| | | | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income | No | Av. income |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1 | 2C2A7a2c | Barata | 10 | 0.35 | 5 | 0.075 | 50 | 1.00 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 3.00 | 0 | 0 |
| 2 | 2C2A8d1c | Tilaetha | 15 | 0.50 | 10 | 0.15 | 40 | 0.80 | 8 | .80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 6.20 | 0 | 0 |
| 3 | 2C2A8e1a | Nohatachhir | 43 | 1.80 | 60 | 0.50 | 170 | 24.16 | 0 | 0 | 0 | 0 | 5 | .60 | 4 | .65 | 0 | 0 | 60 | 3.20 | 0 | 0 |
| 4 | 2C2A8e1d | Kolwan | 12 | 0.60 | 13 | 0.30 | 35 | 1.20 | 0 | 0 | 0 | 0 | 10 | .50 | 5 | .60 | 0 | 0 | 45 | 2.80 | 0 | 0 |
| 5 | 2C2A8e2a | Tendol | 105 | 15.00 | 7 | 0.84 | 145 | 13.05 | 0 | 0 | 0 | 0 | 1 | .10 | 2 | .15 | 0 | 0 | 169 | 14.50 | 0 | 0 |
| 6 | 2C2A8e2b | Phu.Bar.Sa | 239 | 23.90 | 15 | 1.50 | 7 | 1.26 | 0 | 0 | 0 | 0 | 1 | .20 | 1 | .20 | 0 | 0 | 162 | 16.20 | 0 | 0 |
| 7 | 2C3A5h1a | Bithari | 4 | 0.20 | 5 | 0.10 | 50 | 0.90 | 4 | .50 | 0 | 0 | 1 | 0.20 | 1 | .20 | 0 | 0 | 50 | 5.00 | 0 | 0 |

## Tableno3.10 Irrigation Status

| S. No. | Name & Micro Watershed with code | Name of Village | Gross Cultivated Area | | | | Net Cultivated Area | Gross Irrigated Area | | | | Net Irrigated Area | Rainfed Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Kharif | Rabi | Zaid | Total | | Kharif | Rabi | Zaid | Total | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | 2C2A7a2c | Barata | 20 | 750 | 0 | 790 | 750 | 0 | 210 | 0 | 210 | 210 | 540 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2** | 2C2A8d1c | Tilaetha | 115 | 678 | 2 | 795 | 680 | 0 | 175 | 2 | 177 | 170 | 503 |
| **3** | 2C2A8e1a | Nohatachhir | 383 | 603 | 17 | 1030 | 720 | 0 | 213 | 17 | 230 | 230 | 490 |
| **4** | 2C2A8e1d | Kolwan | 180 | 435 | 0 | 615 | 450.28 | 0 | 115 | 0 | 115 | 115 | 335 |
| **5** | 2C2A8e2a | Tendol | 120 | 176 | 2 | 298 | 296.85 | 0 | 130 | 0 | 130 | 130 | 166.85 |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 210 | 298 | 3 | 511 | 486 | 0 | 27 | 3 | 30 | 30 | 456 |
| **7** | 2C3A5h1a | Bithari | 425 | 1375 | 0 | 1800 | 1400 | 0 | 600 | 0 | 600 | 600 | 800 |
| | Total for Project | | 1453 | 4315 | 24 | 5839 | 4783.13 | 0 | 1470 | 22 | 1492 | 1485 | 3290.85 |

**Table no3.11 Source wise Area Irrigated**

| S. No. | Name &Micro watershed with code | Name of Village | Canal Area | State Tube wells | | Tanks | | Open well | | Bore wells | | Lift | | Others (Specify) | | Total Irrigated Area | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No. | Area | No. | Area | No. | Area | No. | Area | No. | Area | No. | Area | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| **1** | 2C2A7a2c | Barata | 100 | 0 | 0 | 2 | 3 | 40 | 65 | 15 | 42 | 0 | 0 | 0 | 0 | 210 | |
| **2** | 2C2A8d1c | Tilaetha | 0 | 0 | 0 | 0 | 0 | 5 | 9 | 100 | 168 | 0 | 0 | 0 | 0 | 170 | |
| **3** | 2C2A8e1a | Nohatachhir | 0 | 0 | 0 | 0 | 0 | 150 | 70 | 33 | 160 | 0 | 0 | 0 | 0 | 230 | |
| **4** | 2C2A8e1d | Phu.Bar.Sa, Kolwan | 76 | 0 | 0 | 0 | 0 | 10 | 15 | 22 | 24 | 0 | 0 | 0 | 0 | 115 | |
| **5** | 2C2A8e2a | Tendol | 0 | 0 | 0 | 6 | 12 | 90 | 118 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 0 | 0 | 0 | 1 | 5 | 4 | 10 | 2 | 15 | 0 | 0 | 0 | 0 | 30 | |
| **7** | 2C3A5h1a | Bithari | 100 | 1 | 20 | 0 | 0 | 30 | 400 | 40 | 280 | 0 | 0 | 0 | 0 | 600 | |
| | Total of project | | 276 | 1 | 20 | 9 | 20 | 329 | 687 | 212 | 689 | 0 | 0 | 0 | 0 | 1485 | |

## Tableno3.12 Ground Water Status

| S. No. | Name & Code of Micro watershed | Name of Village | Depth of Ground Water Table (Below Ground level) in Meter | | No. of Observation well | Remarks |
|---|---|---|---|---|---|---|
| | | | Before Monsoon | After Monsoon | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **1** | 2C2A7a2c | Barata | 7.5 | 5 | 8 | |
| **2** | 2C2A8d1c | Tilaetha | 8.5 | 7.5 | 6 | |
| **3** | 2C2A8e1a | Nohatachhir | 13.7 | 10.20 | 7 | |
| **4** | 2C2A8e1d | Phu.Bar.Sa,Kolwan | 6.10 | 6.15 | 5 | |
| **5** | 2C2A8e2a | Tendol | 20.1 | 18.20 | 4 | |
| **6** | 2C2A8e2b | Phu.Bar.Sa | 8.10 | 7.00 | 6 | |
| **7** | 2C3A5h1a | Bithari | 6.30 | 5.10 | 7 | |

## Tableno3.13 Details of infrastructure in the project areas

| S N | | Parameters | | Status | | | |
|---|---|---|---|---|---|---|---|
| **1** | **2** | **3** | | **5** | | | |
| | | (i) | Name of villages connected to the main road by an all-weather road | All Villages | | | |
| | | (ii) | Village's Name provided with electricity | All Villages | | | |
| | | (iii) | No. of households without access to drinking water | All Villages | | | |
| | | (iv) | No. of educational institutions : Primary(P)/ Secondary(S)/ Higher Secondary(HS)/ vocational institution(VI) | (P) 25 | (S) 8 | (HS) 2 | (VI) 0 |
| | | (v) | Names of villages with access to Primary Health Centre | 2 | | | |
| | | (vi) | Names of villages with access to Veterinary Dispensary | 2 | | | |
| | | (vii) | Names of villages with access to Post Office | 2 | | | |
| | | (viii) | Names of villages with access to Banks | 2 | | | |
| | | (ix) | Names of villages with access to Markets/ mandis | 2 | | | |

| | | | | |
|---|---|---|---|---|
| | | (x) | Names of villages with access to Agro-industries | 0 |
| | | (xi) | Name of villages with access to Anganwadi Centre | 25 |

**Tableno3.14 DETAILS OF COMMON PROPERTY RESOURCES IN THE PROJECT AREA**

| 1 | 2 | 3 | 4 | 5 | | | | 6 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S. No. | Names of MWS with code | | CPR Particulars | Total Area (ha) Area owned/ In possession of | | | | Area available for treatment (ha) | | | |
| | | | | Pvt. persons | Govt. (specify deptt.) | PRI | Any other (Pl. Specify) | Pvt. persons | Govt. (specify deptt.) | PRI | Any other (Pl. Specify) |
| | | | (i) Wasteland/ degraded land | 1298.28 | 57.23 | 0 | 0 | 1292.28 | 0 | 0 | 0 |
| | | | (ii) Pastures | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (iii) Orchards | 17 | 0 | 0 | 0 | 14 | 0 | 0 | 0 |
| | | | (iv) Village Woodlot | 2.10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (v) Forest | 0 | 72.50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (vi) Village Ponds/ Tanks | 0 | 44.50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (vii) Community Buildings | 0 | 12.00 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (viii) Weekly Markets | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (ix) Permanent markets | 0 | 15.50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | (x) Temples/ Places of worship | 0 | 16.00 | 0 | 9 | 0 | 0 | 0 | 0 |
| | | | (xi) Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 3.10 SWOT Analysis for Watershed Development Programme

| **Strength** | |
|---|---|
| 1. | Community are willing to make joint efforts for the development |
| 2. | Average land holding is high i.e. 2.0 ha |
| 3. | Average animal population per family is 5. It indicates greater possibilities of organic farming. |

| | |
|---|---|
| 4. | Sufficient work force is available locally. |
| **Weakness** | |
| 1 | Less vegetative cover resulted into high runoff, soil and nutrient loss |
| 2 | Crisis of water for drinking and irrigation due to dependency on perched water |
| 3 | Very poor cropping intensity (30-40%) during *kharif* season |
| 4. | Health of the soil is poor to very poor due to severe erosion. |
| 5. | High frequency of irrigation due to low water holding capacity |
| 6. | Multidirectional slopes creates hurdles in applying conservation techniques |
| 7. | Majority of the farming community are laggard in adopting new technologies |
| 8. | Grazing / browsing of crops by stray cattle / goat (*Annapratha*). |
| **Opportunities** | |
| 1. | Opportunity for increasing cropping intensity during *kharif* season |
| 2. | Scope for diversification and alternate land use which provides regular employment |
| 3. | High opportunity of breed improvement and organic farming |
| | Presence of extensive ephemeral drain provides opportunity for water harvesting |
| 4. | Greater scope of increasing water use efficiency by adopting micro irrigation as majority of the farmers have their own well and pumping system |
| 5. | Sufficient availability of forest as well as community lands and traditional knowledge of goatary provides opportunity of livelihoods for landless families |
| 6. | Opportunity of dairy industry |
| **Threats** | |
| 1. | Non availability of markets |
| 2. | Presence of granite at a depth of 10 to 100 feet provides less opportunity of water storage and it may creates chaos if water resources not managed properly |
| 3. | High incidences of theft for all kinds of tools and machineries related to agriculture |

### 3.3 Decision Analysis

#### 3.3.1 Matrix ranking

Choice and priority of farmers can be analyzed by matrix ranking. Farmers are cultivating different types of crops viz. lentil, chickpea, field pea, durum wheat, wheat, linseed and mustard/rai in *rabi* season and urd, moong, arhar + sorghum, til and sorghum in *kharif* season. Lentil crop was ranked first in *rabi* season followed by chickpea and field pea, while in *kharif* season arhar + sorghum have the second ranking followed by sesame as fourth ranking. Mustard and linseed crop grown by farmers as mixed with other crop. Lentil crop was preferred by the farmers of micro-watershed due to the black soil which yields better under the conserved moisture. Farmers are cultivating local varieties of lentil called *Malka.* Second preferred crop was chickpea due to black soil with totally depend on rain. The promising varieties of chickpea were *Radhey* and *Awarodhi*. Wilt is the main problem of lentil and chickpea crop in the command area. However, arhar + sorghum preferred by the farmers as second crop in the rotation. It is clear from the analysis that the farmers don't take risk of growing crops as single crop.

Women of the micro-watershed show their priority to knitting, weaving and tailoring. Among the different criterion for deciding suitable enterprises, easily salable items ranked first followed by self dependency and low cost, less labour requiring.

Rural youth of the micro-watershed show their priority to goat rearing followed by poultry, dairy and seed production, organic farming, rabbit, vermi compost unit and nursery unit respectively. Among the different criterion for deciding suitable enterprises, less time taking ranked first followed by self dependency, more marketable and less labour requiring.

**Priority of crops (Maximum ranking is 10 points)**

| **Crop** | **Kharif** | | | | **Rabi** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Standard** | **Urd** | **Sesamum** | **Moong** | **Arhar** | **Pea** | | **Gram** | **Wheat** | **Lentil** | **Mustard / Rai** | **Linseed** |
| | | | | | **Field Pea** | **Grain** | | | | | |
| More Profit | 5 | 7 | 7 | 6 | 5 | 4 | 7 | 6 | 6 | 4 | 5 |
| Suitability for rainfed condition | 9 | 8 | 8 | 5 | 9 | 9 | 9 | 6 | 4 | 6 | 7 |
| Less Insect/Pest & diseases | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 6 |
| Less risk | 8 | 8 | 7 | 5 | 8 | 8 | 8 | 8 | 6 | 5 | 5 |
| Less labour | 9 | 7 | 7 | 8 | 9 | 8 | 9 | 7 | 8 | 4 | 6 |
| Less weeds | 8 | 6 | 6 | 7 | 8 | 7 | 6 | 9 | 7 | 5 | 5 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No Irrigation required | 9 | 7 | 5 | 6 | 9 | 5 | 7 | 8 | 6 | 6 | 6 |
| Total | 54 | 49 | 45 | 43 | 54 | 47 | 52 | 51 | 44 | 37 | 40 |
| Rank | I | II | III | IV | I | IV | II | III | V | VII | VI |

**Livelihood interest of farm women (Max. 10 point)**

| **Livelihood options** / **Standard** | **Goat rearing** | **Agarbatti / Candle & Dona Pattal, Rope making** | **Preservation Fruit & vegetable** | **Tailoring Stitching Weaving** | **Poultry** | **Nursery** | **Organic Manure** | **Rabbit farming** | **Ranking** |
|---|---|---|---|---|---|---|---|---|---|
| Self dependency | 6 | 8 | 7 | 7 | 7 | 3 | 3 | 2 | **III** |
| More sellable | 8 | 8 | 7 | 5 | 8 | 7 | 2 | 1 | **I** |
| Less Labour | 6 | 5 | 6 | 6 | 5 | 4 | 1 | 6 | **IV** |
| Low cost | 8 | 5 | 6 | 7 | 6 | 6 | 0 | 0 | **II** |
| Less Time taking | 5 | 5 | 4 | 6 | 5 | 5 | 5 | 0 | **V** |
| **Ranking** | **I** | **II** | **V** | **IV** | **III** | **VII** | **VIII** | **VIII** | |

**Livelihood interest of rural youth (Max. 10 point)**

| **Livelihood options** / **Standard** | **Vermi unit** | **Seed production / Bank** | **Dairy (Cow Buffaloes)** | **Goat rearing** | **Poultry** | **Nursery** | **Organic Manure** | **Rabbit farming** | **Ranking** |
|---|---|---|---|---|---|---|---|---|---|
| Self dependency | 6 | 4 | 7 | 8 | 7 | 5 | 6 | 6 | **II** |
| More marketable | 7 | 2 | 7 | 6 | 8 | 4 | 4 | 5 | **III** |
| Less Labour | 5 | 1 | 6 | 8 | 5 | 6 | 5 | 4 | **IV** |
| Low cost | 4 | 3 | 4 | 7 | 7 | 5 | 3 | 5 | **V** |
| Less Time taking | 7 | 2 | 7 | 9 | 8 | 4 | 7 | 7 | **I** |
| **Ranking** | **VI** | **VIII** | **III** | **I** | **II** | **VII** | **IV** | **V** | |

### 3.3.2 Rural People's Knowledge

Major occupation of the micro-watershed is agriculture and animal husbandry and several indigenous technical know how had been practiced by the villagers of micro-watershed which are listed below. Wide scale adoption of the ITKs in a participatory mode will help to increase and stabilize production in the micro-watershed.

**A. In-situ moisture conservation practices**

| Indigenous/Local knowledge | Technical specification/ Improvements |
|---|---|
| • Summer ploughing is generally done<br>• Summer ploughing with desi plough. | • Summer ploughing is generally done across the slope of the field and sometimes along the slope in the month of April and May for increasing porosity and creating mini surface structure like ridge and furrows<br>• There is less runoff and soil loss due to more infiltration and less evaporation due to breaking of the capillaries and pulverization of soil.<br>• Availability of plant nutrients increases due to decomposition of crop residues, weeds etc.<br>• The summer ploughing with either *desi* plough (99%) or tractor drawn cultivator (1%) is one of the most common practices in rainfed farming areas of the micro watershed. |
| • *Kulying* is very common during rabi season: tillage operation by *kuly* for field preparation of *rabi* crops like chickpea, lentil etc. *Kulying* is started in *kharif* fallow land just after the recession of monsoon. | • *Kuly* is a bullock drawn blade harrow with blade of 75-90 cm length and weight of 15-20 kg. It can cover 1.5 ha land per day and has service life of 8 to 10 years. It carried out at a depth of 5-7 cm at 8-10 days interval at least 5 to 6 times prior to sowing of *rabi* crops.<br>• Due to repetitive ploughing, the soil is maintained good tilth and weeds are controlled.<br>• *Kulying* reduces evaporation losses and maintains soil moisture level by breaking the capillaries and pulverization of soil. |
| • *Kulphaing* is a common inter-culture operation carried out by *kulpha* in *kharif* crops cultivated in black series soils. | • *Kulphaing* is generally done once or twice during crop growing season, when there is a dry spell.<br>• *Kulpha* is modified form of *kuly* for intercultural operation and operated by a pair of bullocks. Generally, two *kulphas* are operated simultaneously to cover more area per unit time.<br>• The working depth varies from 3-5 cm depending upon the soil condition at the time of operation. It can be manufactured by village artisans and weighs 15-20 kg. |
| • Criss-cross ploughing done twice, firstly along the slope and secondly across the slope. | • The main objectives of criss-cross ploughing is to leave no part of field unploughed, as unidirectional ploughing often leaves some unploughed land between two adjacent furrows, and create a number of criss-cross mini surface water storage structure, which help in increasing the intake opportunity time of water infiltrate into the soil, improve soil moisture and reduce runoff from the field.<br>• At the time of ploughing, farmers deivides the whole field into a number of small blocks. The number and size depends upon the size of field and number of ploughs working in the field.<br>• The ploughing is started from the border of field and goes towards centre till a block/field is covered.<br>• Criss-cross ploughing is a very old indigenous tillage practice in the region, which helps in reducing runoff and soil loss. |
| • *Bundhi* (Earthen bund): formerly farmers of MWS area were doing this work, now this is not in working | • These structures are generally used to retain upslope water and silt. Retention of water behind the *bundhi* increases infiltration in the field by enhancing opportunity time, increase soil moisture regime and reduces runoff and soil loss.<br>• If *bundhi* is intact, there is deposition of silt behind the *bundhi* due to retension of surface runoff, which converts undulating field into nearly plain/level land, and the reclaimed land becomes |

| | |
|---|---|
| | more fertile.<br>• *Bundhies* must be strengthened with grasses and legumes having good soil binding capacity like *Dichanthium annulatum, Cenchrus ciliaris, Cynodon dectylon, Stylosanthes hamata, etc.* These plants apart from stabilizing the bundhies are also very good source of fodder for the cattle. |
| • *Pucca Bandha* (Stone): Old pucca *bandhas* were visible in the area with poor condition, now this is not in working | • MWS programme IWMP will executes this work.<br>• Like *bundhies, bandhas* retain water and silt, enable uniform distribution of rainwater, which increases infiltration in the field by enhancing opportunity time, increases soil moisture regime, reduces runoff and soil loss, converts undulating field into nearly plain/level land, and makes the land fertile.<br>• Most of these structures are unscientifically constructed, which has resulted in side cutting and damage. |

**B. Runoff management practices**

| **Indigenous/Local knowledge** | **Technical specification/ Improvement / Interventions** |
|---|---|
| • Talab (Pond)<br>• Talab is an embankment type pond of various sizes (smaller ponds called *talai*) constructed near human settlements or at depression site of village. | • The structure harvested huge amount of surface runoff, otherwise going waste, and thereby reduces soil loss and increases ground water recharge down below the open/tube well, and meets the water demand for irrigation, animal and domestic consumptions.<br>• Bed silt of the *talabs/talais* can be used for soil fertility improvement and construction/repair/maintenance of mud houses by the farmers. |
| • *Sagar* (Submergence bund) are large submergence bunds constructed as a barrier across the slope of catchment with a provision of *nikas* (sluice) for removing excess water. | • The harvested runoff from catchment is retained during the monsoon season behind the bund to recharge the soil profile. The harvested water is either lost through seepage and evaporation or it is drained out by September/October for sowing of *rabi* crops in the submerged area.<br>• Deposition of fertile soil and increase in moisture regime gives 70-80% higher *rabi* crop yields as compare to adjoining land without submergence bund.<br>• MWS programme IWMP will executes this work. |

**C. Crop production practices and animal husbandry**

| Indigenous/Local knowledge | Technical specification/ Improvement / Interventions |
|---|---|
| • Mixed cropping: lentil, chickpea, durum wheat and wheat crop sown mixed with linseed and mustard in *rabi.*<br>• Sorghum and Arhar mixed crop in *kharif.* | • Crops area growing under set row system without any scientific approach.<br>• Crops should be grown under row system.<br>• An optimum plant density of different crops should be maintained. |
| • Use of *Ghurey ki khad* (un-decomposed FYM) | • Farmers were using un-decomposed farm yard manure, which spread the weeds, insects/pest and disease incidence on the crop.<br>• Use of Vermi-compost, NADEP compost, green manuring etc. should be encouraged. |
| • Shaking of plant (Pigeonpea) | • During attack of *H. armigera* farmers shaking the plant. |
| • Use of Neem leaf & Kernel suspension | • During the attack of different insect/pest on crops they use suspension of neem leaf and kernel as well. |
| • Use of neem leaf in the storage of pulses and cereals | • Neem leaf suspension 10 kg leaf + 20 lit. water boiled when water remains 10 kg. This suspension used to treat the bags, room, windows and door where grains to be stored. Leaf of neem stored in shed for 10-15 days and used for grain storage approximate 50 to 100 gm per quintal of grain.<br>• Grains should be fully dry and have only 10-12% moisture in it. |
| • Animal husbandry<br>- Use of 8 Badi Ilaichi for adult buffaloes and cow for curing of fever.<br>- Rapeseed/Mustard seed used with curd/matha for gas/aphara in animals | • They use 8 badi ilaichi (large cardamum) with 100 gm gur and give two doses, one in the morning and one in the evening.<br>• 100 gm Rapeseed/Mustard seed crushed with stone and mixed in 2 lit. curd and matha for aphara and gas problem. |

### 3.4 Problem Identification

During the process of collecting the important information related to the micro-watershed village's socio-economic status and different enterprises practiced by the villagers, certain problems which have adverse effect both directly and indirectly on their economy are identified after having detailed discussion with participatory farmers groups.

#### 3.4.1 Prioritization of problems

Major factor responsible for low yield of all crops of micro-watershed

1. Less water availability
2. Undulating topography
3. Low fertility due to severe water erosion
4. Uncertain and erratic rainfall
5. Low water holding capacity of soils
6. Heavy weed problem at initial stage of crop growth particularly in *kharif*
7. Insect, pest and disease problem

8. Imbalance use of fertilizers
9. Use of local and desi varieties
10. Rat problem at maturity stage

### 3.4.5 Problem – cause analysis

Lentil is the major crop of the micro-watershed and as such cumulative pulses covers about 79 per cent area. During discussion it was narrated by the farmers of the area that production of lentil and other pulse crops gradually reduced due to the low water availability. Problem mentioned by the farmers were heavy weed infestation at initial stage, wilt problem in all pulses, use of local varieties, insects and pest, imbalance use of fertilizers, etc. Amongst these factors, low water availability is mainly responsible for low yield of all crops. There could be many more problems as mentioned above but of less significance.

# Chapter - 4
# Watershed Activity

## 4.1 Watershed Activities:

Watershed management as a strategy has been adopted by Government of India especially in the rain-fed regions of semi-arid tropical zones. These regions are characterized by low and undependable rain, low soil fertility, poor infrastructure development, low literacy and high incidence of migration. Several studies have identified that there is a dire need of a systematic and scientific approach to deal with watershed development. The common guidelines generate a fresh and flexible framework for the next generation watershed development.

### i) Cluster Approach

This envisages a broader vision of Geo-hydrological unit which involves treating a cluster of micro-watershed. The IWMP-XVII Project consists of four micro- watersheds namely 2C2A7a2c, 2C2A8d1c, 2C2A8e1a, 2C2A8e1d, 2C2A8e2a, 2C2A8e2b and 2C3A5h1a as their respective codes. Further IWMP-XVII watershed project is in continuation with other watershed projects namely Barata, Tilaetha, Nohatachhir, Kolwan, Tendol, Phutra and Bithari Projects this gives an element of continuation of the programme.

### ii) Base line Survey

To access the impact of any watershed development programme a detailed baseline survey has to be conducted. This acts a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, Bio-physical survey and Village level data collection from Barata, Tilaetha Nohatachhir, Kolwan, Tendol, and Bithari. Household census survey includes a detailed questionnaire which was been filled by visiting each and every household in the village. This gave in the details of the demographic profile of the village, the literacy percentage, SC/ST population, number of BPL household, cattle population, net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits.

Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, Cropping pattern, fertilizer used and various sources of irrigation in the field.

### iii) Participatory Rural Appraisal (PRA)

The past experience on soil and water conservation and other ongoing schemes have given tremendous input to focus on creating accountability of the stakeholders towards the programme. This has created an emphasis to include all the stakeholder communities and their local and indigenous Technological Knowledge (ITK) while planning for any activity. Participatory approach provides a new path for planning, implementing and monitoring and post- withdrawal activities with a complete accountability of the stakeholders. Various PRA techniques like resource mapping, social mapping, and season calendars were used to understand the physical and social orientation of the village in general and watershed in specific. These tools put the villagers in ease than the complicated questionnaires. Matrix ranking was used to identify various local vegetations (apt for afforestation), Fodders crops, various institution and their significance in the life of the farmers

### iv) Use of GIS and remote sensing for planning

Use of various high science tools has been promoted at various stages of watershed development.

#### a) Prioritization

Geographical Information System(GIS) has been used for prioritization process. Various layer maps were created like Geo-morphological, Soil, SC/ST population, Ground water Status, Drinking water situation Slope percent. These were all given proper weightage according to the DoLR specification. This helped in prioritization of various watershed areas.

#### b) Planning

A action plan matrix was formulated by State Level Nodal Agency (SLNA) taking into account various features like the slope percent, soil Depth, Soil Texture, Soil erosion in the area for wasteland, forest land and agricultural land. Global positioning System (GPS) was used to identify each and every water conservation. structures available in the project area. This was used to create a map. Contour Map

of vertical interval of 1 meter at a scale of 1:8000 was used for identifying various locations for soil and water conservation structures.

**c) Hydrological modeling**

Hydrology modeling technique was used for locating drainage, stream length, flow direction, sink, Flow accumulation. This model overlaid over cadastral map to calculate the catchment area of each structures like the check dam etc. This has helped to remove the human error which generally occurs while calculating the catchment area of a check dam.

## Table No. 4.1 Details of Scientific Planning and inputs in IWMP Projects

| S,No. | Scientific criteria/ inputs used | Whether scientific criteria was used |
|---|---|---|
| | **(A) Planning** | |
| | Cluster approach | Yes |
| | Whether technical back-stopping for the project has been arranged? **If** yes, mention the name of the Institute | |
| | Baseline survey | Yes |
| | Hvdro-geological survey | Yes |
| | Contour mapping | Yes |
| | Participatory Net Planning (PNP) | Yes |
| | Remote sensing data-especially soil! crop/ run-off cover | |
| | Ridge to Valley treatment | |
| | Online IT connectivity between | |
| | (1) Project and DRDA cell/ZP | Yes |

| | | |
|---|---|---|
| | (2) DRDA and SLNA | Yes |
| | (3) SLNA and DoLR | Yes |
| | Availability of GIS layers | |
| | 1. Cadastral map | Yes |
| | 2. Village boundaries | Yes |
| | 3. Drainage | Yes |
| | 4. Soil /Soil nutrient status) | Yes |
| | 5. Land use | Yes |
| | 6. Ground water status | Yes |
| | 7. Watershed boundaries | Yes |
| | 8. Activity | Yes |
| | Crop simulation models# | No |
| | Integrated coupled analyzer/near infrared visible spectroscopy/medium spectroscopy for high | No |
| | speed soil nutrient analysis | No |
| | Normalized difference vegetation index (NDVI)# | No |
| | Weather Station | |
| | **(B) Inputs** | No |
| | 1. Bio-pesticides | No |
| | 2. Organic manures | Yes |

| | | |
|---|---|---|
| | 3. Vermicompost | Yes |
| | 4. Bio-fertilizer | Yes |
| | 5. Water saving devices | Yes |
| | 6. Mechanized tools/ implements | Yes |
| | 7. Bio-fencing | Yes |
| | 8. Nutrient budgeting | Yes |
| | 9. Automatic water level recorders & sediment samplers | No |
| | Any other (please specify) | No |

## 4.2 Institution building

**4.2.1 Project Implementing Agency**

The Project Implementing Agency (PIA) is Bhoomi Sanrakhan Adhikari, National Watershed Chirgaon Jhansi. The PIA was given responsibility to develop the micro-watershed by District Watershed Development Unit (DWDU) and State Level Nodal Agency (SLNA) considering its vast experiences in handling land and water management issues in the region. The PIA has well experienced trained and sufficient staff to handle the watershed management programme efficiently. In addition the PIA has access for technical backstopping from the ICAR viz. IGFRI and NRCAF, and KVK located at Jhansi. Details of PIA are presented in subsequent section.

**Table- 4.2: Details of Project Implementing Agency**

| Sr. No. | Particulars of PIA | |
|---|---|---|
| 1 | Name of organization | Department of Agricultur, Uttar Pradesh |
| 2 | Designation & Address | Bhoomi Sanrakshan Adhikari,N.W. Chirgaon, IWMP-XVII<br>District -Jhansi |
| 3 | Telephone/Mobil No. | BSA- 09415478673<br>JE - 09452119449<br>JE – 09450079438 |
| 4 | Fax | NA |
| 5 | E-mail | NA |

**Table- 4.3.: Details of Staff at Project Implementing Agency**

| Sr. No. | Name | Designation | Experience (Years) |
|---|---|---|---|
| 1 | Dr. A. N. Panday | B.S.A. | 18 |
| 2 | Er B. V. Singh | Junior Engineer | 28 |
| 3 | Er. K.K. Khare | Junior Engineer | 25 |
| 4 | Laxman Bhaskar | Pariyojana Prabhari | 30 |
| 5 | Rewati Singh | Pariyojana Prabhari | 28 |
| 6 | Mahendra Singh Rana | Pariyojana Prabhari | 27 |
| 7 | Gulab Singh Yadav | Pariyojana Prabhari | 25 |
| 8 | Rama Kant Sharma | Pariyojana Prabhari | 24 |
| 9 | D.N.Kaushal | Pariyojana Prabhari | 20 |
| 10 | Santosh Kumar Niranjan | Pariyojana Prabhari | 18 |
| 11 | Ashok Kumar Gupta | Pariyojana Prabhari | 25 |
| 12 | C.P Singh | Pariyojana Prabhari | 27 |
| 13 | Anil Kumar Shrivastava | Accountant | 30 |
| 14 | Shri Ajeet Kumar | Draftman | 28 |
| 15 | Shri Mansa Ram | Senior Clerk | 25 |
| 16 | Shri Satyaveer | Computer Operator | 22 |
| 17 | Hukum Singh Yadav | Pariyojana Prabhari | 25 |
| 18 | Sobaran Singh | Pariyojana Prabhari | 28 |
| 19 | Vijay Singh Nirajn | Pariyojana Prabhari | 26 |
| 20 | Rajendra Singh Niranjan | Pariyojana Prabhari | 14 |
| 21 | Satya Narayan Dixit | Pariyojana Prabhari | 13 |
| | | | |

**Table 4.4: Details of Watershed Development Team (WDTs)**

| Sr. No. | Name of the PIA | Names of WDT members | M/F# | Age | Qualification / Experience |
|---|---|---|---|---|---|
| 1. | BSA, ( N W ) Chirgaon Jhansi | Dr. A.N Panday | M | 48 | M.s.c ( Ag ) P.h.d |
| | | Sr B. B. Singh | M | 53 | Ag. Engeeniearing Diploma |
| | | Satya Narayan Dixit | M | 42 | B.s.c ( Ag.) |
| | | Er. K.K. Khare | M | 50 | Civil Eng. Diploma |

# M – Male, F – Female

**i) Watershed Committee (WC)**

It is a committee that is constituted by Gram Sabha to implement the watershed project with technical support of WDT in the village. This committee will registered under society Registration Act 1860. The Gram Sabha of the village selects the chairman of the watershed committee with the secretary who will be a paid functionary. The watershed Committees will be formed accordingly in all villages of watershed. Since the watershed has only on village so no separate watershed sub-committee was formed in the village. Capacity building training to the watershed committee is given by WDT.

## Table No. : Watershed Committee details

| Sl. No. | Names of WCs | Date of Registration as a Society | Name | Designation | M/F | SC | ST | SF | MF | LF | Land less | UG | SHG | GP | Any other | Educational qualification | Function/s assigned# |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2C2A7a2c/Barata | Under Progress | Shi Vijay singh | **President** | M | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,, Har prasad | **Secretary** | M | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | | **Member** | 7M/1F | 2 | 0 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | B.C. | | Farmer |
| 2 | 2C2A8d1c/Tilaetha | | ,, Vinay kumar | **President** | M | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,, Mahes kumar | **Secretary** | M | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | | **Member** | 7M/1F | 4 | 0 | 3 | 1 | 3 | 1 | 2 | 1 | 1 | B.C. | | Farmer |
| 3 | 2C2A8e1a/Nohatachhir | | ,, Ritu raj singh | **President** | M | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,,Banvali | **Secretary** | M | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | | **Member** | 7M/1F | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | B.C. | | Farmer |
| 4 | 2C2A8e1d/ Phu.Bar.Sa,Kolwan | | ,, Santaram | **President** | M | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,, Suresh kumar | **Secretary** | M | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | B.C. | B.A | Farmer |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Member** | 7M/1F | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | B.C. | | Farmer |
| 5 | 2C2A8e2a/Tendol | | ,, Jagat singh | **President** | M | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,, Vipin kumar | **Secretary** | M | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | B.C. | B.A | Farmer |
| | | | | **Member** | 7M/1F | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 1 | 0 | B.C. | | Farmer |
| 6 | 2C2A8e2b/Phu.Bar.Sa | | ,, Narayan das | **President** | M | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | B.C. | B.A | Farmer |
| | | | ,, Dipak kumar | **Secretary** | M | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | B.C. | B.A | Farmer |
| | | | | **Member** | 6M/2F | 2 | 0 | 0 | 2 | 2 | 1 | 2 | 1 | 0 | B.C. | | Farmer |
| 7 | 2C3A5h1a/Bithari | | ,,Manohar singh | **President** | M | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | B.C. | B.A | Farmer |
| | | | ,,Jamuna patel | **Secretary** | M | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | B.C. | B.A | Farmer |
| | | | | **Member** | 7M/1F | 3 | 0 | 1 | 3 | 2 | 2 | 1 | 1 | 1 | B.C. | | Farmer |

# Chapter -5

## PHASING OF PROGRAMME AND BUDGETING

### 5.1 Finanacial phasing including administrative cost

**Financial Phasing – IWMP-XVII, (MWS-07)**

| Sr. No. | Particulars | 1st Year | 2nd Year | 3rd Year | 4th Year | Total |
|---|---|---|---|---|---|---|
| **1** | Administrative Cost-10% | 13.239 | 13.239 | 13.24 | 13.24 | 52.958 |
| **2** | Monitering-1% | 1.324 | 1.324 | 1.324 | 1.324 | 5.296 |
| **3** | Evalution-1% | 1.324 | 1.324 | 1.324 | 1.324 | 5.296 |
| **4** | Entry Point Activity-4% | 21.183 | - | - | - | 21.183 |
| **5** | Institution & Capacity Building-5% | 8.826 | 8.826 | 8.826 | - | 26.478 |
| **6** | DPR-1% | 5.296 | - | - | - | 5.296 |
| **7** | Watershed Dev. Work-50% | 29.655 | 88.969 | 88.969 | 88.969 | 296.562 |
| **8** | Livelihood Activity-10% | 0 | 23.831 | 23.831 | - | 47.662 |
| **9** | Production System & Micro enterprises-13% | 13.239 | 13.239 | 13.24 | 13.24 | 52.958 |
| **10** | Consolidation-5% | - | 0 | 0 | 15.887 | 15.887 |
| | **Total** | **94.086** | **150.752** | **150.754** | **133.984** | **529.576** |

### 1.2 Monitoring and Evaluation

Monitoring of the project will be done at each stage and it will be carried out for both, process and outcome. Some community members will be trained and will be involved in participatory monitoring of various parameters and processes and the crop yields. The interventions, expenditure and other information will be displayed in the watershed Micro-watershed through wall writings. Besides trained community members, PIA/DWDU will also monitor the physical and financial progress of watershed development programme. Frontier technologies viz. GIS and

Remote Sensing techniques will be used by the PIA/DWDU for monitoring and evaluation. The PIA shall submit quarterly progress reports (countersigned by the Watershed Committee (WC) President) to the DWDU for further submission to the SLNA. Sustainable and unbiased monitoring will be ensured by involving an independent agency. About 1 per cent of the total budget will be used on this activity.

**5.2.1Plan for Evaluation**

Watershed development activities bring about both tangible and intangible benefits. In order to quantify the benefits, impact analysis has been proposed.

**Theme**

It is presumed that as a consequence of watershed development activities there will be noticeable change in socio-economic status of inhabitants, cropping intensity, ground water recharge, crop diversification, fuel, fodder and small timber availability, livestock composition and milk production, etc. These indicators can be gauged over bench mark data both at the beginning and at the end of the project within the watershed.

**Observations**

The following indicators will be taken into account for quantitative and qualitative assessment. For the purpose, detailed questionnaires will be prepared and field observations will be carried out.

- Duration of availability of drinking water/irrigation and groundwater recharge
- Irrigation frequency and area under irrigation
- Changes in cropping pattern and cropping systems in the farmers fields along with productivity and incomes
- Soil health
- Satellite monitoring for vegetation cover and other parameters
- Fuel, fodder and small timber availability
- Livestock composition and productivity
- Periodic pest and disease monitoring will be done in major crops
- Socio-economic aspects including resource inventory
- Following indices will also be worked out as qualitative indicators of the watershed development:
- Land Improvement Index (LII)
- Crop Diversification Index (CDI)
- Cultivated Land Utilization Index (CLUI)
- Crop Fertilization Index (CFI)
- Induced Watershed Eco-Index (IWEI)

The concurrent and post-project monitoring and evaluation would be conducted to assess the status of watershed related interventions. It will be done by an independent agency having similar experiences. About 1 per cent of the total budget will also be used on evaluation.

**5.3 Physical and Financial-Targets and Outlays**

| S. No. | Activities | Nos./area | Amount (Rs. In Lakh) |
|---|---|---|---|
| **1** | **Preparatory Phase** | | |
| | Entry Point Programme | - | 21.183 |
| | Institution & Capacity building | As per details in chapter 6 | 26.478 |
| | | **Total** | **47.661** |
| **2** | **Watershed Works Phase** | | **0** |
| | Field/Contour /Graded Bunds (FB/CB/GB) | 1323.94 | 66.196 |
| | Marginal Bunds (MB), Peripheral Bunds (PB), Submerged Bunds (SB) | 1985.9 | 119.54 |
| | Earthen Check Dam (CD)/ Gully plug/ Water harvesting bunds (WHB) | 1103.29 | 62.826 |
| | Checkdam/Drop Structure | 14 | 27.9 |
| | Drop spillway | 21 | 20.1 |
| | Field drainage structures | 0 | 0 |
| | Gabion | 0 | 0 |
| | Well recharge unit | 0 | 0 |
| | **Through PIA** | 4413.13 | 296.562 |
| | **Through Convergence*** | **0** | |
| | | | |
| **3** | **Livelihood Activities** | As per details in chapter 7 | **47.662** |
| **4** | **Production System** | | |
| | **Agriculture Production system** | | |
| | Demonstration** | 350 | 21 |
| | On Farm Testing** | | 6 |
| | Seed Multiplication by community | 65ha | 7.558 |
| | Vegetable production | 132ha | 13.20 |
| | **Horticulture** | | 0 |
| | Demonstration | 280 | 4.20 |

| | | | |
|---|---|---|---|
| | Orchard/Planatation (Fruit tree/Forest seedlings ) | 14 ha | 2.10 |
| | **Animal Husbandry** | | |
| | Animal camps | | |
| | Local Tharparkar / Gir Bull Breeding | 700 | 3.50 |
| | **Agroforestry** | **140** | 1.40 |
| | Aonla based | | |
| | Guava based | | |
| | Lemon based | | |
| | Bael based | | |
| | Ber based | | |
| | | | |
| | Through PIA | | **52.958** |
| | **Convergence*** | | |
| | | | |
| | **Project Cost** | | |
| | Preparatory Phase | | |
| | Administrative Cost-10% | | 52.958 |
| | Evalution-1% | | 5.296 |
| | DPR-1% | | 5.296 |
| | Monitoring - 1% | | 5.296 |
| | Consolidation-3% | | 15.887 |
| | Activities under IWMP | | **529.576** |
| | **Total PIA** | | **529.576** |
| | **Total Convergence*** | | **0** |
| | **Total Project Cost** | ` | **529.576** |
| ***Convergence under MNREGA, NHM, FSM, ATMA etc** | | | |

## 5.4 Year wise phasing of interventions/activities for development of watershed

| Physical Target for Watershed Works | | | Year | | | | |
|---|---|---|---|---|---|---|---|
| Activity | | | 2011-12 | 2012-13 | 2013-14 | 2014-15 | Total |
| Land Development | Agro-forestry | ha | 35 | 35 | 35 | 35 | 140 |
| | Horticulture | ha | 3.50 | 3.50 | 3.50 | 3.50 | 14.00 |
| | Agriculture | ha | 49.25 | 49.25 | 49.25 | 49.25 | 197.00 |
| | Pasture | ha | 0 | 0 | 0 | 0 | |
| Soil Moisture Conservation (SMC) | Contour Farming/Contour Bunding/ Graded Bunding/ Field Bunding | ha | 132.4 | 397.18 | 397.18 | 397.18 | 1323.94 |
| Engineering Measures | Earthen Checks(SB/PB/MB) | cu.m. | 29000 | 87001 | 87002 | 87002 | 290005 |
| | Gully Plugs /WHB/CD | cu.m. | 13103 | 39307 | 39307 | 39307 | 131024 |
| | Gabion Structures | No | 0 | 0 | 0 | 0 | 0 |
| | Field Drainage Structures | No | 0 | 0 | 0 | 0 | 0 |
| | Drop Spill Way / Checkdam | No | 5 | 10 | 10 | 10 | 35 |
| | Well Recharge Unit | No | 0 | 0 | 0 | 0 | 0 |
| Livelihood | No. of on farm activates | No | 0 | 14 | 14 | 0 | 28 |
| | No. of beneficiaries | No | 0 | 1605 | 1605 | 0 | 3210 |
| | No. of off-farm activities | No | 0 | 17 | 17 | 0 | 34 |
| | No. of beneficiaries | No | 0 | 1375 | 1375 | 0 | 2750 |
| Production System | Area | ha | 684.54 | 684.54 | 684.54 | 684.54 | 2738.16 |
| | No. of beneficiaries | No | 540 | 540 | 540 | 540 | 2160 |

## 5.5 Year wise financial phasing of interventions/activities for development of watershed

| **Financial Target for Watershed Works** | | | **Unit** | **Year** | | | | **Rs in lacs** |
|---|---|---|---|---|---|---|---|---|
| Activity | | **Quantity** | | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **Total** |
| Land Development | Agroforestry | 140 | Ha | 0.35 | 0.35 | 0.35 | 0.35 | 1.40 |
| | Horticulture | 14 | Ha | 0.525 | 0.525 | 0.525 | 0.525 | 2.10 |
| | Agriculture | 197 | Ha | 5.188 | 5.190 | 5.190 | 5.190 | 20.758 |
| | Pasture | 0 | Ha | 0 | 0 | 0 | 0 | 0 |
| Soil Moisture Conservation (SMC) | Contour Farming/Contour Bunding/ Graded Bunding/ Field Bunding | 1323.94 | Ha | 6.619 | 19.859 | 19.859 | 19.859 | 66.196 |
| Vegetative and | Earthen Checks | 290005 | cum | 11.954 | 35.862 | 35.862 | 35.862 | 119.54 |
| Engineering Measures | Gully Plugs | 131024 | cum | 6.282 | 18.848 | 18.848 | 18.848 | 62.826 |
| | Gabion Structures | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | Field Drainage Structures | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | Drop Spill Way / Checkdam | 35 | No. | 4.8 | 14.40 | 14.40 | 14.40 | 48 |
| | Well Recharge Unit | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | **To tal** | | | | 0 | 0 | 0 | 0 |
| **Livelihood** | **No. of on farm activates** | 28 | No | | 11.915 | 11.915 | 0 | 23.83 |
| | **No. of beneficiaries** | 3210 | No | - | - | - | - | |
| | **No. of off-farm activities** | 34 | No | | 11.916 | 11.916 | 0 | 23.832 |
| | **No. of beneficiaries** | 2750 | No | - | - | - | - | |
| **Production System** | **Area** | 2738.19 | ha | 7.175 | 7.175 | 7.175 | 7.175 | 28.7 |
| | **No. of beneficiaries** | 2160 | No | | - | - | - | |
| | **Total** | 433659.13 | | 42.893 | 126.04 | 126.04 | 102.209 | 397.182 |

### 5.6 Plan of Convergence

Several schemes viz. MGNREGS, ATMA, Food Security Mission, NHM, etc. of Central and State Govt. are running in project area. To make the watershed programme successful.

### 5.6.1 Year wise phasing of interventions/activities for development of watershed under convergence

| **Physical Target for Watershed Works** | | | **Year** | | | | |
|---|---|---|---|---|---|---|---|
| **Activity** | | | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **Total** |
| **Land Development** | Agro-forestry | ha | 0 | 0 | 0 | 0 | 0 |
| | Horticulture | ha | 0 | 0 | 0 | 0 | 0 |
| **Soil Moisture Conservation (SMC)** | Contour Farming/Contour Bunding/ Graded Bunding/ Field Bunding | ha | 0 | 0 | 0 | 0 | 0 |
| **Engineering Measures** | Earthen Checks | cu.m. | 0 | 0 | 0 | 0 | 0 |
| | Gabion Structures | No | 0 | 0 | 0 | 0 | 0 |
| | Field Drainage Structures | No | 0 | 0 | 0 | 0 | 0 |
| | Drop Spill Way / Checkdam | No | 0 | 0 | 0 | 0 | 0 |
| **Production System** | Area | ha | 0 | 0 | 0 | 0 | 0 |
| | No. of beneficiaries | No | 0 | 0 | 0 | 0 | 0 |

### 5.6.2 Year wise financial phasing of interventions/activities for development of watershed under convergence

| **Financial Target for Watershed Works** | | **Quantity** | **Unit** | **Year** | | | | **Rs in lacs** |
|---|---|---|---|---|---|---|---|---|
| Activity | | | | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **Total** |
| Land Development | Agroforestry | 0 | Ha | 0 | 0 | 0 | 0 | 0 |
| | Horticulture | 0 | Ha | 0 | 0 | 0 | 0 | 0 |
| Soil Moisture Conservation (SMC) | Contour Farming/Contour Bunding/ Graded Bunding/ Field Bunding | 0 | Ha | 0 | 0 | 0 | 0 | 0 |
| Vegetative and | Earthen Checks | 0 | cum | 0 | 0 | 0 | 0 | 0 |
| Engineering Measures | Gabion Structures | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | Field Drainage Structures | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | Drop Spill Way / Checkdam | 0 | No. | 0 | 0 | 0 | 0 | 0 |
| | **To tal** | 0 | | 0 | 0 | 0 | 0 | 0 |
| **Production System** | **Area** | 0 | ha | 0 | 0 | 0 | 0 | 0 |
| | **No. of beneficiaries** | 0 | No | 0 | 0 | 0 | 0 | 0 |
| | **Total** | | | 0 | 0 | 0 | 0 | 0 |

## 5.7 Benefit Cost Analysis:

**Crop outcomes**
**Pre Project Scenerio**

| S.No. | Name of Crop (Season wise) | Area (ha) | Production (quintal) | Productivity q/ha | Cost/ ha | Rate Rs/q | Gross Return Rs | Total Cost Rs | Net Return | Net Return /ha | B:C Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Til (Sesamum) | 610.00 | 1037.00 | 1.70 | 5500 | 6500 | 6740500 | 3355000 | 3385500 | 5550 | 2.0 |
| 2 | Urd | 550.00 | 1870.00 | 3.40 | 7500 | 4200 | 7854000 | 4125000 | 3729000 | 6780 | 1.9 |
| 3 | Moong | 520.00 | 1612.00 | 3.10 | 7750 | 4600 | 7415200 | 4030000 | 3385200 | 6510 | 1.8 |
| 4 | Arhar | 70.00 | 441.00 | 6.30 | 9580 | 4350 | 1918350 | 670600 | 1247750 | 17825 | 2.9 |
| 5 | Jawar | 180.00 | 864.00 | 4.80 | 4500 | 1400 | 1209600 | 810000 | 399600 | 2220 | 1.5 |
| 6 | Jawar + Arhar | 75.00 | 570.00 | 7.60 | 8544 | 3250 | 1852500 | 640800 | 1211700 | 16156 | 2.9 |
| | **Total** | **2005.00** | **6394.00** | | | | | | | | |
| 1 | Lentil | 850.00 | 4802.50 | 5.65 | 8850 | 3850 | 18489625 | 7522500 | 10967125 | 12903 | 2.5 |
| 2 | Field Pea | 800.00 | 5800.00 | 7.25 | 7520 | 3200 | 18560000 | 6016000 | 12544000 | 15680 | 3.1 |
| 3 | Chickpea | 720.00 | 4579.20 | 6.36 | 7985 | 3150 | 14424480 | 5749200 | 8675280 | 12049 | 2.5 |
| 4 | Wheat | 750.00 | 14062.50 | 18.75 | 11250 | 1275 | 17929688 | 8437500 | 9492188 | 12656 | 2.1 |
| 5 | Barley | 250.00 | 4300.00 | 17.20 | 9850 | 1025 | 4407500 | 2462500 | 1945000 | 7780 | 1.8 |
| 6 | Linseed + Chickpea (Mixed) | 120.00 | 942.00 | 7.85 | 9845 | 3650 | 3438300 | 1181400 | 2256900 | 18808 | 2.9 |
| 7 | Linseed + Lentil (Mixed) | 110.00 | 709.50 | 6.45 | 8954 | 3860 | 2738670 | 984940 | 1753730 | 15943 | 2.8 |
| 8 | Mustard / Rai | 250.00 | 1125.00 | 4.50 | 9586 | 3650 | 4106250 | 2396500 | 1709750 | 6839 | 1.7 |
| | **Total** | **3850.00** | **36320.70** | | | | | | | | |
| | **Single crop Area** | **2135.00** | | | | | | | | | |
| | **Double crop area** | **1860.00** | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Cucurbits, Cole crops, Egg Plant, Tomato, Potato etc) | 36 | 3270 | 90.83 | 13000 | 500 | 1635000 | 468000 | 1167000 | 32417 | 3.5 |
| | | | | | | | 112719663 | 48849940 | 63869723 | | 2.31 |
| | Total No. of families | 3380 | Per family Net Return from Agriculture | | 18896 | | | | | | |
| | Total cultivable area in MWS | | 5020.00 | | Over All B:C | | 2.31 | | | | |
| | Cropping Intensity | 117.35 | % | | | | | | | | |

**Post Project Scenario**

| S.No. | Name of Crop (Season wise) | Area (ha) | Production (quintal) | Productivity q/ha | Cost/ ha | Rate Rs/q | Groos Return Rs | Total Cost Rs | Net Return | Net Return /ha | B:C Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Til (Sesamum) | 762.50 | 1486.88 | 1.95 | 5800 | 6500 | 9664688 | 4422500 | 5242188 | 6875 | 2.2 |
| 2 | Urd | 687.50 | 2509.38 | 3.65 | 7600 | 4500 | 11292188 | 5225000 | 6067188 | 8825 | 2.2 |
| 3 | Moong | 650.00 | 2353.00 | 3.62 | 7800 | 4950 | 11647350 | 5070000 | 6577350 | 10119 | 2.3 |
| 4 | Arhar | 87.50 | 568.75 | 6.50 | 10350 | 4450 | 2530938 | 905625 | 1625313 | 18575 | 2.8 |
| 5 | Jawar | 225.00 | 1170.00 | 5.20 | 6500 | 1650 | 1930500 | 1462500 | 468000 | 2080 | 1.3 |
| 6 | Jawar + Arhar | 93.75 | 731.25 | 7.80 | 9544 | 3890 | 2844563 | 894750 | 1949813 | 20798 | 3.2 |
| | **Total** | **2506.25** | 8819.25 | | | | | | | | |
| 1 | Lentil | 977.50 | 5649.95 | 5.78 | 9105 | 4560 | 25763772 | 8900138 | 16863635 | 17252 | 2.9 |
| 2 | Field Pea | 920.00 | 6716.00 | 7.30 | 7842 | 3360 | 22565760 | 7214640 | 15351120 | 16686 | 3.1 |
| 3 | Chickpea | 828.00 | 5878.80 | 7.10 | 8023 | 3275 | 19253070 | 6643044 | 12610026 | 15230 | 2.9 |
| 4 | Wheat | 862.50 | 17388.00 | 20.16 | 12620 | 1450 | 25212600 | 10884750 | 14327850 | 16612 | 2.3 |
| 5 | Barley | 287.50 | 5836.25 | 20.30 | 10236 | 1250 | 7295313 | 2942850 | 4352463 | 15139 | 2.5 |
| 6 | Linseed + Chickpea (Mixed) | 138.00 | 1135.74 | 8.23 | 10236 | 3750 | 4259025 | 1412568 | 2846457 | 20627 | 3.0 |
| 7 | Linseed + Lentil (Mixed) | 126.50 | 931.04 | 7.36 | 9456 | 4012 | 3735332 | 1196184 | 2539148 | 20072 | 3.1 |
| 8 | Mustard / Rai | 287.50 | 1566.88 | 5.45 | 9541 | 3785 | 5930622 | 2742911 | 3187711 | 11088 | 2.2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Total** | **4427.50** | **45102.66** | | | | | | | | |
| | **Single crop Area** | **2695.00** | | | | | | | | | |
| | **Double crop area** | **2325.00** | | | | | | | | | |
| | (Cucurbits, Cole crops, Egg Plant, Tomato, Potato etc) | 54 | 5950.8 | 110.20 | 15260 | 650 | 3868020 | 824040 | 3043980 | 56370 | 4.7 |
| | | | | | | | 157793739 | 60741500 | 97052239 | | 2.60 |
| | Total No. of families | 3380 | Per family Net Return from Agriculture | | 28714 | | | | | | |
| | | | | | | | | | | | |
| | Total cultivable area in MWS | | 5020.00 | | Over All B:C | | 2.60 | | | | |
| | Cropping Intensity | 139.20 | % | | | | | | | | |

**Animal outcomes**
**Pre Project Scenerio**

| Particulars | Cows | Buffaloes | Goat | Bullocks |
|---|---|---|---|---|
| Total Animals in Micro watershed Area | 3500 | 5500 | 10500 | 550 |
| Milking Animals | 1420 | 2150 | 3500 | |
| Average Milk Production Lit. / day | 1846 | 520.8 | 140 | |
| Average Milk Production /Animal/ day | 1.3 | 3.5 | 0.4 | |
| Sale of Milk per day (Rs) @ Rs 15/Lit | 27690 | 7812 | 2100 | |
| **Average 150 day milking days & Goat 90 days in a year (Total Rs)** | **4153500** | **78120** | **12600** | |
| Meat Animals | | | 2400 | |
| Average rate of one kids Rs | | | 2500 | |
| **Total Sale in a year Rs** | | | **6000000** | |
| Working Animals (Bullocks) | | | | 550 |
| One year work one agriculture fields 180 days @ 200/ day (One pair) | | | | 36000 |
| **Total Work value of all working animals** | | | | **9900000** |
| **Total value earned by animals in a year** | | | | **20144220** |
| **Total INCOME/FAMILY** | 3380 | | | 5959.83 |
| Total Expenditure / family | | | | 7000 |
| B:C Ratio | | | | 0.85 |

**Post Project Scenario**

| Particulars | Cows | Buffaloes | Goat | Bullocks |
|---|---|---|---|---|
| Total Animals in Micro watershed Area | 5500 | 7000 | 11500 | 750 |
| Milking Animals | 1620 | 3500 | 5000 | |
| Average Milk Production Lit. / day | 2592 | 12600 | 2500 | |
| Average Milk Production /Animal/ day | 1.6 | 3.6 | 0.5 | |
| Sale of Milk per day (Rs) @ Rs 15/Lit | 38880 | 189000 | 37500 | |
| **Average 150 day milking days & Goat 90 days in a year (Total Rs)** | **5832000** | **1890000** | **225000** | |
| Meat Animals | | | 3500 | |
| Average rate of one kids Rs | | | 2800 | |
| **Total Sale in a year Rs** | | | **9800000** | |
| Working Animals (Bullocks) | | | | 750 |
| One year work one agriculture fields 180 days @ 200/ day (One pair) | | | | 36000 |
| **Total Work value of all working animals** | | | | **13500000** |
| **Total value earned by animals in a year** | | | | **31247000** |
| Total INCOME/FAMILY | 3380 | | | 9244.67 |
| Total Expenditure / family | | | | 7080 |
| B:C Ratio | | | | 1.31 |

| Net Income / Family | Pre Project Scenerio | Post Project Scenario |
|---|---|---|
| Agriculure | 18896 | 28714 |

| | | |
|---|---|---|
| Animal Husbandry | 5960 | 9245 |
| **Total (Ag+AH)** | **24856** | **37958** |
| **Over All B:C of MWS** | **Pre Project Scenerio** | **Post Project Scenario** |
| Agriculure | 2.31 | 2.60 |
| Animal Husbandry | 0.85 | 1.31 |
| Over All B: C MWS | **1.58** | **1.95** |

# CHAPTER-6

## CAPACITY BUILDING PLAN

The capacity building of various stake holders will be given very high priority as the watershed is to be developed in participatory mode. Capacity building initiative plays very important role in human resource development of model watershed to replicate and train other watershed resource persons. The capacity building initiatives include training to NARS, government officials, CBOs, farmers and PIAs through field days, hands-on trainings, exposure visits to successful watersheds, training materials and etc. Need-based specialized training courses will be conducted. The details of the training is summarized in Table 6.1.

**Table- 6.1: List of probable training institutes for capacity building**

| Sr. No. | Name of the Training Institute | Full Address with contact no, website & e-mail | Designation of the Head of Institute | Type of Institute | Area(s) of specialization |
|---|---|---|---|---|---|
| 1. | Krishi Vigyan Kendra | Bharari, P.O.- Bhojla, Jhansi | Programme Coordinator | Ag. University | Extension |
| 2. | National Research Centre for Agro-Forestry | Gwaliar Road, Jhansi *www.nrcaf.ernet.in* | Director | ICAR (GoI) | Agro-Forestry/ Watershed Research and management |
| 3. | Indian Grass Land & Fodder Research Institute | Gwaliar Road, Jhansi | Director | ICAR (GoI) | Grass Land & Fodder Research |
| 4. | Bundelkhand University (Agriculture Division) | Kanpur Road, Jhansi | Head (Agronomy) | State University | Teaching & Training |
| 5. | Govt. Agriculture School | Chirgaon, Jhansi | DD (Ag.) | State Govt. | Training to Farmers |
| 6. | Govt. Poly-technique | Gwaliar Raod, Jhansi | Principal | State Govt. | Draft man training |
| 7. | ITI | ITI, Colony, Jhansi | Principal | State Govt. | Draft man training |

**Table- 6.2: Training to stakeholders on participatory watershed management**

| Sl. No. | Client Group | Title of the Programme/Duration/ Time | Objectives | Coverage/Topics | Training Methodology | Training Institutions |
|---|---|---|---|---|---|---|
| 1. | Watershed Committee Members / Watershed Secretaries /Presidents / Field Staff etc | Participatory watershed management<br><br>Duration :<br>2 days on each topics | To familiarize the participants with various aspects of participatory management of watershed | Watershed concept,<br>Salient features of guidelines,<br>Organizing people's groups,<br>Conducting meetings,<br>Recording of proceedings,<br>Office Management,<br>Accounting Procedures,<br>Book keepings and accounts,<br>Maintenance of accounts and records,<br>Participatory Planning,<br>Preparation of schemes and estimates for SHGs,<br>Implementation of works and activities,<br>Assisting execution and recording of works,<br>Effecting timely payments<br>Awareness creation | Lectures on LCD<br>Case discussion<br>Group exercises<br>CDs & LCD Show | KVK/ Research institutes/ NGOs |

**Table 6.3: Title of trainings to be organized for members of WC /WDT/field staff**

| |
|---|
| Durum wheat and low water requiring wheat varieties screening and ICM<br>Interest of groups identification and implementation in collective manner.<br>Applied Vermi-culture, NADEP and composting technologies for livelihood<br>Advance vegetable production techniques<br>Fish culture in water harvesting structures<br>Post harvest and value addition |
| Advance oilseed production techniques.<br>Cultivation of medicinal and aromatic Plants.<br>Low cost feeding of milch animals<br>Integrated pest management in *kharif* and *rabi* pulses |
| Goatary, Dairy, rabbit farming and poultry development.<br>Integrated crop management in pulses and oilseeds |
| Advance pulse and oilseed production techniques |

| |
|---|
| Advance extension skills and use of GIS and GPS in watershed<br>Training on information technology<br>Computer in agriculture marketing (internet)<br>Fabrication of gabion<br>Construction of low cost checkdam, well recharging unit<br>Monitoring and evaluation of impact of watershed management<br>Preparation of reports, leaflets, bulletins, etc.<br>Documentation of success stories<br>Development of nursery tech. |

**Table 6.4: Title of trainings to be organized for members of WC/SHGs/UGs/AGs/WDT at local level**

| Title of the Programme & Duration | Objectives | Coverage/Topics | Training Institutions/Methodologies |
|---|---|---|---|
| Orientation Program on Participatory Planning and Management | • To enhance the technical and managerial capability of participants | • Watershed concept, need and program<br>• Salient features of guidelines<br>• Roles and Responsibilities<br>• Leadership building<br>• Conducting meeting<br>• Farming systems approach<br>• Participatory planning for developments<br>• Preparation of group plan and Action Plan<br>• Group Formation and Management<br>• Conservation and Production measures<br>• Management of CPR<br>• Post Project Management of created assets<br>• Financial Arrangements<br>• INM,IPM Practices<br>• Benefit sharing | KVK/ Research institutes/ NGOs<br>• Lecture-cum-discussions<br>• Practical exercise<br>• Demonstration<br>• Video film show<br>Field visit |

Capacity building programme will be continuous. For the sake of convenience each year may divided in two halves and training may be organized on the topics mentioned in table 6.5.

**Table 6.5: Title of trainings to be organized for stakeholders**

**First half yearly programme**

- Integrated Crop Management (ICM) of oilseeds and pulses of winter
- Integrated Crop Management (ICM in winter vegetables.

- Small Scale Dairy, goatary and poultry unit development for livelihood as option.
- Skill training on preservation of rural products (locally available) under household condition.
- Composite Fish Culture
- Production of Organic Mannure & their marketing
- Integrated pest management of wilt in pulses and gram pod borer in gram, yellow vein mosaic disease of urd and moong.
- Durum wheat and low water requiring wheat varieties screening and ICM
- Interest groups identification and implementation of units in collective manner.
- Applied Vermi-culture NADEP and composting technologies for livelihood and for sustainable development
- Integrated crop management in Groundnut and soybean
- Layout & plantation techniques of Aonla, Ber & Guava.
- Fodder production in *Kharif*
- Safe storage of grain and pulses
- Layout and construction / Rejuvenation of fishpond.

**Second half yearly programme**

- Integrated crop management in oilseed crops of *kharif* & *rabi* season
- Integrated crop management in vegetables of *kharif* season
- Green Fodder production in *Rabi*.
- Seed treatment and method of sowing in *Rabi* crops.
- Application of organic and inorganic fertilizers in fish culture ponds
- Soil and water conservation measures
- Control of collar rot disease in groundnut through seed treatment
- Integrated crop management in *Rabi* pulses.
- Integrated crop management in *Rabi* vegetables.
- Feeding technique of milch animals
- Balance use of feed fro fish production
- Low cost balanced feed for milch animals.
- Identification and eradication of weeds and predatory fish from pond.
- Seed treatment with bio-fertilizers
- Major disease and insect of mustard crop and their management

**Table 6.6 Income and employment generating training programs for SHGs**

Seed production technologies for pulses, cereals and oilseed
Preparation of organic manures
Off season vegetable growing
Back yard poultry farming
Seasonal fruit (Guava, Ber, Aonla) and vegetables (Tomato, Cauliflower, Pea) preservation, packing and marketing
Composite fish farming

Bee keeping management techniques
Value addition in pulses, oilseed, durum wheat (small scale)
Use of computer and communication technology for agriculture marketing.
Seed production of groundnut.
Vegetable nursery management.
Goatary management.
Mini dal mill
Value addition of different types of masala making, packing and marketing
Integrated fish culture cum horticultural crops

# Chapter -7

## PHASING OF PROGRAMME AND BUDGETING

### 7.1 Finanacial phasing including administrative cost

**Financial Phasing – IWMP-XVII, (MWS-07)**

| Sr. No. | Particulars | 1st Year | 2nd Year | 3rd Year | 4th Year | Total |
|---|---|---|---|---|---|---|
| **1** | Administrative Cost-10% | 13.239 | 13.239 | 13.24 | 13.24 | 52.958 |
| **2** | Monitering-1% | 1.324 | 1.324 | 1.324 | 1.324 | 5.296 |
| **3** | Evalution-1% | 1.324 | 1.324 | 1.324 | 1.324 | 5.296 |
| **4** | Entry Point Activity-4% | 21.183 | - | - | - | 21.183 |
| **5** | Institution & Capacity Building-5% | 8.826 | 8.826 | 8.826 | - | 26.478 |
| **6** | DPR-1% | 5.296 | - | - | - | 5.296 |
| **7** | Watershed Dev. Work-50% | 29.655 | 88.969 | 88.969 | 88.969 | 296.562 |
| **8** | Livelihood Activity-10% | 0 | 23.831 | 23.831 | - | 47.662 |
| **9** | Production System & Micro enterprises-13% | 13.239 | 13.239 | 13.24 | 13.24 | 52.958 |
| **10** | Consolidation-5% | - | 0 | 0 | 15.887 | 15.887 |
| | **Total** | **94.086** | **150.752** | **150.754** | **133.984** | **529.576** |

#### 1.4 Monitoring and Evaluation

Monitoring of the project will be done at each stage and it will be carried out for both, process and outcome. Some community members will be trained and will be involved in participatory monitoring of various parameters and processes and the crop yields. The interventions, expenditure and other information will be displayed in the watershed Micro-watershed through wall writings. Besides trained community members, PIA/DWDU will also monitor the physical and financial progress of watershed development programme. Frontier technologies viz. GIS and

Remote Sensing techniques will be used by the PIA/DWDU for monitoring and evaluation. The PIA shall submit quarterly progress reports (countersigned by the Watershed Committee (WC) President) to the DWDU for further submission to the SLNA. Sustainable and unbiased monitoring will be ensured by involving an independent agency. About 1 per cent of the total budget will be used on this activity.

**7.2.1Plan for Evaluation**

Watershed development activities bring about both tangible and intangible benefits. In order to quantify the benefits, impact analysis has been proposed.

**Theme**

It is presumed that as a consequence of watershed development activities there will be noticeable change in socio-economic status of inhabitants, cropping intensity, ground water recharge, crop diversification, fuel, fodder and small timber availability, livestock composition and milk production, etc. These indicators can be gauged over bench mark data both at the beginning and at the end of the project within the watershed.

**Observations**

The following indicators will be taken into account for quantitative and qualitative assessment. For the purpose, detailed questionnaires will be prepared and field observations will be carried out.

- Duration of availability of drinking water/irrigation and groundwater recharge
- Irrigation frequency and area under irrigation
- Changes in cropping pattern and cropping systems in the farmers fields along with productivity and incomes
- Soil health
- Satellite monitoring for vegetation cover and other parameters
- Fuel, fodder and small timber availability
- Livestock composition and productivity
- Periodic pest and disease monitoring will be done in major crops
- Socio-economic aspects including resource inventory
- Following indices will also be worked out as qualitative indicators of the watershed development:
- Land Improvement Index (LII)
- Crop Diversification Index (CDI)
- Cultivated Land Utilization Index (CLUI)
- Crop Fertilization Index (CFI)
- Induced Watershed Eco-Index (IWEI)

The concurrent and post-project monitoring and evaluation would be conducted to assess the status of watershed related interventions. It will be done by an independent agency having similar experiences. About 1 per cent of the total budget will also be used on evaluation.

**7.3 Physical and Financial-Targets and Outlays**

| S. No. | Activities | Nos./area | Amount (Rs. In Lakh) |
|---|---|---|---|
| **1** | **Preparatory Phase** | | |
| | Entry Point Programme | - | 21.183 |
| | Institution & Capacity building | As per details in chapter 6 | 26.478 |
| | | **Total** | **47.661** |
| **2** | **Watershed Works Phase** | | **0** |
| | Field/Contour /Graded Bunds (FB/CB/GB) | 1323.94 | 66.196 |
| | Marginal Bunds (MB), Peripheral Bunds (PB), Submerged Bunds (SB) | 1985.9 | 119.54 |
| | Earthen Check Dam (CD)/ Gully plug/ Water harvesting bunds (WHB) | 1103.29 | 62.826 |
| | Checkdam/Drop Structure | 14 | 27.9 |
| | Drop spillway | 21 | 20.1 |
| | Field drainage structures | 0 | 0 |
| | Gabion | 0 | 0 |
| | Well recharge unit | 0 | 0 |
| | **Through PIA** | 4413.13 | 296.562 |
| | **Through Convergence*** | **0** | |
| | | | |
| **3** | **Livelihood Activities** | As per details in chapter 7 | **47.662** |
| **4** | **Production System** | | |
| | **Agriculture Production system** | | |
| | Demonstration** | 350 | 21 |
| | On Farm Testing** | | 6 |
| | Seed Multiplication by community | 65ha | 7.558 |
| | Vegetable production | 132ha | 13.20 |
| | **Horticulture** | | 0 |

| | | | |
|---|---|---|---|
| | Demonstration | 280 | 4.20 |
| | Orchard/Plantation (Fruit tree/Forest seedlings ) | 14 ha | 2.10 |
| | **Animal Husbandry** | | |
| | Animal camps | | |
| | Local Tharparkar / Gir Bull Breeding | 700 | 3.50 |
| | **Agroforestry** | **140** | 1.40 |
| | Aonla based | | |
| | Guava based | | |
| | Lemon based | | |
| | Bael based | | |
| | Ber based | | |
| | | | |
| | Through PIA | | **52.958** |
| | **Convergence*** | | |
| | | | |
| | **Project Cost** | | |
| | Preparatory Phase | | |
| | Administrative Cost-10% | | 52.958 |
| | Evalution-1% | | 5.296 |
| | DPR-1% | | 5.296 |
| | Monitoring - 1% | | 5.296 |
| | Consolidation-3% | | 15.887 |
| | Activities under IWMP | | **529.576** |
| | **Total PIA** | | **529.576** |
| | **Total Convergence*** | | **0** |
| | **Total Project Cost** | ` | **529.576** |
| ***Convergence under MNREGA, NHM, FSM, ATMA etc** | | | |

# *Chapter -8*

## CONSOLIDATION AND WITHDRAWAL STRATEGY

**8. Consolidation and Withdrawal Strategy**

Success of any program depends on sustainability of the various watershed interventions and sustainability can only be achieved through active participation of community. Active participation and cooperation of community can be ensured by building their capacities through exposures and trainings. From the beginning emphasis will be on capacity building and empowerment of stakeholders. The Watershed Committee, SHGs, Area Groups, Users Group and other CBOs will be established, trained, and strengthened to continue development after withdrawal of PIA. By building economic activities through CBOs community participation will be sustained. The PR&D approach along with demand driven interventions will reduce dependency on subsidies. Contributions from the community will be ensured for the entire activities to develop sense of belongingness and these contributions will be deposited to the account of Watershed Development Fund. Watershed Development Fund will also be strengthening through donations from the individual and institutions and the CBOs will be trained to run watershed as business model on sustainable basis. The tangible economic benefits along with empowerment and hand holding by PIA will empower the CBOs to develop and sustain the watershed activities after withdrawal of the PIA. Community organizations will withdraw the money from the WDF to maintain the asset created during the implementation phase. The consolidation phase will also include writing of project completion report, documentation of success stories, making films, leaflets, bulletins and the lessons learnt. The expenditure will be done as per the Common Guidelines for Watershed Development Projects 2008.

# *Chapter -9*

## EXPECTED PROJECT OUTCOME

**9.1 Employment Generation and Checking Migration**

There had been very heavy migration from Bundelkhand region. During drought years, It is as high as 39% against an average migration rate of 11%, in other regions of Uttar Pradesh towards northern part of the country, specially the states of Delhi, Punjab and Haryana, as agriculture labours, factory workers, rickshaw pullers etc. The major reason attributed to high rate of migration is continuous drought in the region and absence of any other alternate livelihood opportunity, in spite of several anti-poverty programmes.

Due to watershed management the cropping intensity will be increased by around 22 per cent, in turn acreage in agricultural activities will be increased by about 925ha. Therefore, an additional employment of about 92520 man days will be generated annually. Therefore, no migration in search of livelihoods is expected after implementation of watershed programme.

**9.2 Other Expected Outcome***

The following tangible benefits are expected after implementation of the project:

- Runoff will be reduced by about 30 per cent, however soil and nutrient loss may be reduced up to 40 per cent from the watershed.
- Irrigation intensity may be increased to 40 per cent from present 20 per cent life saving irrigation.
- Surface water in nallah may be available for more than 10 months against 4-5 months at present.
- Average ground water recharge of about 4 m may be easily obtained after implementation of the programme
- Productivity of crops may be increased by about 30 per cent
- Significant saving of seeds may be obtained through crop demonstration with improved package of practices
- During implementation phase about 2,00,000 mandays will be created through the soil and water conservation measures and crop/agroforestry interventions.
- The over all B C ratio of the project is estimated to be 1.95 as compared to the 1.58 in pre project scenario (detailed analysis is given in Chapter 7)

***Above mentioned outcomes are based on the meta analysis of 636 watershed projects throughout the country done by ICRISAT, Hyderabad and practical experience of watershed management in Bundelkhand region.**

**9.3 Questions to be answered**

This project will answer the following questions :

1. Will the measures taken for water harvesting sufficient enough to recharge the perched water table?
2. Will the soil and water conservation practices be helpful in combating drought?
3. Will alternate land use such as agroforestry land use system result in self reliance/prosperity in drought prone areas?

4. Can the strategies based on watershed basis yield fruitful results?
5. Response of the villagers towards the project and their participation in sustaining developed resources after whithdrawal of the project?
6. Will the formation of SHGs will help in savings and generation of self employment?
7. Will the watershed programmes improve the socio-economic conditions of the stake holders?
8. Will the watershed programme helps in capacity building of the stake holders for dissemination of various activities of watershed programme?
9. Will it sustain after project withdrawal?

**9.4 Problems that could be solved as a results of this project/study**

Following problems can be tackled in the proposed watershed :

1. Solving the problems of shortage of fuel, fodder, fruit and small timber requirement of villagers.
2. Creating water resources for ground water recharge availability of surface water for animal drinking and nistar purposes.
3. Increasing fertilizer consumption and improving NPK consumption ratio.
4. Optimizing crop productivity by putting more area under HYV and irrigation.
5. Increasing cropping intensity.
6. Promoting dairying through increased fodder availability.
7. Improving basic amenities and facilities like health, education, drinking water etc.
8. Increasing per capita income and thereby standard of living of farming community.
9. Increasing co-operative membership.
10. Increasing self employment.
11. Improving living standard of society.

## Annexure--II

# PLANNING AND ESTIMATE DIFFERENT ACTIVITIES

Design of any erosion measures is mainly dependent on runoff from a catchment. Therefore, estimation of probable runoff from any catchment is the first step towards designing and construction of soil and water conservation measures. Runoff is drainage of precipitation from a catchment, which flows out through its natural drainage system. After the occurrence of infiltration and other losses from the precipitation, the excess rainfall flows out through the small natural channels on the land surface to the main drainage channel. Such types of flows are called surface flows. A part of the infiltrated rainwater moves parallel to land surface as subsurface flow, and reappears on the surface at certain other points. Such flows are called interflows. The other part of the infiltrated water percolates downwards to ground water, and moves laterally to emerge in depressions and rivers, and joins the surface flow. This type of flow is called the subsurface flow or ground water flow.

Runoff is a rainfall driven process and depends upon biophysical characteristics of the catchments. Runoff estimation includes its volume and peak rate of flow volume. In designing spillways and outlets or waterways, peak rate of runoff is required while for assessing the storage in earthen dam, tanks and ponds etc. the estimates of runoff volumes are required. Another important variable of interest in drainage line treatment is the flow velocity that is required for determining scour pattern in the river bed and along the banks. In this way, various characteristics parameters of runoff are required for the design of soil and water conservation structures.

**Methods of Runoff Computation**

There are many methods available for runoff estimation. The most commonly adopted methods are the Curve Number method of the Soil Conservation Service of the USDA for estimation of both excess runoff volume and peak flow rate and the Rational method for the peak flow rate. Many empirical relationships are also widely used for estimation of flow rates. Runoff of the watershed was estimated using Curve Number Method.

***Curve number method***

The Curve Number method was developed for the determination of the rainfall excess of agricultural watersheds, on per storm basis.

$$Q = \frac{(p - 0.2S)^2}{P + 0.8S}$$

Where, Q= direct runoff, mm

P= storm rainfall, mm

S= a parameter for surface retention

The parameter S is defined as

$$S = \frac{25400}{CN} - 254$$

Where, CN = an arbitrary curve number varying from 0 to 100

The amount of rainfall (P) is also affected by duration. For design considerations, maximum runoff volume is required. It is established that minimum storm duration for flood estimation can be taken as 6 hours. But in certain conditions design rainfall for greater durations can also be taken.

**Estimation of Runoff from the Watershed**

Runoff from the watershed is estimated by Curve Number method of the Soil Conservation Service of the USDA using 18 years data (1990-2009) with a gap of 2005 and 2006). It is estimated that runoff potential of the project area is 335 mm, equivalent to 37 per cent of average annual rainfall. On the basis of runoff estimated, engineering measures were designed. The works related to natural resource conservation, production system and livelihoods are described in subsequent sections:

### 5.2.1 Natural resources conservation (Soil and moisture conservation measures, rain water harvesting and water resource development)

To control the damaging runoff which is a cause of erosion from agricultural as well as non agricultural lands, structural measures are required. Following measure are recommended for watershed development in arable and non arable land. The estimate and detailed design of all kinds of interventions are given in Chapter 10. However, summary of physical and financial requirement of different activities is given at the end of this chapter and its yearwise phasing has been given in Chapter 7.

#### 5.2.1.1 Engineering measures for degraded agricultural lands

- Contour bund/field bunds/graded bunds with suitable surplusing arrangements are proposed to prevent erosion of natural resources and improved the moisture regime of having slope 0-3 per cent.
- Marginal/peripheral/submergence bunds with suitable surplusing arrangements are proposed to prevent erosion of natural resources from agricultural lands having slope in the range of 3 to 5 per cent.
- Earthen checkdams/gully plugs /water harvesting bund with suitable weir structures are proposed to conserve runoff and prevent erosion.
- In the lower reach of the watershed, vegetative bunds of vetiver, munj, and other locally available grasses will be taken up.
- Excess runoff will be disposed off safely from the fields though grassed water ways and suitable structures.
- Well recharging units
- Field drainage structures

#### 5.2.1.2 Agronomical measures for agricultural lands

Agronomical measures like contour farming, crop geometry, mulching, deep ploughing, strip, mixed and intercropping, crop rotation and residue management will be taken care in the watershed development programme.

#### 5.2.1.3 Conservation measures for wastelands/ degraded lands/forest areas

To rehabilitate the wasteland/degraded lands/forest areas, vegetative barriers, all types of gully pluggings including drop spillways, installation of gabions, etc. are describes in subsequent section.

- **Vegetative barriers:** It will be introduced to prevent soil erosion.

- **Gully plugging**

It has been observed that the plugging of gullies is very much effective in grade control and gully stabilization as well as ground water recharge. Gully plugs which are categorized as temporary, semi-permanent and permanent will be constructed in the watershed.

The watershed is having number of wells, which is ultimate source of drinking and irrigation water supply. These shallow open dug wells' recovery is dependent on perched water. The ephemeral streams of the watershed offer an opportunity to check and store surface water. By checking these streams, wells in the down slope get recharged faster and ultimately more and more area can be brought under irrigation. Following structures have been proposed in the scheme to augment water resources.

- **Gabion**

NRCAF, Jhansi has demonstrated the effectiveness of the gabion for soil and water conservation at Garhkundar-Dabar watershed in Teekamgarh district of M.P. in Bundelkhand region. The Centre has also imparted trainings for fabrication/installation of gabions to the NGOs. Gabions are being widely used for construction of soil conservation structures now a days. Gabion is large mesh boxes of different sizes, generally rectangular in shape and filled with stones larger than the mesh openings. Galvanized iron wire of 8-10 gauge thickness is used in the fabrication of wire nets and the mesh size is generally kept 10-15 cm. Gabion structures have long life (20-25 years) almost similar to cement permanent structures.

Gabions constructions have the following advantages over the cement ones :

1. Flexibility: In uneven sinking foundation gabions can be bending without breaking, whenever there is some unequal settlement in the foundation. These structures do not collapse like rigid structure.
2. Permeability: Gabion structure is highly permeable and act as self draining units. Seepage or base flow is easily drained off by them and thus structure is safer against hydrostatic pressure.
3. Stability: A gabion is a heavy gravity unit, able to withstand earth thrust.
4. Economy: Gabion structures are comparatively cheaper than concrete structure.

Fabrication of a gabion of 3 cum requires about 28-30 kg of GI wire and its fabrication and installation in the field may be done by 8 semi skilled labours. The details are given in Table 5.1.

**Table 5.1: Estimate for fabrication of a gabion (3 $m^3$) and its installation in the watershed**

| S. No. | Material | Quantity | Rate (`) | Amount (`) |
|---|---|---|---|---|
| 1. | G.I.Wire 8-10 gauge | 30 kg | 45.00/kg. | 1350.00 |
| 2. | Stone / Boulders | 4.5 cum | 700.00/cum | 3150.00 |
| 3. | Labour for fabrication and its laying | 8 Semi Skilled | 150.00/mandays | 1200.00 |
| | **Total** | | | **5700.00** |

The detailed technical design and estimates of these structures are given in Chapter 11. Capacity survey of the sites of weir structures was conducted and analyzed for water storage and submergence area using software Surfer. The details of the study are presented in Chapter 7.

**5.2.2 Production System Interventions**

To improve the production and productivity of different crops in the project area, first of all analysis of gaps in the production technologies for cereals, pulses and oilseeds have to be identified. Following gap analysis has been worked out for different catagories of crops.

**Gap analysis in cultivation of Pulses (Urd, Moong and Arhar): Kharif Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific reasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion | Old seeds | P | 1& 2 | 1 & 2 |
| 02 | Seed rate (per ha.) | As per crop wise recomendation | As per crop wise recomendation | N | N | N |
| 03 | Seed treatment | According to problem as fungicides and rizobium | - | F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |
| 05 | <u>Fertilizer / nutrient (kg/ha)</u><br>- Basal (N+P+S)<br>- Top dress (N ) | 20:40:40(N:P:K) (Use SSP for P) | N | F<br>F | 1, 2 & 5 | 1, 2, 3 & 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha)<br>- Method of application | <br>2-3 kg wittable sulphur or 2q zypsum | - | - | - | - |
| 07 | Pest management | IPM | Only chemical | P | 1 | 1 & 2 |
| 08 | Disease management | IPM | Only chemical | P | 1 | 1 & 2 |
| 09 | Weed management<br>- Mechanical<br>- Herbicide | <br>Hand weeding<br>Pedimethaline 3.3 lit /ha | <br>No hand weeding<br>- | F | 1 | 1&2 |
| 10 | Any other | - | - | - | - | - |
| 11 | Average Yield (Q / ha.)<br>- Grain<br>- Timber | <br>16- 30 q/ha<br>15 q/ha | <br>9.10 q/ha<br>Burning | <br>F<br>F | <br>1<br>1 | <br>1&2<br>1 & 2 |

**(*) F = Full P = Partial N = Nil**

** Code for specific reasons for gap in adoption

1- Lack of knowledge about appropriate practices
2- Lack of organic carbon in the soil
3- Lack of knowledge about plant protection measurer
4- Lack of appropriate varieties according to climatic zone.
5- Non-availability of inputs.

*** Code for farmer proposed extension strategy

1- Training of appropriate soil fertility management
2- Demonstration of balance fertilizer, use of biofertilizer, Use of micro nutrients and new seeds
3- Linkage with credit societies.
1- Exposure visit same climatic zone institute as Jabalpur Indore.
5- Availability of inputs zinc sulphate, MOP.

**Gap Analysis in cultivation of Pulses (Pea, Gram and Lentil)- Rabi Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific reasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion | Old seeds, Awarodhi | P | 1& 2 | 1 & 2 |
| 02 | Seed rate (per ha.) | 80 kg | 100 kg | P | 1 | 1 |
| 03 | Seed treatment | According to problem as fungicides and rizobium | - | F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 05 | Fertilizer / nutrient (kg/ha)<br>- Basal (N+P+K)<br>- Top dress (N ) | 20 : 60 : 40<br>2% foliar spray of Urea | 100 kg DAP | F<br><br>F | 1, 2 & 5 | 1, 2, 3 & 5 |
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha)<br>- Method of application | Use of sulphur (2q zypsum or 3kg wittable sulphur) | Nil | F | 1 | 1 & 2 |
| 07 | Pest management | IPM | Only chemical | P | 1 | 1,2&5 |
| 08 | Disease management | IPM | Only chemical | P | 1 | 1,2&5 |
| 09 | Weed management<br>- Mechanical<br>- Herbicide | Hand weeding<br>Pedimethaline 3.3 lit /ha | No hand weeding<br>- | F | 1 | 1&2 |
| 10 | Water management :<br>- Number of irrigations<br>- Method of irrigation | <br>01<br>Check, basin, sprinkler | <br>Nil<br>- | P | 3 & 4 | 1 & 2 |
| 11 | Method of harvesting | Manual | Manual | N | N | N |
| 12 | Any other | - | - | - | - | - |
| 13 | Average Yield (Q / ha.)<br>- Grain<br>- Fodder/ Bio- Moss | <br>20-25 q/ha<br>15 q/ha | <br>9.10 q/ha<br>Burning | <br>F<br>F | <br>1<br>1 | <br>1&2<br>1 & 2 |

**Gap analysis in cultivation of Oilseeds (Soybean, Groundnut and Til): - Kharif Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific reasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion in Bundelkhand (zone 6) | Old seeds | F | 1& 2 | 1 & 2 |
| 02 | Seed rate (per ha.) | As per crop wise recomendation | As per crop wise recomendation | Nil | Nil | Nil |
| 03 | Seed treatment &<br>Soil treatment | Thirum 2.5 gm / kg of seed<br>Azatobactor + PSB | No<br><br>No | F<br><br>F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |
| 05 | Fertilizer / nutrient (kg/ha) | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | - Basal (N+P+K)<br>- Top dress (N ) | 80 : 60 : 40<br>Use SSP for P | As mixed crop (No fertilizer) | F<br><br>F | 1, 2 & 5 | 1, 2 |
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha)<br>- Method of application | Use of sulphur (2q zypsum or 3kg wittable sulphur) | Nil | <br>F | <br>1 | <br>1 & 2 |
| 07 | Pest management | IPM | Only chemical | F | 1 | 1 & 2 |
| 08 | Disease management | IPM | Only chemical | F | 1 | 1 & 2 |
| 09 | Weed management<br>- Mechanical<br>- Herbicide | Hand weeding | No hand weeding<br>- | <br>F | <br>1 | <br>1 |
| 10 | Any other | Intercropping line (1 : 3) | No | F | 1 | 1 |
| 11 | Average Yield (Q / ha.)<br>- Grain<br>- Fodder/ Bio- Moss | <br>18-20 q/ha<br>5 q/ha | <br>9.10 q/ha<br>- | <br>F<br>F | <br>1<br>1 | <br>1<br>1 |

**Gap analysis of Oilseeds (Rai, Mustard and Toria): Rabi Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific reasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion | Old seeds | <br>F | <br>1& 2 | <br>1 & 2 |
| 02 | Seed rate (per ha.) | As per crop wise recomendation | As per crop wise recomendation | Nil | Nil | Nil |
| 03 | Seed treatment &<br>Soil treatment | Thirum 2.5 gm / kg of seed<br>Azatobactor + PSB | No<br><br>No | F<br><br>F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |
| 05 | Fertilizer / nutrient (kg/ha)<br>- Basal (N+P+K)<br>- Top dress (N ) | <br>80 : 60 : 40<br>Use SSP for P | <br>As mixed crop (No fertilizer) | <br>F<br><br>F | <br>1, 2 & 5 | <br>1, 2 |
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha) | Use of sulphur (2q zypsum or 3kg wittable | Nil | <br>F | <br>1 | <br>1 & 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | - Method of application | sulphur) | | | | |
| 07 | Pest management | IPM | Only chemical | F | 1 | 1 & 2 |
| 08 | Disease management | IPM | Only chemical | F | 1 | 1 & 2 |
| 09 | Weed management<br>- Mechanical<br>- Herbicide | Hand weeding | No hand weeding<br>- | <br>F | <br>1 | <br>1 |
| 10 | Any other | Intercropping line (1 : 3) | No | F | 1 | 1 |
| 11 | Average Yield (Q / ha.)<br>- Grain<br>- Fodder/ Bio- Moss | <br>18-20 q/ha<br>5 q/ha | <br>9.10 q/ha<br>- | <br>F<br>F | <br>1<br>1 | <br>1<br>1 |

**Gap analysis in cultivation of Cereals (Jowar, Bajra and Maize):-Kharif Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific reasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion in Bundelkhand (zone 6) | Old seeds | F | 1& 2 | 1 & 2 |
| 02 | Seed rate (per ha.) | As per crop wise recomendation | As per crop wise recomendation | Nil | Nil | Nil |
| 03 | Seed treatment &<br>Soil treatment | Thirum 2.5 gm / kg of seed<br>Azatobactor + PSB | No<br><br>No | F<br><br>F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |
| 05 | Fertilizer / nutrient (kg/ha)<br>- Basal (N+P+K)<br>- Top dress (N ) | <br>80 : 60 : 40<br>Use SSP for P | As mixed crop (No fertilizer) | F<br><br>F | 1, 2 & 5 | 1, 2 |
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha)<br>- Method of application | Use of Zinc suphate (25kg) | Nil | F | 1 | 1 & 2 |
| 07 | Pest management | IPM | Only chemical | F | 1 | 1 & 2 |
| 08 | Disease management | IPM | Only chemical | F | 1 | 1 & 2 |
| 09 | Weed management | Hand weeding | No hand weeding | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | - Mechanical<br>- Herbicide | | - | F | 1 | 1 |
| 10 | Average Yield (Q / ha.)<br>- Grain<br>- Fodder/ Bio- Moss | <br>25-30 q/ha<br>150 q/ha | <br>9-10 q/ha<br>100 q/ha | <br>P<br>P | <br>1<br>1 | <br>1<br>1 |

**Gap analysis in cultivation of cereals (Wheat and Barley):-Rabi Season**

| Sl. No. | Items of package | Recommended practice | Existing practice | Gap in adoption (F/P/N) (*) | Specific seasons for the gap (**) | Farmer proposed strategy (***) |
|---|---|---|---|---|---|---|
| 01 | Varieties | Improved variety as per recomendetion in Bundelkhand (zone 6) | Old seeds | F | 1& 2 | 1 & 2 |
| 02 | Seed rate (per ha.) | As per crop wise recomendation | 2 time seed used | P | 2 | 2 |
| 03 | Seed treatment &<br>Soil treatment | Thirum 2.5 gm / kg of seed<br>Azatobactor + PSB | No<br>No | F<br>F | 1 | 1 & 2 |
| 04 | Organic manure (tons /ha) | FYM 150-200<br>NADEP compost – 60-70<br>Vermicompost – 25-30 | Use undecomposed matter | F | 1 | 1 & 2 |
| 05 | Fertilizer / nutrient (kg/ha)<br>- Basal (N+P+K)<br>- Top dress (N ) | <br>120:60:40<br>Half dose of N | <br>100:40:00 | <br>P<br>F | <br>1, 2 & 5 | <br>1, 2 |
| 06 | Micro nutrient (specify) :<br>- Dose (kg/ha)<br>- Method of application | Use of Zinc suphate (25kg) | Nil | F | 1 | 1 & 2 |
| 07 | Pest management | IPM | Only chemical | F | 1 | 1 & 2 |
| 08 | Disease management | IPM | Only chemical | F | 1 | 1 & 2 |
| 09 | Weed management<br>- Mechanical<br>- Herbicide | Hand weeding | No hand weeding<br>- | <br>F | <br>1 | <br>1 |
| 10 | Average Yield (Q / ha.)<br>- Grain<br>- Fodder/ Bio- Moss | <br>25-30 q/ha<br>150 q/ha | <br>9-10 q/ha<br>100 q/ha | <br>P<br>P | <br>1<br>1 | <br>1<br>1 |

Crop improvement programme will be taken up on farmer's field with participatory approach on pulses, oilseeds, cereals, etc. Improved package of practices will be demonstrated on farmer's fields. Application of recommended doses of fertilizers, pesticides, weedicides and other practices to the crops was not practiced in the area and farmers rarely use these practices in integrated and balanced manner. For the improvement of productivity integrated crop management, integrated pest management and integrated nutrient management demonstrations should be included in the programme. To improve the productivity following should be followed:

- Placement of basal dose of fertilizers at 8-10 cm depth in the root zone
- Application of multi-nutrient fertilizers to supplement the need of sulphur and other nutrients.
- Intercropping: Recommended intercropping systems like sorghum + pigeon pea, pigeon pea + black gram and soybean + pigeon pea are promising only under normal monsoon condition. Their productivity declines significantly if the monsoon gets delayed up to first week of August. Castor + green gram intercropping is an efficient intercropping system for delayed monsoon condition in black soil. Following intercroppings can be tried to improve the productivity of the system.

***Sorghum + Pigeon pea Intercropping***

- Sorghum is one of the prominent *kharif* crops of this rainfed MWS
- As the rooting pattern and date of maturity between the sorghum and pigeon pea differ, the two crops show good compatibility when grown together. Sorghum is harvested after 100 to 110 days while pigeon pea matures in 230 to 240 days.
- The legume crop of pigeon pea helps in maintaining soil fertility.
- Sorghum + pigeon pea intercropping is the most promising cropping system for normal monsoon rainfall and even under aberrant weather condition in Bundelkhand region in black soil series.
- The crop should be sown in 1:1 row ratio during last week of June to first week of July as per monsoon occurrence.
- The intercropping system is suitable for rainfed farming in Jhansi district as well as for Micro-watershed of black soil series.

***Pigeon pea + black gram Intercropping***

- Pigeon pea and black gram are the prominent *kharif* crops of this rainfed MWS
- As the rooting pattern and date of maturity between the black gram and pigeon pea differ, the two crops show good compatibility when grown together. Black gram is harvested after 90 to 100 days while pigeon pea matures in 230 to 240 days.
- Both the legume crop of pigeon pea and black gram helps in maintaining soil fertility.
- Pigeon pea + black gram intercropping is the most promising cropping system for normal monsoon rainfall and even under aberrant weather condition in Bundelkhand region in black soil series.
- The crop should be sown in 1:2 row ratios during last week of June to first week of July as per monsoon occurrence.
- The intercropping system is suitable for rainfed farming in Jhansi district as well as for micro-watershed of black soil series.

***Soybean + Pigeon pea Intercropping***

- Soybean is the new *kharif* crops for this areas where soil is black and has moisture and life saving irrigation near the water harvesting structures.
- As the rooting pattern and date of maturity between the soybean and pigeon pea differ, the two crops show good compatibility when grown together. Soybean is harvested after 110 to 120 days while pigeon pea matures in 230 to 240 days.
- The crop should be sown in 2:1 & 3:1 row ratios during last week of June to first week of July as per monsoon occurrence.

***Castor + green gram intercropping***

- Castor + green gram intercropping is an efficient intercropping system for delayed monsoon condition as emerged in last five years.

- Castor is a long duration (220-230 days) non-edible crop which grows well under rainfed condition with little effect on its productivity due to delayed sowing upto first week of August than other crop in the area.
- Unlike castor, green gram (*Mung bean)* is a fast growing (65-70 days duration) legume, which escapes competition with castor and is suited well for delayed monsoon conditions.
- Castor and green gram should be sown in separate rows across the slope in 1:2 ratio i.e. 30 cm apart so that the distance between two castor rows remains 60 cm. This would minimize erosion hazard under field conditions.
- This system provides excellent vegetative cover on the ground and reduces runoff and soil loss and improving soil fertility status. It provides employment for 93-95 man-days.

***Vegetables and spices***

Vegetables and spices were not being grown on commercial scale in the watershed villages. Therefore, it is decided to promote cultivation of onion, garlic, tomato, brinjal, cucurbits, chilies, turmeric and isabgol in areas for income and nutritional security.

***Fodder cultivation***

Scarcity of fodder in the area emerged as one of the major concern of the watershed community during PRA exercise. Therefore, in addition to the development of community pasture land, fodder cultivation in agricultural fields will be taken up extensively to meet the fodder demands of animals as revealed in fodder requirement analysis.

***Replacement of old varieties***

Farmers were not aware of high yielding varieties of crops. Certified seeds were rarely used in the area. Therefore, the efforts will be made to replace the prevailing varieties by new high yielding varieties, having wider adaptability against adverse climatic condition. Varieties of urd, moong, sesamum, sorghum and pearl millet in *kharif* season while durum wheat, wheat, lentil, field pea, chickpea, linseed and mustard/rai in *rabi* season will be introduced on farmers field.

### 5.2.2.2 ON Farm Test

Productivity of different crops in the region is significantly low, therefore, following On Farm Tests are proposed in the project area:

**OFT – 01**

1. Crop : Chickpea
2. Problem identified : Low yield of chickpea
3. Title : Evaluation of high yielding varieties
4. Farmers practice : Use of local varieties
5. Details of technologies selected for assessment and refinement
   Treatments : T1 - Farmers Practice (local variety)
   : T2 - KWR-108
   : T3 - JG-315
6. Farming situation : Rainfed
7. No. of farmers : 05
8. Initial input : Seed of high yielding varieties

1) No. of pods/plant
2) Yield (q/ha)
3) C:B ratio

9. Area : 4000 Sq. Meter
10. Cost of input : Rs. 4000
11. Total cost : Rs. 20000

**OFT – 02**

1. Crop: : Lentil
2. Problem identified: : Low yield of Lentil (using local varieties)
3. Title: : Evaluation of high yielding varieties
4. Farmers practice : Use of local varieties
   Treatment: : T1 - Farmers practice (local variety)
   : T2 - DPL-62
   : T3 - DPL 54
5. Farming situation : Rainfed
6. No. of farmers : 05
7. Initial input : Seed
8. Performance indicators

: 1) Yield (q /ha)
: 2) C B Ratio

9. Area : One Acre
10. Cost of input : Rs. 2000

11. Total cost : Rs. 10000

**OFT – 3**

1. Crop : Linseed
2. Problem identified : Mixed crop with chickpea and lentil (Low yield)
3. Title : Screening of high yielding
4. Farmers practices : Sowing of mixed
5. Details of technologies selected for assessment and refinement
   Treatment : T1 - Farmers Practice
   : T2 - Padmini
   : T3 - Parwati
6. Farming situation : Rainfed
7. No. of farmers : 05
8. Sources of Technology : C. S. A. University of Ag., & Tech., Kanpur
9. Initial input : Seed
10. Performance indicators : 1) Yield (q/ha)
    : 2) C B ratio
11. Area : One acre per location
12. Cost of input : Rs. 1500
13. Total cost: : Rs. 7500

**OFT – 4**

1. Crop / Enterprises : Til
2. Problem identified : Low yield of sesamum
3. Title : Selection of high yielding varieties
4. Farming situation : Rainfed
5. Farmers practice : Local varieties
6. Details of technologies selected for assessment/refinement
   Treatment : T1 - Farmers Practice
   : T2 - Shekhar
   : T3 - Pragati
7. Sources of technology : C. S. A. University of Agric. & Tech., Kanpur
8. No. of farmers : 10
9. Critical input : Seed
10. Performance indicators :
    : 1) Yield (q/ha)
    : 2) C:B ratio

11. Area : One acre
12. Cost of input : Rs. 250
13. Total cost : Rs. 2500

**OFT – 5**

1. Crop / Enterprises : Arhar (Pigeon pea)
2. Problem Identified : Long duration crop with mixed with sorghum

3. Title : Introduction of short duration pigeon pea varieties
4. Farming situation : Rainfed
5. Farmers practice : Long duration varieties
6. Details of technologies selected for assessment/refinement
7. Treatment : T1- Farmers Practice
: T2- UPAS 150
: T3- Malviya 13
8. No. of farmers : 05
9. Critical input : Seed
10. Performance indicators : 1) Yield (q/ha)
3) C.B.ratio
11. Area : One acre per location
12. Cost of input : Rs. 1500
13. Total cost : Rs. 7500

**OFT – 6**

1. Crop/Enterprises : Animal Husbandry
2. Problem identified : High mortality due to the endoparasites
3. Title : Effect of deworming practices on mortality in kids.
4. Details of technologies selected for assessment and refinement :

Treatment: : T1- Farmers Practice (No Deworming)
: T2-First deworming at 10 days deworming with cubazin
- Second deworming at one month age with piperazine
- Third deworming at two month age with Nelwarm
- Fourth deworming at three month age with Zenil flue drench or Destrodin tab.

5. No. of kids : 05 herds (Each herds containing 10-15 kids)
6. Sources of Technology : IVRI, Bareilly
7. Initial input : Deworming
8. Production system and thematic area : Disease Management

9. Performance indicators : 1) Kid mortality
2) Body weight gain (at 3 and 6 month age)
: 3) Occurrence of other associated health problems, if any
: 4) C: B ratio
10. Cost of input : Rs. 1500
11. Total cost : Rs. 7500

**OFT- 7**

1. Crop : Durum Wheat
2. Problem identified : Low Yield
3. Title : Assessment of durum wheat varieties in local condition
4. Farmers practices : Local varieties
5. Details of technologies selected for assessment and refinement
6. Treatment: T1 : Farmers practice (Local varieties )
T2 : Malav Shakti
T3 : Malav Ratan
7. Farming situation : Rainfed
8. No. of location : 05
9. Sources of Technology : Indore Ag. University
10. Initial input : Seed
11. Area : One acre
12. Performance indicators : Yield (q/ha)
C:B ratio

14.Cost of input : Rs 2000 / location
15.Total of cost : Rs. 10000

**OFT- 8**

1. Crop : Wheat
2. Problem identified : Low Yield
3. Title : Screening of low water requirement varieties.
4. Farmers practices : Use of isoproturan 50% @ 1.5 kg / ha
5. Details of technologies selected for assessment and refinement
6. Treatment: T1 : Farmers practice (WH-147 Old)
T2 : Maldakani
T3 : Raj 3765
7. Farming situation : Three irrigation
8. No. of location : 05

9. Sources of Technology : C. S. A. University of Ag. Tech., Kanpur
10. Initial input : Seed
11. Area : One acre / location
12. Performance indicators : Yield (q/ha)
C:B ratio
13. Cost of input : Rs 2000 / location
14. Total of cost : Rs. 10000

**5.2.2.3 Crop Demonstrations:** Following crop demonstrations are proposed to bridge the productivity gap.

**A. Pulses:- Kharif season**

| **Name of Crop** | | | **Urd, Moong and Arhar** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 5.00 ha | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Given below | 75.00 | | |
| 2. Sowing Time | 25 July to August | | | |
| 3. Required Seed | 12-15 kg | 15 X 75 | 1200.00 | 600.00 |
| 4. Land Preparation | | | | By user |
| 5. Sowing Bullock/Seed drill | Line sowing | 600 | 600.00 | 300.00 |
| 6. Intercultural Operation | One manually | 900 | 900.00 | 450.00 |
| 7. Use Weedicide (IPM) | 3.3 lit / ha Pendimethalin at pre emergence/ Total | 450/lit | 1485.00 | 743.00 |
| 8. Use of organic manure as FYM or NEDAD or Vermicompost | 100 q/ha or<br>60 q/ha or<br>30 q/ha | 60/q<br>150/q<br>300/q | 6000.00<br>9000.00<br>9000.00 | 3000.00<br>4500.00<br>4500.00 |
| 9. Bio Fertilizers/Bio-agents (IPNM) | | | | |
| i) Rhizobium + PSB (IPNM) | 1.50 kg /ha (Soil treatment) | 136.00 | 204.00 | 102.00 |
| ii) Trichoderma (IPM) | Soil 3 kg /ha in Manure | 130.00 | 390.00 | 195.00 |
| 10. Recommended dose of fertilizers (IPNM) | | | | |
| 25:60:30 NPK | 130 kg | 10 | 1300 | 650 |
| i) DAP | 375 kg | 5 | 1875 | 938 |

| | | | | |
|---|---|---|---|---|
| ii) SSP | In case of SSP 54 kg Urea applied | 6 | 324 | 162 |
| iii) Urea | | 7 | 350 | 175 |
| iv) MOP | | | | |
| | | | | |
| 11. IPM | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Spray of Neem Seed Kernal | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Mataka Khad | NA | | | |
| Insecticides/Fungicides | | | | |
| **ICM** | **Total** | | **33052.00** | **16527.00** |
| Demonstrations on IPM, IPNM, Improved Seed and Technology can be done according to the problem and choice of user | | | | |
| **Variety** | | | | |
| **Urd** | Shekhar 1, Shekhar 2, Shekhar 3, Azad 1, Azad 2 (Green) & 3 | | | |
| **Moong** | T 44, K 851, PDM 11, 54 139 | | | |
| **Arhar** | Early- Paras, U.P.A.S.120, Pusa 992, Type 21<br>Late – Amar, Bahar, Narendra Arhar -1, Azad, Pusa 9, Malviya Vikash, Chamtkar | | | |

**Rabi**

| **Name of Crop** | | | **Lentil, Chickpea and Field Pea** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.5 ha | |
| **Total Area of Demonstration** | | | 5 ha | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Un-irrigated | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Given below | | | |
| 2. Sowing Time | IInd week of October | | | |
| 3. Required Seed | | | | |
| Gram and Pea | 100 kg/ha | 70.00 | 7000.00 | 3500.00 |
| Lentil | 40 kg / ha (F1,F2, Certified) | 80.00 | 4000.00 | 2000.00 |
| 4. Land Preparation | By User | | - | By User |
| 5. Sowing Bullock/Seed drill | By User | | - | By User |
| 6. Intercultural Operation | By User | | - | By User |
| 7. Use Weedicide | Pendimethalin 3.3 li/ha (Pre emergence) | 465.00 | 1535.00 | 767.00 |
| 8. Use of organic manure as FYM or NEDAD or Vermicompost | 100 q/ha or<br>60 q/ha or<br>30 q/ha | 60/q<br>150/q<br>300/q | 6000.00<br>9000.00<br>9000.00 | 3000.00<br>4500.00<br>4500.00 |
| 9. Bio Fertilizers / Bio-agents | 24 pkt | 7 | 168 | 84 |
| i) Rhizobium + PSB | 5 Pkt + 5 Pkt = 10 Pkt @ Rs | 7.50 | 75.00 | 37.50 |
| ii) Trichoderma | 1.50 kg /ha (Soil treatment) | 136.00 | 204.00 | 102.00 |
| 10. Recommended dose of fertilizers | | | | |
| 25:60:30 NPK | | | | |
| i) SSP | 375 kg /ha | 5 | 1875 | 938 |
| ii) Urea | In case of SSP 50 kg Urea applied | 6 | 300 | 150 |
| iii) MOP | 50 kg / ha | 7 | 350 | 175 |
| 11. IPM | | | | |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| **ICM** | | | **39931.00** | **19965.50** |

| | |
|---|---|
| Demonstrations on IPM, IPNM, Improved Seed and Technology can be done according to the problem and choice of user | |
| **Variety** | |
| **Lentil** | Narendra Masoor-1, DPL-15, L-4076, Pusa Vaibhav<br>Late- IPL-81, K-75 |
| **Chickpea** | KWR-108, KGD 1168, JG 315, Pusa 256, |
| **Field Pea** | PJ 885, Indra, Jai,<br>Late – Adarsh |

**B. Oilseeds: Kharif season**

| **Name of Crop** | | | **Til, Groundnut and Soybean** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 3.00 ha | |
| **Number of Demonstration** | | | 6 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Given below | | | |
| 2. Sowing Time | June last to July last | | | |
| 3. Required Seed | | | | |
| **Til** | 5 kg./ ha | | | |
| **Groundnut** | 95 kg./ha | | | |
| **Soybean** | 80 kg | | | |
| 4. Land Preparation | By user | | | |
| 5. Sowing Bullock/Seed drill | Line sowing | 410 / hr | 615 | 308 |
| 6. Intercultural Operation | Thinning and Digging of plant at raining | 2 Labour 120/day | 240 | 120 |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of organic manure as FYM or NEDAD or Vermicompost | 100 q/ha or<br>60 q/ha or<br>30 q/ha | 60/q<br>150/q<br>300/q | 6000.00<br>9000.00<br>9000.00 | 3000.00<br>4500.00<br>4500.00 |
| 1. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB (Til & Groundnut) | With 1 q vermi compost / NADEP 10 Pkt + 10 Pkt in one ha | 300 + 7 | 450 | 225 |
| ii) Rhizobium + PSB (Soybean) | 20 Pkt | 7 | 140 | 70 |
| 12. Recommended dose of fertilizers | | | | |

| | | | | |
|---|---|---|---|---|
| 30 : 15 : 25 N : P : Zn NPK | | | | |
| i) SSP | 275 kg | 5 | 1375 | 688 |
| ii) Urea | 55 kg | 5 | 275 | 140 |
| iii) Zn | 25 kg | 10 | 250 | 125 |
| | | | | |
| 13. IPM | | | | |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | | | | |
| **ICM** | | | **27769** | **13888** |
| Demonstrations on IPM, IPNM, Improved Seed and Technology can be done according to the problem and choice of user | | | | |
| **Variety** | | | | |
| **Til** | Shekhar, Pragati | | | |
| **Groundnut** | Prakash, Amber | | | |
| **Soybean** | P.S.564, P.K.416 | | | |

*Economics of Demonstration, Observations to be taken on yield / ha

| | |
|---|---|
| **Name of Crop** | **Castor (On earthen bunds)** |
| **Area under each Demonstration** | 1.5 X 600 Meter = 900 sq. M or 1000 sq.m. |
| **Total Area of Demonstration** | 10 ha |
| **Number of Demonstration** | 10 X 10 = 100 |
| **Situation** | Rainfed |

| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
|---|---|---|---|---|
| 1. Name of Varieties | Type -3, Tarai-4, Kalpi 6, | | | |
| 2. Sowing Time | 15 July to 15 August | | | |
| 3. Required Seed | 15 / ha | 70 | 1050 | 105 |
| 4. Land Preparation | - | - | - | - |
| 5. Sowing Bullock/Seed drill | Digging by hand on Bunds | 4 labour @ Rs 120 / day | 480 | 48 |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | - | - | - | - |
| 9. Use of Vermi-compost | - | - | - | |
| 10. Use of NEDAP Compost | - | - | - | - |

| | | | | |
|---|---|---|---|---|
| 11. Bio Fertilizers/Bio-agents | - | - | - | - |
| i) Azatobactor + PSB | - | - | - | - |
| ii) Rhizobium + PSB | - | - | - | - |
| iii) Trichoderma | - | - | - | - |
| 12. Recommended dose of fertilizers | - | - | - | - |
| 50:25:15 NPK | | | | |
| i) DAP | 45 kg | 10 | 450 | 45 |
| ii) SSP | - | - | - | - |
| iii) Urea | 80 kg | 5 | 400 | 40 |
| iv) MOP | 25 kg | 5 | 125 | 13 |
| | | | | |
| 13. IPM | | | | |
| Spray of Neem oil and leaf extrect | - | - | - | - |
| Mataka Khad | - | - | - | - |
| Insecticides/Fungicides | - | - | - | - |
| | | | | |
| **Total** | | | **2505** | **251** |

*Economics of Demonstration, Observations to be taken on yield / ha

**Rabi Season**

| **Name of Crop** | | | **Mustard/Rai** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 5.00 | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Maya, Kranti, Basanti | | | |
| 2. Sowing Time | September last to Last October | | | |
| 3. Required Seed | 5 kg /ha | 150 | 750 | 375 |
| 4. Land Preparation | By user | | | |
| 5. Sowing Bullock/Seed drill | Line sowing | - | - | - |
| 6. Intercultural Operation | Topping at the time of before flowering | 2 Labour @ 120/day | 240 | 120 |
| 7. Use Weedicide | NA | | | |
| 8. Use of organic manure as FYM or<br>NEDAD or Vermicompost | 100 q/ha or<br>60 q/ha or<br>30 q/ha | 60/q<br>150/q<br>300/q | 6000.00<br>9000.00<br>9000.00 | 3000.00<br>4500.00<br>4500.00 |
| 9. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 20 Pkt Soil Treatment | 7 | 140 | 70 |
| 10. Recommended dose of fertilizers | | | | |
| 80:60:40 NPK | | | | |
| i) DAP | 120 kg | 10 | 1200 | 600 |
| ii) SSP | - | - | - | - |
| iii) Urea | 100 kg | 5 | 500 | 500 |
| iv) MOP | 80 kg | 5 | 400 | 200 |
| 11. IPM | | | | |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | Melathion/ Indosulphan | | 700 | 350 |

| | | | | |
|---|---|---|---|---|
| | | | | |
| ICM | | | **28354.00** | **14427.00** |

| **Name of Crop** | | | **Toriya** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 | |
| **Total Area of Demonstration** | | | 4.00 | |
| **Number of Demonstration** | | | 8 | |
| **Situation** | | | Irrigated / Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | T. 9, Bhawani, PT – 303, PT 30 | | | |
| | | | | |
| 2. Sowing Time | September | | | |
| 3. Required Seed | 4 kg | 150 | 600 | 300 |
| 4. Seed treatment | 2 thirum + 1 gm Carbendazim / kg seed | | 150 | 75 |
| 5. Sowing Bullock/Seed drill | Line sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By user | | | |
| 9. Use of Vermi-compost | By user | - | - | - |
| 10. Use of NEDAP Compost | By user | - | - | - |
| 11. Bio Fertilizers/Bio-agents | - | - | - | - |
| i) Azatobactor + PSB | - | - | - | - |
| ii) Rhizobium + PSB | - | - | - | - |
| iii) Trichoderma | - | - | - | - |
| 12. Recommended dose of fertilizers | - | - | - | - |
| 50:30:30 NPK | | | | |
| i) DAP | 60 kg | 10 | 600 | 300 |
| ii) SSP | - | - | - | - |
| iii) Urea | 100 kg | 5 | 500 | 250 |
| iv) MOP | 50 kg | 5 | 250 | 125 |
| | | | | |
| 13. IPM | | | | |

| | | | | |
|---|---|---|---|---|
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | - | - | - |
| **Total** | | | **2524** | **1262** |

| **Name of Crop** | | | **Linseed** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 | |
| **Total Area of Demonstration** | | | 5.00 | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Parwati, Padmini, rashmi etc | | | |
| 2. Sowing Time | Full October | | | |
| 3. Required Seed | 30 kg | 75 | 2250 | 1125 |
| 4. Seed Treatment | 2 thirum + 1 gm Carbendazim / kg seed | | 150 | 75 |
| 5. Sowing Bullock/Seed drill | Line sowing | 410 /hr | 820 | 410 |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User | - | - | - |
| 9. Use of Vermi-compost | - | - | - | - |
| 10. Use of NEDAP Compost | - | - | - | - |
| 11. Bio Fertilizers/Bio-agents | - | | - | - |
| i) Azatobactor + PSB | - | - | - | - |
| ii) Rhizobium + PSB | - | - | - | - |
| iii) Trichoderma | - | - | - | - |
| 12. Recommended dose of fertilizers | | | | |
| 50:40:40 NPK | | | | |
| i) DAP | 80 kg | 10 | 800 | 400 |
| ii) SSP | - | - | - | - |
| iii) Urea | 65kg | 5 | 325 | 162 |
| iv) MOP | 80 | 5 | 400 | 200 |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 13. IPM | | | | |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| **Total** | | | **5169** | **2584** |

**C. Cereals and Millets**
**Kharif season –**

| **Name of Crop** | | | **Sorghum, Bajra and Maize** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 | |
| **Total Area of Demonstration** | | | 5.00 | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | | | | |
| 2. Sowing Time | June last week | | | |
| 3. Required Seed | | | | |
| Sorghum | 12 kg /ha | | | |
| Bajra | 5 kg/ha | | | |
| 4. Seed treatment | 2 thirum + 1 gm Carbendazim / kg seed | | 150 | 75 |
| 5. Sowing Bullock/Seed drill | Line sowing | | 900 | 450 |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | Atragene 50% 1.5 kg /ha | 235/ acre | 588 | 294 |
| 8. Use of organic manure as FYM or | 100 q/ha or | 60/q | 6000.00 | 3000.00 |

| | | | | |
|---|---|---|---|---|
| NEDAD or Vermicompost | 60 q/ha or<br>30 q/ha | 150/q<br>300/q | 9000.00<br>9000.00 | 4500.00<br>4500.00 |
| 9. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 20 Pkt Soil Treatment | 7 | 168 | 84 |
| ii) Trichoderma | 1.5 kg/ha (Soil treatment) | 136 | 204 | 102 |
| 10. Recommended dose of fertilizers | | | | |
| 80:40:30 NPK | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | | | | |
| 11. IPM | | 175 | 350 | 175 |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| | | | | |
| 14. Harvesting | | | 2000 | 1000 |
| 15. Threshing /Weighing | | | 3500 | 1750 |
| 16. Storage | | | 200 | 100 |
| | | | | |
| | | | | |
| **Variety** | | | | |

| | |
|---|---|
| **Sorghum** | Varsha, CSV 13, 15<br>Late – Vjeta, Bundela |
| **Bajra** | Raj-171, ICTP-8203, ICMB-155<br>Late-WCC-75 |
| **Maize** | Ganga-11, Sartaj, Prakash, Dakan 107<br>Late-HQPM-5 |

**Rabi Season**

| **Name of Crop** | | | **Barley, Wheat (*aestivum*) and Durum Wheat** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 3.00 ha | |
| **Number of Demonstration** | | | 06 | |
| **Situation** | | | Rainfed | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate(Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Azad, K-141, Geetajali, Upasna | | | |
| | Late- DWR-28, Lakhan | | | |
| 2. Sowing Time | Oct last week | | | |
| 3. Required Seed | 100 kg/ha | | | |
| **Barley** | | | | |
| **Wheat (*aestivum*) and Durum Wheat** | 125kg/ha | | | |
| 4. Land Preparation | By User | | 900 | 450 |
| 5. Sowing Bullock/Seed drill | By User | | 450 | 225 |
| 6. Intercultural Operation | By User | | | |
| 7. Use Weedicide | Total 2.5 Pkt | 450/acre | 1125 | 563 |
| 8. Use of organic manure as FYM or NEDAD or Vermicompost | 100 q/ha or<br>60 q/ha or<br>30 q/ha | 60/q<br>150/q<br>300/q | 6000.00<br>9000.00<br>9000.00 | 3000.00<br>4500.00<br>4500.00 |
| 9. Bio Fertilizers/Bio-agents | 24 Pkts | 7 | 164 | 84 |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |

| | | | | |
|---|---|---|---|---|
| 10. Recommended dose of fertilizers | | | | |
| 25:60:30 NPK | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| v) Zinc Sulphate | 20 kg/ha | 40 | 800 | 400 |
| 11. IPM | | 175 | 350 | 175 |
| Spray of Neem oil and leaf extrect | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| | | | | |
| 14. Harvesting | | | 2500 | 1250 |
| 15. Threshing /Weighing | | | 5000 | 2500 |
| 16. Storage | | | 500 | 250 |
| | | | | |
| | | | | |

| **Variety** | |
|---|---|
| **Barley** | Azad, K-141, Geetajali, Upasna<br>Late- DWR-28, Lakhan |
| **Wheat (*aestivum*)** | K-8027, C-306, LOK-1, HD-2888, Raj-1555<br>Late-Marviya-234, UP-2425 |
| **Durum Wheat** | Malav Shri, Shakti, Ratan |

**5.2.2.4 Demonstrations on fodder and grass cultivation**

| **Name of Crop** | **Stylo hamata (on bund)** |
|---|---|
| **Area under each Demonstration** | 0.50 ha |
| **Total Area of Demonstration** | 10.00 ha |
| **Number of Demonstration** | 20 |
| **Situation** | Rainfed |
| **Seed Requirement** | 250 kg |
| **Seed Amount** | 7500 |

| Detail of Demonstration | Intervention / Technology Adopted | Rate (Rs/kg/ Pkt) | Cost per ha (Rs) | Demonstration Cost (Rs) |
|---|---|---|---|---|
| 1. Name of Varieties | Malav Shri, Shakti, Ratan | | | |
| | | | | |
| 2. Sowing Time | Oct to mid Nov | | | |
| 3. Required Seed | 125 kg/ha | 20 | 2500 | 1250 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | 24 Pkts | 7 | 164 | 84 |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |
| 12. Recommended dose of fertilizers | | | | |
| 25:60:30 NPK | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| | | | | |
| 14. Harvesting | | | 2500 | 1250 |
| 15. Threshing /Weighing | | | 5000 | 2500 |
| 16. Storage | | | 500 | 250 |

| | | | | |
|---|---|---|---|---|
| **Name of Crop** | | | **Berseem** | |
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 2.00 ha | |
| **Number of Demonstration** | | | 4 | |
| **Situation** | | | Irrigated | |
| **Seed Requirement** | | | 30 kg | |
| **Seed Amount** | | | 4500 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Malav Shri, Shakti, Ratan | | | |
| | | | | |
| 2. Sowing Time | Oct to mid Nov | | | |
| 3. Required Seed | 125 kg/ha | 20 | 2500 | 1250 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | 24 Pkts | 7 | 164 | 84 |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |
| 12. Recommended dose of fertilizers | | | | |
| 25:60:30 NPK | | | | |

| | | | | |
|---|---|---|---|---|
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| | | | | |
| 14. Harvesting | | | 2500 | 1250 |
| 15. Threshing /Weighing | | | 5000 | 2500 |
| 16. Storage | | | 500 | 250 |

| **Name of Crop** | | | **Sudan Grass** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 5.00 ha | |
| **Number of Demonstration** | | | 10 | |
| **Situation** | | | Irrigated | |
| **Seed Requirement** | | | 60 kg | |
| **Seed Amount** | | | 4500 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | SSG (Pro-agro)/pioneer | | | |
| | | | | |
| 2. Sowing Time | March to July | | | |
| 3. Required Seed | 20 kg/ha | 80 | 1600 | 800 |

| | | | | |
|---|---|---|---|---|
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | | | | |
| 12. Recommended dose of fertilizers | | | | |
| 25:60:30 NPK | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | | | | |
| Mataka Khad | | | | |
| Insecticides/Fungicides | NA | | | |
| | | | | |

| **Name of Crop** | | | **Lucerne** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 2.00 ha | |
| **Number of Demonstration** | | | 4 | |
| **Situation** | | | Irrigated | |
| **Seed Requirement** | | | 24 kg | |
| **Seed Amount** | | | 2900 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | As per annexure-II | | | |

| | | | | |
|---|---|---|---|---|
| 2. Sowing Time | Oct to mid Nov | | | |
| 3. Required Seed | 15 kg/ha | 100 | 1500 | 750 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | - | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | | | |
| 9. Use of Vermi-compost | By User (Training) | | | |
| 10. Use of NEDAP Compost | By User (Training) | | | |
| 11. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | | | | |
| 12. Recommended dose of fertilizers | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 50 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | | | | |
| Mataka Khad | | | | |
| Insecticides/Fungicides | | | | |
| | | | | |

**5.2.2.5 Demonstrations on medicional and aeromatic plants**

| | | | | |
|---|---|---|---|---|
| **Name of Crop** | | | **Aloe-Vera** | |
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 1.00 ha | |
| **Number of Demonstration** | | | 2 | |
| **Situation** | | | Irrigated | |
| **Rhizomes** | | | 35000 | |
| **Amount** | | | 70000 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Rhizomes | | | |
| | | | | |
| 2. Sowing Time | July | | | |
| 3. Required Seed | 30000 Rhizomes | 0.50 | 15000 | 7500 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |
| 12. Recommended dose of fertilizers | | | | |
| | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |

| | | | | |
|---|---|---|---|---|
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |
| Insecticides/Fungicides | NA | | | |
| | | | | |
| 14. Harvesting | | | 2500 | 1250 |
| 15. Threshing /Weighing | | | 5000 | 2500 |
| 16. Storage | | | 500 | 250 |
| | | | | |

| **Name of Crop** | | | **Tulsi** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 1.00 ha | |
| **Number of Demonstration** | | | 2 | |
| **Situation** | | | Irrigated | |
| **Seed Requirement** | | | 15 kg | |
| **Seed Amount** | | | 3750 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Kali Tulsi | | | |
| | | | | |
| 2. Sowing Time | June to July | | | |
| 3. Required Seed | 5 kg/ha | 500 | 2500 | 1250 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |

| | | | | |
|---|---|---|---|---|
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |
| 12. Recommended dose of fertilizers | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |

| **Name of Crop** | | | **Turmeric** | |
|---|---|---|---|---|
| **Area under each Demonstration** | | | 0.50 ha | |
| **Total Area of Demonstration** | | | 2.00 ha | |
| **Number of Demonstration** | | | 4 | |
| **Situation** | | | Irrigated | |
| **Rhizomes** | | | 15 q | |
| **Amount** | | | 37500 | |
| **Detail of Demonstration** | **Intervention / Technology Adopted** | **Rate (Rs/kg/ Pkt)** | **Cost per ha (Rs)** | **Demonstration Cost (Rs)** |
| 1. Name of Varieties | Rhizomes | | | |
| | | | | |
| 2. Sowing Time | June to July | | | |
| 3. Required Seed | 5 q | 3000 | 15000 | 7500 |
| 4. Land Preparation | | | | |
| 5. Sowing Bullock/Seed drill | Line Sowing | - | - | - |
| 6. Intercultural Operation | - | - | - | - |
| 7. Use Weedicide | - | - | - | - |
| 8. Use of FYM | By User (Training) | 600 | 3600 | 1800 |

| | | | | |
|---|---|---|---|---|
| 9. Use of Vermi-compost | By User (Training) | 150 | 3000 | 1500 |
| 10. Use of NEDAP Compost | By User (Training) | 100 | 3000 | 1500 |
| 11. Bio Fertilizers/Bio-agents | | | | |
| i) Azatobactor + PSB | 12 Pkt + 12 Pkt | 7 | 168 | 84 |
| ii) Rhizobium + PSB | | | | |
| iii) Trichoderma | 2.5 kg/ha (Soil treatment) | 136 | 340 | 170 |
| 12. Recommended dose of fertilizers | | | | |
| i) DAP | 100 kg/ha | 9 | 900 | 450 |
| ii) SSP | | | | |
| iii) Urea | 150 kg/ha | 6 | 900 | 450 |
| iv) MOP | 50 kg/ha | 7 | 350 | 175 |
| | 20 kg/ha | 40 | 800 | 400 |
| 13. IPM | | 175 | 350 | 175 |
| Spray of Neem Seed Kernal | At 15 days interval (10 kg) | 30 | 300 | 150 |
| Mataka Khad | 15 + 15 + 15 + 15 + 2 kg/Lit Water, Neem leave, Cow dung, Cow urine and Gur (62 kg/lit) | 2 | 124 | 62 |

**5.2.2.6 Horticulture/agroforestry development**

. Growing of crops in combination with woody perennial on same piece of land is called agroforestry and it is economically viable and way out to increase the permanent vegetal cover. The estimates for aonla, guava, lemon, bael, ber and silvi-pastoral systems are presented in Table 11.4 to 11.9.

**Table 5.2: Estimate for development of aonla based agroforestry systems (100 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.75x0.75x0.75 m3 | 25.00 | 2500.00 |
| 2. | Average of cost of planting material | 20.00 | 2000.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 250.00 |
| 4. | Cost of planting+1st watering | 4.00/plant | 400.00 |
| 5. | Cost of raising agricultural crops @ Rs. 15,000.00 ha-1 yr-1 | 15000.00 | 15000.00 |
| 6. | Miscellaneous | Lump sump | 2000.00 |
| | | G. Total | 22150.00 |

**Table 5.3: Estimate for development of guava based agroforestry systems (100 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.75x0.75x0.75 m3 | 25.00 | 2500.00 |
| 2. | An average of cost of planting material | 15.00 | 1500.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 250.00 |
| 4. | Cost of planting+1st watering | 4.00/plant | 400.00 |
| 5. | Cost of raising agricultural crops @ Rs. 15,000.00 ha-1 yr-1 | 15000.00 | 15000.00 |
| 6. | Miscellaneous | Lump sump | 2000.00 |
| | | G. Total | 21650.00 |

**Table 5.4: Estimate for development of lemon based agroforestry systems (150 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.75x0.75x0.75 m3 | 25.00 | 3750.00 |
| 2. | Average of cost of planting material | 7.00 | 1050.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 375.00 |
| 4. | Cost of planting+1st watering | 4.00/plant | 600.00 |
| 5. | Cost of raising agricultural crops @ Rs. 15,000.00 ha-1 yr-1 | 15000.00 | 15000.00 |
| 6. | Miscellaneous | Lump sump | 2500.00 |

| | | | |
|---|---|---|---|
| | | G. Total | 23275.00 |

**Table 5.5: Estimate for development of bael based agroforestry systems (100 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.75x0.75x0.75 m3 | 25.00 | 2500.00 |
| 2. | Average of cost of planting material | 10.00 | 1000.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 250.00 |
| 4. | Cost of planting+1st watering | 4.00/plant | 400.00 |
| 5. | Cost of raising agricultural crops @ Rs. 15,000.00 ha-1 yr-1 | 15000.00 | 15000.00 |
| 6. | Miscellaneous | Lump sump | 2000.00 |
| | | G. Total | 21150.00 |

**Table 5.6: Estimate for development of ber based agroforestry systems (150 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.75x0.75x0.75 m3 | 25.00 | 3750.00 |
| 2. | Average of cost of planting material | 10.00 | 1500.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 375.00 |
| 4. | Cost of planting+1st watering | 4.00/plant | 600.00 |
| 5. | Cost of raising agricultural crops @ Rs. 15,000.00 ha-1 yr-1 | 15000.00 | 15000.00 |
| 6. | Miscellaneous | Lump sump | 2500.00 |
| | | G. Total | 23725.00 |

**Table 5.7: Estimate for development of silvopastoral systems (400 trees/ha)**

| S.N. | Work items | Cost/unit (Rs.) | Amount (Rs./ha) |
|---|---|---|---|
| 1. | Digging of pits of 0.6x0.6x0.6 m3 | 13.00 | 5200.00 |
| 2. | Average of cost of planting material | 7.00 | 2450.00 |
| 3. | Carriage charges from nursery to the planting site | 2.50 | 1000.00 |
| 4. | Cost of planting+1st watering | 3.00/plant | 1200.00 |
| 5. | Cost of raising pasture @ Rs. 25,000.00 ha-1 yr-1 (About 38000 slips of different grasses will be required) | 25000.00 | 25000.00 |
| 6. | Miscellaneous | Lump sump | 3000.00 |
| | | G. Total | 38200.00 |

## 5.3 **Livelihood Option for Village Groups / Community**

### **1. Vermi-compost unit**

Capacity – 100 metric tonn per year

| S. No. | Head of Expenditure | Unit | Quantity | Rate (Rs.) | Total Amount (Rs.) |
|---|---|---|---|---|---|
| 1. | Land | Sq. Meter | 4000 | 50000.00 | 50000.00 |
| 2. | Platform | Sq. Meter | 240 | - | 40000.00 |
| 3. | Shed (Angle iron & Asbestos Sheet) | | 240 | - | 120000.00 |
| 4. | Hand pump / Well | - | 01 | - | 40000.00 |
| 5. | Dung | Metric ton | 100 | 500 | 50000.00 |
| 6. | Red worms (*Eisinia fetida)* | Quintal | 01 | 25000 | 25000.00 |
| 7. | Chhanna (Manual) | - | 01 | 8000 | 8000.00 |
| 8. | Weight/Kanta | - | 01 | - | 4000.00 |
| 9. | Implements- Spade, Tasala, Hajara etc. | - | - | - | 2000.00 |
| 10. | Other Expenses & Labour | - | - | - | 25000.00 |
| | **Total** | | | | **364000.00** |

Farmers share is 1- Land, 2- Plate form, 4- Hand pump/Well, 5- Dung & 10- Labour i.e Rs. 50000.00 + 40000.00 + 40000.00 + 50000.00 + 25000.00 = 205000.00 (Rs. Two lakh five thousand only). Remaining amount Rs. 1,59000.00 (Rs. One lakh fifty nine thousand only) will be provided by the project. Term and condition is applied that vermicompost unit will run in participatory mode by the Groups i.e. made by farming community for their livelihood improvement.

Farmers share – 205000.00
Project Share - 159000.00
**Total (Rs.) 364000.00**

**2. Nursery unit**

| S. No. | Head of Expenditure | Unit | Quantity | Rate (Rs.) | Total Amount (Rs.) |
|---|---|---|---|---|---|
| 1. | Land | Acre | 1/2 | 90000.00 | 45000.00 |
| 2. | Fencing | | | | |
| a. | Barbed wire | Quintal | 1.5 | 6600.00 | 9900.00 |
| b. | Concrete polls | No. | 53 | 275.00 | 14575.00 |
| c. | Lobour | No. | 20 | 100.00 | 2000.00 |
| 3. | Boring / Well | No. | 01 | 40000.00 | 40000.00 |
| 4. | Beds preparation, irrigation channels etc. | - | - | - | 10000.00 |
| 5. | Low cost poly house (Bareja) | No. | 01 | - | 5000.00 |
| 6. | Implements- khurpi, Spade, hajara etc. | - | - | - | 2000.00 |
| 7. | Polythene begs | Kg | 150 | 100.00 | 15000.00 |
| 8. | Manure (FYM) | Ton | 2 | 1500.00 | 30000.00 |
| 9. | Chemicals | - | - | - | 1000.00 |
| | **Total** | | | | **174475.00** |

Farmers share is 1- Land, 2- Labour, 3- Boring/Well, 5- Bed & irrigation channels i.e Rs. 45000.00 + 2000.00 + 40000.00 + 10000.00 = 97000.00 (Rs. Ninety seven thousand only). Remaining amount Rs. 77475.00 (Rs. Seventy seven thousand four hundred seventy five only) will be provided by the project. Term and condition is applied that Nursery unit will be run in participatory mode by the Groups i.e. made by farming community for their livelihood improvement.

Farmers share – 97000.00
Project Share - 77475.00
**Total 174475.00**

**Month Wise Plan of Nursery Raising**

Nursery development work takes six months to one year and monthly work for raising of plants is fixed. Here we detailed the plants in village condition of district Lalitpur (UP)

| Months | Details of Plants & work |
|---|---|
| January | Collect the seeds of Sirash, Khair, Aonla, Teak, Bakain, Acacia, Amaltash plant from Forest Deppt. or other reliable sources |
| February | Seed Sowing – Bamboo, Shisham, Sirash, Gulmohar & Seed Treatment of Teak seed by Lime in pit |
| March | Plant Germinated Root Trainer in Polythene Bags for Shisham, Vilayati Babool and Aonla |
| April | Seed sowing should be done of Khair, Aonla, Bamboo and Arjun |
| May | Collect seeds of Kangi, Shemal and Gulmohar |
| June | One year or more old plant of Jamun, Kangi, Arjun and Shisham ready for the sale |
| July | For the next year Germination Plot should be prepared for the Ber, Gulmohar, Khair, Kathal, Jamun, Kangi, Neem etc. and germinated plants of two to three leaves should be transferred in to the Polythene bags |
| August | Sown seed in July transferred into the Polythene bags plots and Neem Seed should be cleaned from flesh and sown in the germinated plots. |
| September | Sowing of Neem, Kachnar, Acacia seeds etc. Polythene bags filling and collect seeds of Gauva |
| October | Polythene filling, Watering etc. |
| November | Polythene filling, Watering etc. |
| December | Polythene filling, Watering etc. |

***Seed collection and arrangement*:**

| Months | Plants |
|---|---|
| January | Teak, Kagzi Neebu, Guava, Khair |
| February | Teak, Kagzi Neebu, Guava, Khair, Cutting of Teak, Aonla |
| March | Teak, Kagzi Neebu, Guava, Khairm Cutting of Teak, Aonla |
| April | Khair, Aonla, Bamboo and Arjun |
| May | Collect seeds of Kangi, Shemal and Gulmohar |
| June | Subabool, Babool, Shemal, Bamboo, Neem, Sheesham, |
| July | Neem, Vilayati Babool, Sesbania |

**3. Goat kids project**

**Shed Cost** : Made by locally available material

| S.No. | Particulars | Amount |
|---|---|---|
| 1. | Thatch Structure / Khapparel Shed (Size: 15 X 300 Feet) with partition for one male | |
| | 1. Khapperrel / Bamboo | 4000.00 |
| | 2. Thatch, Puwal etc. | 1000.00 |
| | 3. Rope Band & Patera | 500.00 |
| | 4. Periphery boundary Kacchi / Stone / Pacca | 3000.00 |
| | 5. Miscellaneous | 1500.00 |
| | **Total** | **10000.00** |

**Input Involved**

| S.No. | Particulars | Amount |
|---|---|---|
| 1. | Kids goat No.- 20 @ 1000 / female | 20000.00 |
| 2. | Adult Male | 3000.00 |
| | **Total** | **23000.00** |

**Recurring Cost**

| S.No. | Particulars | *Amount* |
|---|---|---|
| 1. | Labour- Grazing of Goat (Mandays yearly: One person /day @ Rs. 100 / day | 36000.00 |
| 2. | Feed Cost (@ Rs 4000 / month Annually –) | 48000.00 |
| | Barley & Wheat under size | |
| | Chickpea under size | |
| | Green fodder (Leaf of subabool, lobia, grasses, legumes etc) | |
| | Wheat Straw | |
| 3. | Medicines & Health care (FMD, Deworming & Vaccinations) annually charges and Training | 6000.00 |
| 4. | Insurance (annually) | 1200.00 |
| | **Total** | **91200.00** |
| | **Total Expenditure** | **124200.00** |

Farmers share is 1- Shed, 2- Labour, 3- Feed cost i.e Rs. 10000.00 + 36000.00 + 48000.00 = 94000.00 (Rs. Ninety four thousand only). Remaining amount Rs. 30200.00 (Rs. Thirty thousand and two hundred only) will be provided by the project. Term and condition is applied that Goat unit will be run in participatory mode by the Groups i.e. made by farming community for their livelihood improvement.

Farmers share – 94000.00

Project Share - 30200.00

**Total 124200.00**

**4. Goat rearing project**

Goats create employment to the rural poor including effective utilization of unpaid family labour. Goat rearing is going on in Bundelkhand with traditional grazing system; these include grazing on non-cultivated land, grazing on community land close to the villages. In this system animals are housed at night and let loose for grazing in the daytime with no supplementation with concentrate mixture. The production per animal is low but margin of profit is high as no investment is involved on feeding. Growing habits of grasses, development of pasture on non-cultivated lands is essential in participatory mode. Intensive production system where no grazing land is available the goats are reared on stall feeding. Under this system there is no risk of parasite infestation, maximum protection from adverse weather conditions, however, some space is provided for exercise. When sufficient grazing area is not available supplementary feeding is done in form of concentration mixture or green and dry fodder.

The integration of livestock with crop production is a means of establishing sustainable system that aim to optimize resources use. The realization of such aims will maximize the degree of self-reliance of the system, since a variety of products will be obtained with minimum inputs to maintain soil fertility. The varied activities on the integration farm create employment opportunities for all members of the extended family. Use of native pasture, crop residue and fibrous agro products supplementary feeding whenever necessary for efficient rumen fermentation and high animal productivity. The tree crops are highly appropriate for this region. They capture a large amount of solar enery and they produce sustainable yield of biomass. They reduce erosion, improve soil structure and fertility and plant with shallow roots can be grown under the trees.

***Structures***

Made by locally available material

| **S.No.** | **Particulars** | **Amount** |
|---|---|---|
| 1. | Thatch Structure / Khapparel Shed (Size: 15 X 300 Feet) with partition for one male | |
| | 1. Khapperrel / Bamboo | 4000.00 |
| | 2. Thatch, Puwal etc. | 1000.00 |
| | 3. Rope Band & Patera | 500.00 |
| | 4. Periphery boundary Kacchi / Stone / Pacca | 3000.00 |
| | 5. Miscellaneous | 1500.00 |
| | **Total** | **10000.00** |

***2. Input involved***

| **S.No.** | **Particulars** | **Amount** |
|---|---|---|
| 1. | Adult Female No.- 10 @ 3000 / female | 30000.00 |
| 2. | Adult Male | 3000.00 |
| | **Total** | **33000.00** |

***3. Recurring Cost***

| **S.No.** | **Particulars** | ***Amount*** |
|---|---|---|
| 1. | Grazing of Goat (Mandate yearly: One person /day @ Rs. 100 / day | 36000.00 |
| 2. | Feed Cost (@ Rs 4000 / month Annually –) | 48000.00 |
| | Barley & Wheat under size | |
| | Chickpea under size | |
| | Green fodder (Leaf of subabool, lobia, grasses, legumes etc) | |

| | | |
|---|---|---|
| | Wheat Straw | |
| 3. | Medicines & Health care (FMD, Deworming & Vaccinations) annually charges | 6000.00 |
| 4. | Insurance (annually) | 1200.00 |
| | **Total** | **91200.00** |

Total Expenditure 1, 2 & 3 = 134,200.00

**Output / Receipts from Goat Rearing Project**

| **S.No.** | **Particulars** | ***Amount*** |
|---|---|---|
| | **i. Milk Production:** | |
| 1. | Milk Production (10 Goat)<br>(5 Month @ 1 lit / day / Goat = 1500 lit Sale @ Rs. 15/lit | 22500.00 |
| 2. | Milk Production (4 Month) = 1200 lit @ Rs. 15/lit | 18000.00 |
| | **Total** | **40,500.00** |
| | **B. Selling of Goat Kids (From six Month to 12 year)** | |
| 3. | First Production (after six month from starting) Average two kids (Assumed that ratio of male & female is 50:50)<br>10 male to be sale @ Rs. 1800 / kid<br>10 Female kids retain for next rearing (Rate calculated for next unit) | <br><br>18000.00<br>30000.00 |
| 4. | Second Production (Av. two kids/ goat)<br>10 Old Stock Production – 20 kids<br>(assumed that ratio of male & female is 50:50)<br>a. 10 Male sale @ Rs. 1500 / kid<br>b. 10 Female kids for next rearing @ 2000 / kid | <br><br><br>15000.00<br>20000.00 |
| | **Total** | **83000.00** |
| | **C. Goat Manure** | |
| 5. | After one year 50 q (if not grazed) if grazing is going on then vermi-compost / NADEP Unit is compulsory with each unit | **15000.00** |
| | **D. Permanent Parent Stock** | |
| 6. | 11 Parent - one unit @ Rs. 4000 / Goat | **44000.00** |
| | **Total** | **182500.00** |

**Note:**

1. Two Unit of Goat will be separated from this Unit after 14 months that input cost is included in lower side in respect of rates, which are prevailing in the market.
2. Next Two units will be further distributed to the Participatory groups.
3. One Acre of waste land will produce complete feed for one unit by the growing of Subabool (*Luceana leucocephala*) and grasses (Dhabroo, Dinanath etc.)
4. Growing of grasses and legumes on earthen work is compulsory (*Stylosanthes hamata*, Dina Nath, Dhabroo, *Cenchrus ciliaris*, etc.)

5. Farmers share is 50% of above cost

**Net Return from Goat Rearing Project: 182,500 – 134200 = 48,300.00**

Feeding cost should be included in net return if complete watershed approach adopted, so this return will be just double.

**Information related to the Goat Rearing**

1. **Research Institute:**
   Central Goat Research Institute,
   Farah, Makdoom,
   Mathura U.P.
2. **Local Market for Parent Materials: Jamunapari & Barberi**
   1. Chaura, Kalpi, Jalaun U.P.
   2. Kosi, Mathura
   3. Pukhranya, Kanpur, Dehat

.

**5. Project on Cultivation of Medicinal & Aromatic Plants:**

Name of Crop: Ashwaganda, Sarpgandha, Allovera (Gvarpatha)

**Unit Economics:**

Land Requirement: Five ha (Participatory)

Machinery & Apparatus: Spade, Bucket, Moter (Pump) etc. – 30,000.00

**Input required:**

| | | | |
|---|---|---|---|
| a. | Seed & Planting material | - | 15,000.00 |
| b. | Manure | - | 20,000.00 |
| c. | Miscellaneous | - | 5,000.00 |
| | | **Total** | **40,000.00** |

**Recurring Cost:**

Electric / Pump set (Diesel etc.) 15,000.00

**Worker & Labours**

| S. No. | Particulars | No. | Amount (Rs) |
|---|---|---|---|
| 1. | Full time Labour | 01 @ Rs. 100 / day | 2600.00 |
| 2. | Casual Labour | 05 for 20 days @ Rs. 100 / day | 10000.00 |
| | Total | | 12600.00 |

**Other Expenditure:**

| | | |
|---|---|---|
| a. Transportation | - | 10,000.00 |
| b. Maintenance & Storage etc. | - | 10000.00 |
| c. Stationary & Poster etc. | - | 5000.00 |
| | **Total** | **25000.00** |

**Total Unit Cost**

| | | |
|---|---|---|
| 1. Machinery | - | 30,000.00 |
| 2. Input - | - | 40,000.00 |
| 3. Worker & labour | - | 12600.00 |
| 4. Other Expenditure | - | 25000.00 |
| | Total Expenditure | 107600.00 |

**Unit Profit**

| | |
|---|---|
| Total production from one ha is about Rs. | 250,000.00 |
| Yearly Income from Unit | 142400.00 |

Address for Seed & Other Material used in Unit

1. Central Institute of Medicinal & Aromatic Plants (CIMAP)
P.O. – Ram Sagar, Mishara Nagar , Lucknow

**6. Masala Grinding Project**

**1. Land Requirement;** 1000 Sq Feet Rent Rs. 1500.00 per Month

**2. Capacity:** 300 working days
6480 kg Chilly Powder
6000 kg Coriander Powder
6960 kg Haldi
1200 kg Garam Masal
Job Work

**3. Machinery Required**

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Pulverizer (5 horse power) | 01 | 37000.00 | 37000.00 |
| 2. | Packaging Machine | 01 | 12000.00 | 12000.00 |
| 3. | Taraju, Bant etc | 01 | 4500.00 | 4500.00 |
| 4. | Electrification | 01 | 3500.00 | 3500.00 |
| | **Total** | | | **57000.00** |

**Working Capital / Month**

**4. Raw Material**

| S. No. | Items | Quantity | Rate | Amount (Rs) |
|---|---|---|---|---|
| 1. | Chilly | 540 kg | 40 / kg | 21600.00 |
| 2. | Haldi | 580 kg | 30 kg | 17400.00 |
| 3. | Coriander | 500 kg | 35 | 17500.00 |
| 4. | Jeera | 20 kg | | 5500.00 |
| 5. | Badi Ilaichi | 30 kg | | 3500.00 |
| 6. | Kali Mirch | 40 kg | | 9500.00 |
| 7. | Dal Chinni | 30 kg | | 5000.00 |
| 8. | Laong | 20 kg | | 2800.00 |
| 9. | Packaging Material | 12.00 | | 2500.00 |
| | **Total** | | | **85300.00** |

**Workers & Labours**

1. Skilled Labour 01 @ Rs. 185 / day 5550.00
2. Helper 02 @ Rs. 100 / Day 6000.00

**Total** **11550.00**

**5. Utilities Expenditure per Month**

1. Electricity Expenditure 1000.00
2. Water etc. 1000.00

**Total** **2000.00**

**6. Other Expenditure per Month**

1. Rent 1500.00
2. Postage / Stationary Expenditure 500.00
3. TA. Transportation etc. 2000.00
4. Insurance 500.00
5. Administrative expenses 1200.00

**Total** **5700.00**

**Capital Required per Month**

1. Raw Material 85300.00
2. Worker & Labour 11550.00

3. Utilities Exp. 2000.00
4. Other Exp 5700.00
**Total** **104550.00**

**Total Project Cost**

A. Machinery & Tools 57000.00
B. Capital Running 104550.00
**Total** **161550.00**

**Entrepreneur Share – 50 %**
**Implementing agency share - 50 %**
**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Coriander Powder | 6000 kg | Rs 60 / kg | 360000.00 |
| Michi Powder | 6480 | Rs 65 / kg | 421200.00 |
| Haldi Powder | 6960 kg | 55 / kg | 382800.00 |
| Garam Masal | 1200 | 165 / kg | 192000.00 |
| Job work | | | 150000.00 |
| | **Total** | | **1506000.00** |

**7. Oil Expeller Project**

**1. Land Requirement;** 1250 Sq Feet Rent Rs. 1200.00 per Month
**2. Capacity:** 300 working days
50 kg Mustard / hour
40 % Job Work

**3. Machinery Required**

| **S.No.** | **Particulars** | **No.** | **Rate** | **Total Amount (Rs)** |
|---|---|---|---|---|
| 1. | Oil Expeller (6 Volt Ave. 50 kg / hr ) 7 HP Motor | 01 | 48000 | 48000.00 |
| 2. | Filter Press | 01 | 15000.00 | 15000.00 |
| 3. | Shaft, Patta etc. | - | 7500.00 | 7500.00 |
| 4. | Electrification & furniture | - | 15000.00 | 15000.00 |
| | **Total** | | | **85500.00** |

**Working Capital / Month**

**4. Raw Material**

| S. No. | Items | Quantity | Rate | Amount (Rs) |
|---|---|---|---|---|
| 1. | Mustard | 4500 kg | 18 / kg | 81000.00 |
| | **Total** | | | **81000.00** |

**5. Workers & Labours**

| | | |
|---|---|---|
| 1. Skilled Labour 01 @ Rs. 185 / day | 5550.00 | |
| 2. Helper 01 @ Rs. 100 / Day | 2600.00 | |
| **Total** | | **8150.00** |

**6. Utilities Expenditure per Month**

| | |
|---|---|
| 1. Electricity Expenditure | 3500.00 |
| 2. Water etc. | 1000.00 |
| **Total** | **4500.00** |

**7. Other Expenditure per Month**

| | | |
|---|---|---|
| 1. Rent | 1200.00 | |
| 2. Postage / Stationary Expenditure | | 500.00 |
| 3. TA. Transportation etc. | | 2000.00 |
| 4. Insurance | | 500.00 |
| 5. Administrative expenses | | 1200.00 |
| **Total** | | **5400.00** |

**8. Capital Required per Month**

| | | |
|---|---|---|
| 1. Raw Material | 81000.00 | |
| 2. Worker & Labour | | 8150.00 |
| 3. Utilities Exp. | | 4500.00 |
| 4. Other Exp | | 5400.00 |
| **Total** | | **99050.00** |

**Total Project Cost**

| | | |
|---|---|---|
| A. Machinery & Tools | 85500.00 | |
| B. Capital Running | | 99050.00 |
| **Total** | | **184550.00** |

Entrepreneur Share – 50 %
Implementing agency share - 50 %

**Assumed Profit**

| Particulars | Quantity | Rate | Amount (Rs) |
|---|---|---|---|
| Mustard Oil | 19440 | Rs 60 / kg | 1166400.00 |
| Cake | 34590 | Rs15 / kg | 518850.00 |
| Job Work | - | - | 550000.00 |
| | **Total** | | **2235250.00** |

**8. Papad Making Unit**

**1. Land Requirement;** 1000 Sq Feet Rent Rs. 1000.00 per Month

**2. Capacity:** 300 working days
6960 kg urd Papad
4620 kg Moong Papad

**3. Machinery Required**

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Papad Making Machine (with ¼ HP motor) | 01 | 28000.00 | 28000.00 |
| 2. | Aata mixing machine (with motor) | 01 | 25000.00 | 25000.00 |
| 3. | Loi making Machine (with motor) | 01 | 27000.00 | 27000.00 |
| 4. | Loi Pressing Machine hand running | 01 | 3500.00 | 3500.00 |
| 5. | Other Pans & Apparatus | - | - | 5000.00 |
| 6. | Electrification | - | - | 7500.00 |
| 7. | Furniture & Other | - | - | 7500.00 |
| | **Total** | | | **103500.00** |

**Working Capital / Month**

**4. Raw Material**

| S. No. | Items | Quantity | Rate | Amount (Rs) |
|---|---|---|---|---|
| 1. | Moong Aata | 350 kg | 30 kg | 10500.00 |
| 2. | Urd Aata | 495 kg | 35 kg | 17352.00 |
| 3. | Jeera | 20 kg | 55 kg | 1100.00 |
| 4. | Papad Khar | 33 kg | 20 / kg | 660.00 |
| 5. | Salt | 33 kg | 10 / kh | 330.00 |
| 6. | Hing | 1 kg | | 150.00 |
| 7. | Lal Mich, Kali Mirch, | | | 2000.00 |
| 8. | Other packing material | | | 5000.00 |

| | | | | |
|---|---|---|---|---|
| | **Total** | | | **37092.00** |

**Workers & Labours**

| | | |
|---|---|---|
| 1. Skilled Labour 01 @ Rs. 185 / day | 5550.00 | |
| 2. Helper 02 @ Rs. 100 / Day | 5200.00 | |
| **Total** | | **10750.00** |

**5. Utilities Expenditure per Month**

| | | |
|---|---|---|
| 1. Electricity Expenditure | | 750.00 |
| 2. Water etc. | | 1000.00 |
| **Total** | | **1750.00** |

**6. Other Expenditure per Month**

| | | |
|---|---|---|
| 1. Rent | 1000.00 | |
| 2. Postage / Stationary Expenditure | | 500.00 |
| 3. TA. Transportation etc. | | 2000.00 |
| 4. Insurance | | 500.00 |
| 5. Administrative expenses | | 1200.00 |
| **Total** | | **5200.00** |

**7. Capital Required per Month**

| | | |
|---|---|---|
| 1. Raw Material | 37092.00 | |
| 2. Worker & Labour | | 10750.00 |
| 3. Utilities Exp. | | 1750.00 |
| 4. Other Exp | | 5200.00 |
| **Total** | | **54792.00** |

**Total Project Cost**

| | | |
|---|---|---|
| A. Machinery & Tools | 103500.00 | |
| B. Capital Running | | 54792.00 |
| **Total** | | **158292.00** |

Entrepreneur Share – 50 %
Implementing agency share - 50 %

**Assumed Profit**

| Particulars | Quantity | Rate | Amount (Rs) |
|---|---|---|---|
| Moong Papad | 4620 kg | Rs 66 / kg | 304920.00 |
| Urd Papad | 6960 kg | Rs75 / kg | 522000.00 |
| | **Total** | | **826920.00** |

**9. Wooden Furniture Unit**

1. Land Requirement; 40 X 20 Feet Rent Rs. 2000.00 per Month
2. Capacity: 300 working days
3. Machinery Required

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Aari , Rabdha, Hammer, etc. | - | - | 18000.00 |
| 2. | Small Aara Machine (1/2 HP Motor) | 01 | 38000.00 | 38000.00 |
| 4. | Other Pans etc. | - | - | 5000.00 |
| | **Total** | | | **61000.00** |

**Working Capital / Month**

**4. Raw Material**

| S. No. | Items | Quantity | Rate | Amount (Rs) |
|---|---|---|---|---|
| 1. | Sheesham, Teak wood etc. | - | - | 150000.00 |
| 2. | Keel, Pench, Primar, etc. | - | - | 12000.00 |
| 3. | Favicole, Ply wood, Sun Mica eyc. | - | - | 25000.00 |
| | **Total** | | | **248000.00** |

**5. Workers & Labours**

1. skilled Karigar @ 250 / Day 7500.00
2. Labour 02 @ Rs. 100 / Day 5200.00

**Total** **12700.00**

**6. Other Expenditure per Month**

1. Rent 2000.00
2. Postage / Stationary Expenditure 500.00
3. TA. Transportation etc. 2000.00
4. Insurance 500.00
5. Administrative expenses & Sale Rapper etc. 2500.00

**Total** **7500.00**

**7. Capital Required per Month**

1. Raw Material 248000.00
2. Worker & Labour 12700.00

3. Other Exp 7500.00

**Total** **268200.00**

**Total Project Cost**

A. Machinery & Tools 61000.00

B. Capital Running 268200.00

**Total** **329200.00**

Entrepreneur Share – 50 %

Implementing agency share - 50 %

**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Furniture made | - | Per month | 2,62000.00 |
| | 300 days / Years | | 2620000.00 |
| | **Total** | | **800000.00** |

**10. Mini Dal Mill Unit**

**1. Land Requirement;** 1250 Sq Feet Rent Rs. 1200.00 per Month

**2. Capacity:** 300 working days

10 quintal / day

40 % Job work (Community Basis)

**3. Machinery Required**

| **S.No.** | **Particulars** | **No.** | **Rate** | **Total Amount (Rs)** |
|---|---|---|---|---|
| 1. | Mini Dal Mill (IIPR Kanpur) | 01 | 42000 | 42000.00 |
| 2. | Other Utensils | - | - | 5000.00 |
| 3. | Shaft, Patta etc. | - | 7500.00 | 7500.00 |
| 4. | Other (electric etc.) | - | - | 3000.00 |
| | **Total** | | | **57500.00** |

**Working Capital / Month**

**4. Raw Material**

| **S. No.** | **Items** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|---|
| 1. | Urd, Moong, chickpea, Pea | 100 q | 2500 / q | 250000.00 |
| | **Total** | | | **250000.00** |

**5. Workers & Labours**

1. Skilled Labour 01 @ Rs. 185 / day 5550.00

2. Helper 01 @ Rs. 100 / Day 2600.00

**Total** **8150.00**

**6. Utilities Expenditure per Month**

1. Electricity Expenditure 3500.00

2. Sailling 7 Drying etc 7500.00

| | | | |
|---|---|---|---|
| | **Total** | | **11000.00** |
| **7.** | **Other Expenditure per Month** | | |
| | 1. Rent | 1200.00 | |
| | 2. Postage / Stationary Expenditure | | 500.00 |
| | 3. TA. Transportation etc. | | 2000.00 |
| | 4. Insurance | | 500.00 |
| | 5. Administrative expenses | | 1200.00 |
| | **Total** | | **5400.00** |
| **8.** | **Capital Required per Month** | | |
| | 1. Raw Material | 250000.00 | |
| | 2. Worker & Labour | | 8150.00 |
| | 3. Utilities Exp. | | 11000.00 |
| | 4. Other Exp | | 5400.00 |
| | **Total** | | **274550.00** |
| **Total Project Cost** | | | |
| | A. Machinery & Tools | 57500.00 | |
| | B. Capital Running | | 274550.00 |
| | **Total** | | **332050.00** |

Entrepreneur Share – 50 %
Implementing agency share - 50 %

**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Dal of different kind | 1500 q | Rs Ave 3000 / q | 4500000.00 |
| Job Work | - | - | 500000.00 |
| | **Total** | | **5000000.00** |

**11. Small Dairy Farm Unit**

**1. Land Requirement;**

5 Buffaloes/Cows Unit Requires: 400 Sq Feet covered area (thatched) made by local material and Approximately 1000 sq feet open area

Rent Rs. 2000.00 per Month

**2. Capacity:** 5 Animal Unit

**3. Live Stock & Machinery Required**

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Buffaloes / Cows (Murra/ Tharparkar) | 05/05 | 30000 / animal | 150000.00 |
| 2. | Milk Can | 06 | 500 | 3000.00 |
| 3. | Balty | 10 | 150 | 1500.00 |
| 4. | Chaff cutter (with Motor) | 01 | 3500 | 3000.00 |
| 5. | Other pans etc. | - | - | 2000.00 |
| | **Total** | | | **159500.00** |

**Working Capital / Month**

**4. Raw Material**

| S. No. | Items | Quantity | Rate | Amount (Rs) |
|---|---|---|---|---|
| 1. | Bhusa / month | 20 quintal | 180 / q | 3600.00 |
| 2. | Green Fodder / Concentrate Feed etc. | 6 kg/ Buffalo & 4 kg / Cow Appro. 1000 kg | 10 kg | 10000.00 |
| | **Total** | | | **13600.00** |

**5. Workers & Labours**

| | | |
|---|---|---|
| 1. Skilled Labour 01 @ Rs. 185 / day | 5550.00 | |
| 2. Helper 02 @ Rs. 100 / Day | 2600.00 | |
| **Total** | | **8150.00** |

**6. Other Expenditure per Month**

| | | |
|---|---|---|
| 1. Rent | 2000.00 | |
| 2. Postage / Stationary Expenditure | | 500.00 |
| 3. TA. Transportation etc. | | 2000.00 |
| 4. Insurance | | 1200.00 |
| 5. Administrative expenses | | 1200.00 |
| **Total** | | **6900.00** |

**7. Capital Required per Month**

| | | |
|---|---|---|
| 1. Raw Material | 13600.00 | |
| 2. Worker & Labour | | 8150.00 |
| 3. Other Exp | | 6900.00 |
| **Total** | | **28650.00** |

**Total Project Cost**

A. Live Stock & Machinery/Tools 159500.00

B. Capital Running 28650.00

**Total** **188150.00**

Entrepreneur Share – 50 %

Implementing agency share - 50 %

**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Milk sale (peak) | 9000 lit | Rs 15 / lit. | 135000.00 |
| Dry Spell | 4500 lit | Rs. 15 / lit | 67500.00 |
| | **Total** | | **202500.00** |

**12. Small Poultry Unit**

**A. Capital Investment**

1. Broiler House Tubular Structure

Approximately 1000 sq @ Rs 100 / sq feet = 1,00,000.00

2. Broiler Apparatus

a. Adult Feeder 25 Nos. @ Rs. 250 / No. 6250.00

b. Chick Feeder 25 Nos. @ 75 / No. 1875.00

3. Brooder Automatic 03 Nos. @ Rs. 1250 / No. 3750.00

4. Electric Fitting etc. 7500.00

**Total** **119375.00**

**B. Working Capital:**

1. 1000 chicks one day old @ 12 / Chick 12000.00
2. Balanced Broiler Feed for 45 days @ 2.5 gm/ chick Rs. 6.00 / kg 15,000.00
3. Poultry Liter (wooden Powder) 2500.00
4. Medicines 2000.00
5. Transport 1000.00
6. Working Staff & labour 5500.00
7. Other Expenses 5000.00

**Total** **43000.00**

**Total Unit Cost**

1. Capital Investment – 119375.00
2. Working Capital - 43000.00

**Total** **162375.00**

Entrepreneur Share – 50 %

Implementing agency share - 50 %

**Returns**

1. Broiler 1000 Birds (Live weight –1.30 kg) @ Rs. 70 / Bird 70000.00
2. Poultry Manure 1500.00

3. Feed Blank Gunny Bags 2500.00

**Total** **74000.00**

**Total Five Crops will made in a year, So Net Return = 3,70,000.00**

**13. Motor Mechanic Workshop**

1. Land Requirement; 1250 Sq Feet Rent Rs. 1200.00 per Month
2. Capacity: 300 working days

Moror Bike, Tractor, Diesel Engine etc

**3. Machinery Required**

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Instruments | | | 50000.00 |
| 2. | Shed etc | - | - | 50000.00 |
| | **Total** | | | **100000.00** |

**4. Workers & Labours**

1. Skilled Labour 01 @ Rs. 185 / day 5550.00
2. Helper 01 @ Rs. 100 / Day 2600.00

**Total** **8150.00**

**5. Utilities Expenditure per Month**

1. Electricity Expenditure 3500.00

**6. Other Expenditure per Month**

1. Rent 1200.00
2. Postage / Stationary Expenditure 500.00
3. TA. Transportation etc. 2000.00
4. Insurance 500.00
5. Administrative expenses 1200.00

**Total** **5400.00**

**7. Capital Required per Month**

1. Worker & Labour 8150.00
2. Utilities Exp. 3500.00
3. Other Exp 5400.00

**Total** **17050.00**

**Total Project Cost**

A. Machinery & Tools 100000.00
B. Capital Running 17050.00

**Total** **117050.00**

Entrepreneur Share – 50 %
Implementing agency share - 50 %

**Assumed Profit**

| Particulars | Quantity | Rate | Amount (Rs) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Job work | Rs. 20000/Month | | 240000.00 |
| | **Total** | | **240000.00** |

**14. Barber Shop**

1. Shop area / rent ; Rs. 100.00 per Month
2. Capacity: 300 working days
3. Machinery Required

| S.No. | Particulars | No. | Rate | Total Amount (Rs) |
|---|---|---|---|---|
| 1. | Instruments & Mirrors etc. | | | 50000.00 |
| 2. | Shed etc | - | - | 50000.00 |
| | **Total** | | | **100000.00** |

**4. Workers & Labours**

1. Skilled Labour 01 @ Rs. 185 / day 5550.00

**5. Utilities Expenditure per Month**

1. Electricity Expenditure 3500.00

**6. Other Expenditure per Month**

1. Rent 1000.00
4. Insurance 500.00

**Total** **1500.00**

**7. Capital Required per Month**

1. Worker & Labour 5550.00
2. Utilities Exp. 3500.00
3. Other Exp 1500.00

**Total** **10550.00**

**Total Project Cost**

| | | |
|---|---|---|
| A. Machinery & Tools | 100000.00 | |
| B. Capital Running | | 10550.00 |
| **Total** | | **110550.00** |

Entrepreneur Share – 50 %
Implementing agency share - 50 %

**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Job work | Rs. 1500/Month | | 180000.00 |
| | **Total** | | **180000.00** |

**15. Rope making Unit (Linseed)**

1. Land Requirement; ½ acre
2. Capacity: 300 working days
3. Machinery, raw material & Building Required

| **S.No.** | **Particulars** | **No.** | **Rate** | **Total Amount (Rs)** |
|---|---|---|---|---|
| 1. | Rope making machine | 01 | 35000 | 35000.00 |
| 2. | Decomposing structure | 01 | 25000 | 25000.00 |
| 3. | Shed cum office | 01 | 25000 | 25000.00 |
| 4. | Raw material (linseed stem) | 20 ton | 6000/ton | 60000.00 |
| | **Total** | | | **145000-00** |

**4. Workers & Labours**

| | | |
|---|---|---|
| 1. Skilled Labour 01 @ Rs. 185 / day | 5550.00 | |
| 2. Helper 01 @ Rs. 100 / Day | 2600.00 | |
| **Total** | | **8150.00** |

**5. Utilities Expenditure per Month**

| | |
|---|---|
| 1. Electricity Expenditure | 3500.00 |

**6. Other Expenditure per Month**

| | | |
|---|---|---|
| 1. Rent | 1200.00 | |
| 2. Postage / Stationary Expenditure | | 500.00 |
| 3. TA. Transportation etc. | | 2000.00 |
| 4. Insurance | | 500.00 |
| 5. Administrative expenses & marketing | | 1800.00 |
| **Total** | | **6000.00** |

**7. Capital Required per Month**

| | |
|---|---|
| 1. Worker & Labour | 8150.00 |
| 2. Utilities Exp. | 3500.00 |
| 3. Other Exp | 6000.00 |

**Total** **17650.00**

**Total Project Cost**

A. Machinery & Tools 145000.00

B. Capital Running 17650.00

**Total** **162650.00**

Entrepreneur Share – 50 %

Implementing agency share - 50 %

**Assumed Profit**

| **Particulars** | **Quantity** | **Rate** | **Amount (Rs)** |
|---|---|---|---|
| Rope | 15 ton rope / yr | 12000 / ton | 180000.00 |
| Job work | - | | 50000.00 |
| | **Total** | | **230000.00** |

**16. Organic Product Unit**

| S. No | Particulars | Description |
|---|---|---|
| 1 | Cereals | Duram Wheat – as grown by the local growers on small groups basis |
| 2 | Pulses | Chickpea, pea, lentil, Urd, Moong and Arhar |
| 3 | Fruits | Aonla |

Above crops to be identified according to the Agro climatic situation (Land, situations, irrigations etc)

Work Plan

1. Identification of commodities groups
2. Informations of groups and their land and farming system approach
3. Certification process
4. Practices for organic growing

Certification Charges For Five Years

| S.No. | Details of Certification | Amount (Rs) |
|---|---|---|
| 1 | 1st year – Travel & Inspection 7000 / day | 49000.00 |
| | Report Preparation | 5000.00 |
| | Certification | 5000.00 |
| | Others (Stationary etc) | 1000.00 |
| | Total | 60000.00 |
| 2. | 2nd year | 60000.00 |
| 3 | 3rd year | 60000.00 |
| 4 | 4th Year | 60000.00 |
| 5 | 5th year | Self by the groups |
| | Total | 240000.00 |
| | PIA Share – 50 % | 120000.00 |
| | Group Share – 50 % | 120000.00 |

**17. Seed Production and Seed Bank**

**Existing Problem:** Seed replacement

| S. No. | Particulars | Analysis of Problem | |
|---|---|---|---|
| 1. | Quality of Seed | Very poor | Low Yield of Crops |
| 2. | Availability of Seed | Untimely | Effect the Yield of crops |
| 3. | Seed Rate (at the time of sowing) | Higher 1.5 to 2.0 times then recommendation | Money loss |
| 4. | Productivity | Very Low | Lack of awareness about seed and ICM |
| 5. | Replacement rate of Seed | Nil | Low productivity |

**Objectives:**

1. To improve the quality of uncertified seed (farmer's seed) or Truthful seed at village level.
2. To increase the production and productivity.
3. To create awareness among the farmers about quality seed, seed rate and method of sowing.
4. To generate employment for unemployed rural youth.
5. To save grain for extra use and income.
6. Multiplication of seed of newly released varieties suitable for microclimate.

**Work Plan:**

1. Formation of advisory committees
2. Selection of farmers for seed production in groups.

3. Selection of land according to crops requirement.
4. Arrangement of seed before the main season from different universities / states.
5. Field visits of farmers for truthful seed and for certification by certified agencies
6. Marketing of seed by groups or e marketing.

**Seed Multiplication Table**

| S. No. | Crop | Required seed (q/ha) | Productivity q/ha | Area sown (ha) | Required seed (q) |
|---|---|---|---|---|---|
| 1. | Durum Wheat | 1.00 | 18.00 | 40 | 40.00 |
| 2. | Chickpea | 1.00 | 12.00 | 20 | 20.00 |
| 3. | Field Pea | 1.00 | 12.00 | 20 | 20.00 |
| 4. | Lentil | 0.60 | 11.00 | 20 | 12.00 |
| 5. | Urd | 0.50 | 4.00 | 10 | 5.00 |
| 6. | Moong | 0.50 | 4.00 | 10 | 5.00 |

**Input Required**

2. Seed:

| S. No. | Crop | Required seed (in quintal) | Approximately Rate of Seed (Rs./q) | Amount (Rs.) |
|---|---|---|---|---|
| 1. | Durum Wheat | 40.00 | 2500 | 100000 |
| 2. | Chickpea | 20.00 | 6500 | 130000 |
| 3. | Field Pea | 20.00 | 5400 | 108000 |
| 4. | Lentil | 12.00 | 6000 | 72000 |
| 5. | Urd | 5.00 | 5500 | 27500 |
| 6. | Moong | 5.00 | 5600 | 28000 |
| | **Total** | | | **465500** |

3. Cost of Cultivation: From sowing to harvesting all activities should be done by the individual farmer under the Self help group.
4. Drying, Sorting & Cleaning at village level:
   10 Labour Rs. @ 100 for one day for each crop for one ha produce for wheat
   5 labour Rs. @ 100 for one day for each crop for one ha produce for pulses

| Crop | Area (ha) | Labour for one ha | Amount (Rs.) |
|---|---|---|---|
| Durum Wheat | 40.00 | 1000 | 40000.00 |
| Chickpea | 20.00 | 500 | 10000.00 |
| Field Pea | 20.00 | 500 | 10000.00 |
| Lentil | 12.00 | 500 | 6000.00 |
| Urd | 5.00 | 500 | 2500.00 |
| Moong | 5.00 | 500 | 2500.00 |

| | | | |
|---|---|---|---|
| **Total** | **102** | | **71000.00** |

5. Registration Fees (@ Rs 450 /ha 45900.00
6. Packaging (hand Sieving machine) **5500.00**
7. Jute Bags ( bags of 40 kg Total No. 3430) **51450.00**
8. Transportation & services charges etc. 20000.00

**Total** **122850.00**

**Income from one Unit & Area Expansion with good productivity**

| S. No. | Crop | Production | Rate / q | Total Amount (Rs.) | Area can be sown |
|---|---|---|---|---|---|
| 1. | Durum Wheat | 720 | 2000 | 1440000 | 720 |
| 2. | Chickpea | 240 | 5000 | 1200000 | 240 |
| 3. | Field Pea | 240 | 4500 | 1080000 | 240 |
| 4. | Lentil | 132 | 4500 | 594000 | 220 |
| 5. | Urd | 20 | 4000 | 80000 | 40 |
| 6. | Moong | 20 | 4200 | 84000 | 40 |
| | **Total** | **1372** | | **4478000** | **1500** |

- At least 2 units will be established in the whole cluster of watershed by the self help groups.
- Interested SHGs will be preferred and village community work for seed bank and deposit seeds for higher production and increasing the area of the watershed under the cluster approach.
- The production from seed production unit will be used as seed bank by SHGs and other villagers of productivity enhancement. The SHGs will get money from other farmers on behalf of their seed and the benefited farmers will take an oath to spread these seed for higher productivity in the watershed to other farmers.

**Outcomes from Seed Production & Seed Bank programme**

| S. No. | Crop | Production | Total Amount (Rs.) | Two unit in cluster | Area can be sown (ha) |
|---|---|---|---|---|---|
| 1. | Durum Wheat | 720 | 1440000 | 2880000 | 1440 |
| 2. | Chickpea | 240 | 1200000 | 2400000 | 480 |
| 3. | Field Pea | 240 | 1080000 | 2160000 | 480 |
| 4. | Lentil | 132 | 594000 | 1188000 | 440 |
| 5. | Urd | 20 | 80000 | 160000 | 80 |
| 6. | Moong | 20 | 84000 | 168000 | 80 |
| | **Total** | **1372** | **4478000** | **8956000** | **3000.00** |

- It is very clear from the production of seed and their bank which will run in participatory mode in the watershed

# DESIGN AND ESTIMATES OF ACTIVITIES

## ESTIMATE OF DROP SPILLWAY

Barata

**Soil Conservation Unit**
**Name of Yojana**
**Name of Project**
**Name of Work** **W.H.B.** **Kh.No.**

| S.N. | Particulars | Nos | Length (M) | Width (M) | Height (M) | Quantity (Cmt) |
|---|---|---|---|---|---|---|
| 1 | **Earth Work in Foundation** | | | | | |
| | Crest Wall | 1 | 5.05 | 1.70 | 1.30 | 11.16 |
| | Headwall Extt. | 2 | 3.40 | 0.80 | 1.30 | 7.07 |
| | Side Wall | 2 | 5.29 | 0.80 | 1.30 | 11.00 |
| | D/s Wing Wall | 2 | 2.60 | 0.80 | 1.30 | 5.41 |
| | Toe Wall | 1 | 5.05 | 0.80 | 1.30 | 5.25 |
| | Aprone bed | 1 | 5.05 | 4.00 | 1.30 | 26.26 |
| | **Total** | | | | | **66.16** |
| 2 | **Sand Filling in Foundation** | | | | | |
| | Crest Wall | 1 | 5.05 | 1.60 | 0.10 | 0.81 |
| | Headwall Extt. | 2 | 3.30 | 0.70 | 0.10 | 0.46 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Side Wall | 2 | 5.29 | 0.70 | 0.10 | 0.74 |
| | D/s Wing Wall | 2 | 2.50 | 0.70 | 0.10 | 0.35 |
| | Toe Wall | 1 | 5.05 | 0.70 | 0.10 | 0.35 |
| | Aprone bed | 1 | 5.05 | 4.00 | 0.10 | 2.02 |
| | **Total** | | | | | **4.73** |
| 3 | **Cement Concrete Work(1:4:8) Mix** | | | | | |
| | Crest Wall | 1 | 5.05 | 1.60 | 0.20 | 1.62 |
| | Headwall Extt. | 2 | 3.30 | 0.70 | 0.20 | 0.92 |
| | Side Wall | 2 | 5.29 | 0.70 | 0.20 | 1.48 |
| | D/s Wing Wall | 2 | 2.50 | 0.70 | 0.20 | 0.70 |
| | Toe Wall | 1 | 5.05 | 0.70 | 0.20 | 0.71 |
| | Aprone bed | 1 | 5.05 | 4.00 | 0.20 | 4.04 |
| | **Total** | | | | | **9.47** |
| 4 | **Stone Masonry Work(1:4) Mix** | | | | | |
| | Crest Wall I Step | 1 | 5.05 | 1.60 | 0.30 | 2.42 |
| | Crest Wall IInd Step(1.6+.95) | 1 | 5.05 | 1.28 | 1.75 | 11.27 |
| | Headwall Extt. I Step | 2 | 3.30 | 0.70 | 0.30 | 1.39 |
| | Headwall Extt. IInd Step(.7+.5) | 2 | 3.30 | 0.60 | 2.80 | 11.09 |
| | Side Wall I Step | 2 | 5.29 | 0.70 | 0.30 | 2.22 |
| | Side Wall IInd Step(.7+.52) | 2 | 5.29 | 0.65 | 1.20 | 8.25 |
| | Side Wall IIIrd Step | 2 | (5.29+3.3)/2 | 0.55 | 1.60 | 7.56 |
| | D/s Wing Wall I Step | 2 | 2.50 | 0.70 | 0.30 | 1.05 |
| | D/s Wing Wall IInd Step(.7+.5) | 2 | 2.50 | 0.60 | 1.20 | 3.60 |
| | Toe Wall I Step | 1 | 5.05 | 0.70 | 0.30 | 1.06 |
| | Toe Wall IInd Step | 1 | 5.05 | 0.70 | 0.50 | 1.77 |
| | Aprone bed | 1 | 5.05 | 4.00 | 0.30 | 6.06 |
| | **Total** | | | | | **57.74** |
| 5 | **Plastering Work(1:3) Mix** | | | | | |
| | Crest Wall I Step | 1 | 5.05 | 4.70 | | 23.74 |
| | Headwall Extt. Top | 2 | 3.30 | 0.50 | | 3.30 |
| | Headwall Extt. (out side) | 2 | 3.30 | | 1.15 | 7.59 |
| | Side Wall Top | 2 | 6.17 | 0.50 | | 6.17 |
| | Side Wall ( in side) | 2 | 4.00 | | 0.50 | 4.00 |
| | Wing Wall (Top+side ) | 2 | 2.50 | 1.20 | | 6.00 |
| | Toe Wall (Top +Height) | 1 | 5.05 | 0.00 | 1.20 | 6.06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Aprone bed | 1 | 5.05 | 4.00 | | 20.20 |
| | **Total** | | | | | 77.06 |
| 6 | **Pointing Work(1:2) Mix** | | | | | |
| | Headwall Extt. | 2 | 3.30 | | 1.10 | 7.26 |
| | Headwall Extt. Up Head wall | 2 | 0.60 | | 1.24 | 1.49 |
| | Side Wall IInd Step | 2 | 4.25 | 0.00 | 0.70 | 5.95 |
| | Side Wall IIIrd Step | 2 | (5.29+3.3)/2 | | 1.60 | 13.74 |
| | Wing Wall | 2 | 0.00 | | 0.60 | 0.00 |
| | **Total** | | | | | 28.44 |

## Abstract of Material

| S.No. | Item | Qty | Unit | Cemrnt (Bags) | Sand (Cmt.) | Grit (Cmt.) | Khanda (Cmt.) | Total |
|---|---|---|---|---|---|---|---|---|
| 1 | Sand Filling | 4.73 | Cmt. | 0.00 | 4.73 | 0.00 | 0.00 | |
| 2 | Cement Concrete (1:4:8) | 9.47 | Cmt. | 32.19 | 4.36 | 8.81 | 0.00 | |
| 3 | Stone Masonary (1:4) | 57.74 | Cmt. | 184.76 | 25.98 | 0.00 | 57.74 | |
| 4 | Plastering (1:3) | 77.06 | Sq.Mtr. | 14.32 | 1.54 | 0.00 | 0.00 | |
| 5 | Pointing (1:2) | 28.44 | Sq.Mtr. | 1.99 | 0.14 | 0.00 | 0.00 | |
| | **Total:-** | | | 233.27 | 36.75 | 8.81 | 57.74 | |
| | **Say:-** | | | 233.00 | 36.70 | 8.80 | 57.70 | |
| | Unit Rate | | | 292.00 | 546.00 | 1078.00 | 1100.00 | |
| | Cost of Material | | | 68036.00 | 20038.20 | 9486.40 | 63470.00 | 161030.60 |
| | Weight of Material (ton) | | | 11.65 | 57.34 | 12.39 | 83.62 | 165.01 |

**Labour Cost (B)**

| S.No. | Item | Qty | Rate | Mason | Beldar | Remark |
|---|---|---|---|---|---|---|
| 1 | E/W in Foundation | 66.16 | 2.3Cmt./MD | 0.00 | 38.46 | |
| 2 | Sand Filling in Foundation | 4.73 | 4Cmt./MD | 0.00 | 1.18 | |
| 3 | Cement Concrete (1:4:8) | 9.47 | 5Cmt./Mas | 1.89 | 43.55 | |
| 4 | RRS/M Work (1:4) | 57.74 | 1.0Cmt./Mas | 57.74 | 115.48 | |
| 5 | Plaster work (1:3) | 77.06 | 8Sqmt./Mas | 9.63 | 14.45 | |
| 6 | Pointing work (1:2) | 28.44 | 10Sqmt./Mas | 2.84 | 2.84 | |
| 7 | Head Load with Lead 50Mtr. | 165.01 | 1.41 MD/Ton | 0.00 | 14.85 | |
| 8 | Cuering | 7 days | .5MD/day | 0.00 | 0.00 | |
| 9 | Water Charge | 3%of cost | 41.0MD | 0.00 | 62.00 | |
| 10 | Gapfilling | 66.16 | 3.0Cmt./MD | 0.00 | | |
| | **Total** | | | 72.11 | 292.82 | |
| | **Say** | | | 72.00 | 292.00 | |
| | **Unit Rate** | | | 185.00 | 120.00 | |
| | **Laboure wise cost** | | | 13320.00 | 35040.00 | **48360.00** |
| | **Total Str. Cost** | **(LC+M C )** | | | | **209390.60** |

# 2- Sample Design of Checkdam/Drop Structure

| | | | | | | |
|---|---|---|---|---|---|---|
| HYDROLOGIC DESIGN | | | | | | |
| Area (ha) | 210 | | | | | |
| slope | 0.0071 | | | | | |
| K | 7.47 | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| a | 0.17 | | | | | |
| b | 0.75 | | | | | |
| n | 0.96 | | | | | |
| Time of Concentration | | | | | | |
| | | Le.77 | Se-0.385 | | | |
| L (m) | 3500 | 535.71 | | | | |
| S | 0.0071 | | 6.7028 | | | |
| | | hour | Tc + b | | (tc+b) power n | |
| Tc | 69.913 | 1.1652 | 1.9152 | | 1.8661 | |
| Intensity | | | | | | |
| | | Tr power a | | | | |
| Tr | 15 | 1.5847 | | | | |
| I | | 6.3435 | | | | |
| Discharge | | | | | | |
| | | | Taken | | | |
| | c | 0.6 | Coeff | | | |
| | I | 63.435 | mm/hr | | | |
| | A | 210 | ha | | | |
| | Q | 22.202 | | | Cumec | |

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- 
- 
- 
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| | | | | | | |
|---|---|---|---|---|---|---|
| HYDRAULIC DESIGN | | | | | | |
| | Length of crest weir (m) | | 9.5 | | | |
| | Weir height (m) | | h | | | |
| | | Q = 1.71*L*h power (3/2) | | | | |
| | | h power 3/2 | 1.3667 | | | |
| | | h | 1.2313 | 1.25 | h1 | |
| | | h + free board | 1.3544 | 1.35 | | |

| | | | | | |
|---|---|---|---|---|---|
| | Depth of gulley | 3.38 | | | |
| | Height of water drop (H) | 2.03 | | Say | 2 |

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| STABILITY ANALYSIS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Let | | | Top width (m) | t | 1.2 | | | |
| | | | | Bottom width (m) | T | 1.9 | | | |
| | Weight of dam per unit length (kg) | | | | W | 6820 | | W square | 46512400 |
| | Horizontzl water pressure (Kg) | | | | P | 2000 | | P square | 4000000 |
| | Uplift pressure (kg) | | | | U | (T*w*H)/2 | 1900 | | |
| | Net downword force (kg) | | | | Wn | W-U | 4920 | Wn Square | 24206400 |
| | Resultant (kg) | | | | R | | | | 5310.96978 |
| | | | | | H | 2 | | | |
| | | | | | Xbar | | 0.788172 | | |
| | | | | | Z | | 0.330798 | | |
| | Point of Resultant (xbar+Z) | | | | | | 1.11897 | | |
| | | | | | EA | | 1.111828 | | |
| | | | | | P*H/3 | | 1333.333 | | |
| | | | | | W*EA | | 7582.667 | | |
| | | | | | b/6 | | 0.316667 | | |
| | | | | | b/2 | | 0.95 | | |
| | | e = xbar+Z-b/2 | | | e (OF) | | 0.16897 | | |
| | | fmax = Wn/b(1+6*e/b) | | | fmax | | 3971.191 | | |
| A Safety against sliding | | | | | | | | | |
| | | | | (mu*W)/P | | | 1.23 | | |
| B Safety against overturning | | | | (W*EA)/(P*H/3) | | | 2.028756 | | |
| C Safety against Tension | | | | e<b/6 or b/6-e should be +ive | | | 0.147696 | | |
| D Safety against Crushing | | | Permiss comp Stress kg/sqm | | | say | 10000 | | |
| | | | PCS-fmax should be +ive | | | | 6028.809 | | |
| Depth of Foundation | | | | | | | | | |
| | | Normal scour depth, dn | | | 0.473[Q/f]power1/3 | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Q (cumec) | 22.202 | | | | | |
| | | | | Q (Cusec) | 783.46 | | | | | |
| | | | | f is silt factor, take= | | 2 | | | | |
| | | | | [q/f] | | 391.73 | | | | |
| | | | | [q/f] power1/3 | | 7.31693 | | | | |
| | | | | dn (ft) | | 3.46091 | | | | |
| | | | | dn (m) | | 1.05515 | | | | |
| | | | Maximum scour depth, dm | | | 1.5*dn | 1.58273 | | | |
| | | | | | | | | Technical Specification | | |
| | | | Foundation depth, D | | | 1.33 dm | 2.10503 | | 2.20 | |
| Minimum length of headwall extension (m) | | | | E=3h+0.6 or 1.5F whichever is greater | | | | | | |
| | | | | F is net drop from top of transverse sill to crest | | | | | | |
| | | | | St= height of transverse sill= h/3 | | | | 0.45 | 0.50 | |
| | | | | F (m) | 1.5 | | | | | |
| | | | | E (m) | 4.65 | or | 2.25 | say | 5.00 | |
| Length of Basin Lb | | | | | | | | | | |
| | | | Lb (m)= F(2.28*h/F+0.52) | | | 3.858 | | say | 4.00 | |
| Height of the sidewall at end sill is taken to be minimum 1.5h1,but more than H/2 | | | | | | | | | | |
| | | | | J (m) | 1.5h1 | 1.875 | more than H/2 | 1 | 1.90 | |
| Height of the sidewall at the weir end | | | | | | | | | | |
| | | | Equal to gully depth | | 3.38 | | | | 3.35 | |
| | | | | M (m) | 2(F+1.33h-J) | | | 2.791 | 2.80 | |
| | | | | K (m) | Lb+.1-M | | | 1.309 | 1.80 | |
| Length of Wing wall (WL) | | | | | | | | | | |
| | | | | WL = 2.25h | | | | 3.0375 | 3.00 | |
| Depth of Toe Wall | | | | | | | | | | |
| | | | | h1+0.1 | | | | 1.35 | 1.50 | |

| WORK ABSTRACT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sl. No. | | Specification (m) | | | Quantity (cum) | | | |
| | Item | Length | Breadth | Depth | | | | |
| 1 | Clearing of site (Removal of trees, shrubs and bushes) | 20.00 | 12.00 | | | | | |
| 2 | Earth work | | | | | | | |
| | a) in hard soil Headwall Foundation | 9.50 | 2.80 | 1.25 | 33.25 | Effective depth will be 1.00 m | | |
| | b) in hard soil RHS of Headwall extension | 5.00 | 2.80 | 4.50 | 63.00 | | | |
| | c) in hard soil LHS of Headwall extension | 5.00 | 2.80 | 4.00 | 56.00 | | | |
| | d) in hard soil cutoff wall | 19.50 | 1.20 | 1.20 | 28.08 | | | |
| | e)in hard soil side wall on both side | 9.20 | 2.00 | 3.50 | 64.40 | Effective depth will be 1.50 m | | |
| | f) in hard soil Toe wall | 9.50 | 1.60 | 2.00 | 30.40 | Effective depth will be 1.50 m | | |
| | g) in hard soil Wing wall on both side | 6.00 | 1.80 | 4.50 | 48.60 | Effective depth will be 1.50 m | | |
| | h) Apron | 4.00 | 9.50 | 1.20 | 45.60 | | | |
| | | | | Total | 369.33 | | | |
| 3 | Cement concrete | | | | | | | |
| | Cement Concrete (1:2:4) | | | | | | | |
| | a) cutoff wall | 19.50 | 0.60 | 1.20 | 14.04 | | | |
| | b) Head wall coping | 9.50 | 1.20 | 0.05 | 0.57 | | | |
| | c) Apron | 4.00 | 9.50 | 0.05 | 1.90 | | | |
| | d) Transverse sill coping | 9.50 | 0.60 | 0.05 | 0.29 | | | |
| | | | | Total | 16.80 | | | |
| | Cement Concrete (1:4:8) | | | | | | | |
| | e) Toe wall | 9.50 | 1.20 | 0.15 | 1.71 | | | |
| | f) Apron | 4.00 | 9.50 | 0.15 | 5.70 | | | |
| | g) Side wall on both side | 9.20 | 1.40 | 0.15 | 1.93 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | h) Wing wall on both side | 6.00 | 1.20 | 0.15 | 1.08 | | | |
| | i)Headwall and Headwall Extension | 19.50 | 1.60 | 0.15 | 4.68 | | | |
| | | | | Total | 15.10 | | | |
| 4 | Requirement of sand to nullify the impact of cracks | | | | | | | |
| | a) Below cutoff wall | 19.50 | 0.80 | 0.10 | 1.56 | | | |
| | b)Below Headwall and headwall extension | 19.50 | 1.60 | 0.10 | 3.12 | | | |
| | c) Below side wall on both sides | 9.20 | 1.40 | 0.10 | 1.29 | | | |
| | d) Below wing wall on both side | 6.00 | 1.20 | 0.10 | 0.72 | | | |
| | e) Below apron | 4.00 | 9.50 | 0.10 | 3.80 | | | |
| | f) Below Toe wall | 9.50 | 1.00 | 0.10 | 0.95 | | | |
| | | | | Total | 11.44 | | | |
| 5 | Stone Masonary in CM 1:4 | | | | | | | |
| | a) Headwall and Headwall Extension on both side-Foundation | 19.50 | 2.00 | 1.00 | 39.00 | | | |
| | b) Headwall+ Headwall Extension on both side above gully bed-super structure | 19.50 | 1.55 | 2.00 | 60.45 | Width=(1.2+1.9)/2= 1.55 m | | |
| | c) Headwall Extension on both the side above crest | 10.00 | 1.20 | 1.35 | 16.20 | | | |
| | d) Foundation for side wall on both side | 9.20 | 1.20 | 1.50 | 16.56 | | | |
| | e) Side wall on both side -super structure (K Part)-I | 3.60 | 1.00 | 1.90 | 6.84 | | | |
| | f) Side wall on both side-above part-I mentioned in (e): (K Part)-II | 3.60 | 0.80 | 1.00 | 2.88 | | | |
| | g) Side wall on both side above part-II mentioned in (f): (K Part)-III | 3.60 | 0.60 | 0.45 | 0.97 | | | |
| | h) Side wall on both side-Super structure (M Part)-I | 5.60 | 1.00 | 1.50 | 8.40 | | | |
| | i) Side wall on both side above Part-I mentioned in (h): (M Part)-II | 5.60 | 0.80 | 0.40 | 1.79 | | | |
| | j) Side wall on both side above Part-II mentioned in (i): (M Part)-III | 5.60 | 0.60 | 0.73 | 2.44 | Avg. ht. of triangle portion= | 0.73 | |
| | k) Foundation for wing wall on both side | 6.00 | 1.00 | 1.50 | 9.00 | | | |
| | l) Wing wall on both side-Super structure- Part- I | 6.00 | 0.80 | 0.80 | 3.84 | | | |
| | m) Wing wall on both side-Above Part-I mentioned in (l): Part -II | 6.00 | 0.60 | 0.55 | 1.98 | Avg. ht. of triangle portion= | 0.55 | |
| | n) Toe wall: Part I | 9.50 | 0.80 | 1.00 | 7.60 | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | o) Toe wall: Part II | 9.50 | 0.70 | 0.50 | 3.33 | | | |
| | p) Transverse Sill | 9.50 | 0.60 | 0.50 | 2.85 | | | |
| | q) Apron | 4.00 | 9.50 | 0.40 | 15.20 | | | |
| | | | | Total | 199.33 | | | |
| 6 | M S Bar (10 mm, q) | | | | 3.00 | | | |
| 7 | Providing rough stone pitching in u/s (both side) | 34.00 | 3.50 | 0.25 | 29.75 | | | |
| 8 | Cement pointing to stone masonary in CM 1:3 (sqm) | | | | | | | |
| | a) Headwall both side | 19.00 | | 2.00 | 38.00 | | | |
| | b) Side wall both side (RHS and LHS)-Part I | 9.20 | | 1.90 | 17.48 | | | |
| | c) Side wall both side (RHS and LHS)-Part II | 3.60 | | 1.45 | 5.22 | | | |
| | d) Side wall both side (RHS and LHS)-Part-III | 5.60 | | 0.73 | 4.06 | Avg. ht. of triangle portion= | 0.73 | |
| | e) Wing wall both side-Part I | 6.00 | | 0.80 | 4.80 | | | |
| | f) Wing wall both side-Part I | 6.00 | | 0.55 | 3.30 | Avg. ht. of triangle portion= | 0.55 | |
| | | | | Total | 72.86 | | | |
| 9 | Nala training wherever necessary (m) | | | | 0.00 | | | |
| 10 | Filling of black clay soil in the up stream (free from any kind of gravel) | | | | 6.00 | trolly | | |

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| MATERIAL ABSTRACT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Required Quantiy | | | | | |
| | | | | | | Quantiy,cum | Cement,bags | Sand,cum | Conc ,cum | Khanda (cum) | Boulder(cum) | MS Bar (q) |
| 1 | Cement Concrete mix for cut-off wall (1:2:4): 12 mm conc. | | | | | 16.80 | 107.49 | 7.56 | 15.12 | | | |
| 2 | Cement Concrete mix for cut-off wall (1:4:8); 20 mm conc. | | | | | 15.10 | 51.35 | 7.10 | 14.20 | | | |
| 3 | Stone Maspnary in CM 1:4 | | | | | 199.33 | 498.31 | 67.77 | | 199.33 | | |
| 4 | MS Bar for reinforcing | | | | | | | | | | | 3.00 |
| 5 | Boulder for pitching | | | | | 29.75 | | | | | 29.75 | |
| 6 | Cement pointing to stone masonary in CM | | | | | 72.86 | 4.52 | 0.46 | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1:3 (sqm) | | | | | | | | | | |
| 7 | Black clay soil (gravel free) | | | | | 6.00 | | | | | |
| 8 | Requirement of sand to nullify the impact of cracks | | | | | | | 11.44 | | | |
| | | | | | Total | | 661.66 | 94.32 | 29.31 | 199.33 | 29.75 | 3.00 |

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| COST ABSTRACT | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sl. No. | Item | Quantity | Unit | Rate (Rs./Unit) | Amount (Rs.) |
| A | 1 | Cement | 662 | Bag | 235.00 | 155491.19 |
| | 2 | Sand | 94.32 | $m^3$ | 750.00 | 70742.41 |
| | 3 | Concrete-12 mm | 15.12 | $m^3$ | 1300.00 | 19650.15 |
| | 4 | Concrete-20 mm | 14.20 | $m^3$ | 1150.00 | 16325.26 |
| | 5 | Khanda | 199 | $m^3$ | 1200.00 | 239190.00 |
| | 6 | M S Bar (10 mm Saria) | 3.00 | q | 4000.00 | 12000.00 |
| | 7 | Boulder | 29.75 | $m^3$ | 700.00 | 20825.00 |
| | 8 | Filling of black clay soil in the up stream (free from any kind of gravel) | 6.00 | | 1500.00 | 9000.00 |
| | | | | | Total | 543224.00 |
| B | 9 | Water supply through tanker @ 3 % of material cost | | | | 16296.72 |
| C | 9 | Labour Charges @ 25% | | | | 135806.00 |
| | | | | | Total (A+B+C) | 695326.72 |
| | 10 | Misc. @ 3% | | | | 20859.80 |
| | | | | | G. Total | 716186.53 |
| | | Say Rs. 716000/- (Rs. Eleven lakh sixteen thousand only) | | | | |

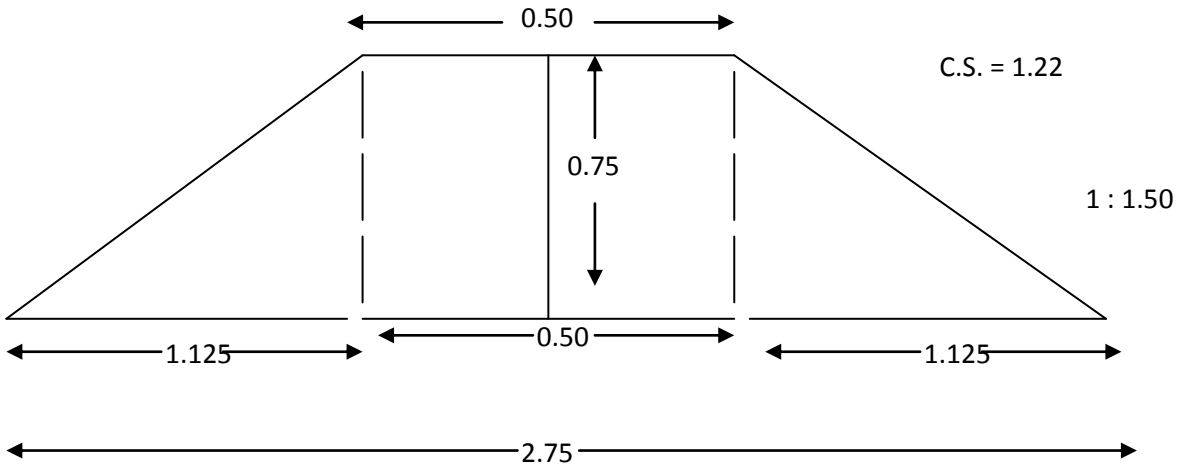


Fig. 1 Field Bunds: Cross Section – 1.22 (Not to Scale)

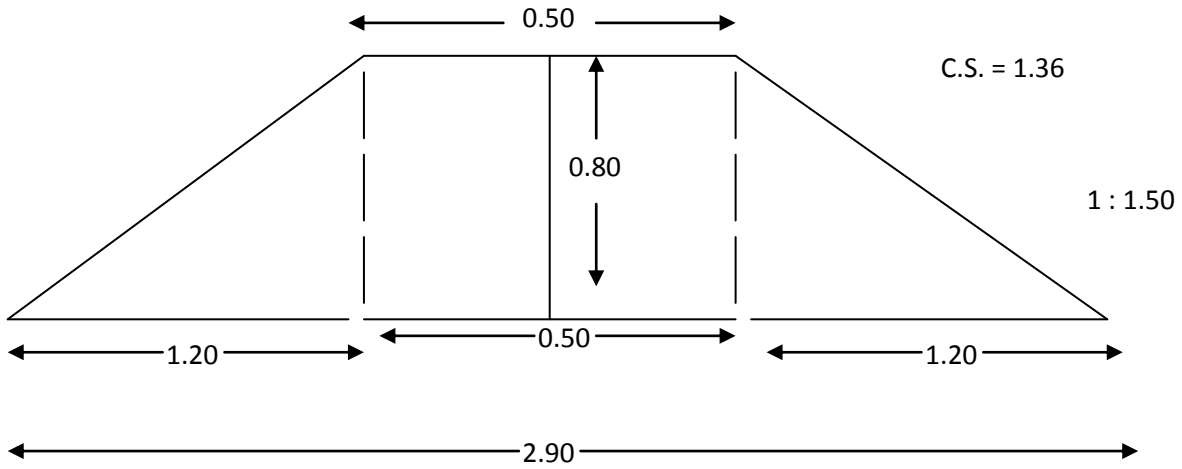


Fig. 2: Field Bunds: Cross Section – 1.36 (Not to Scale)

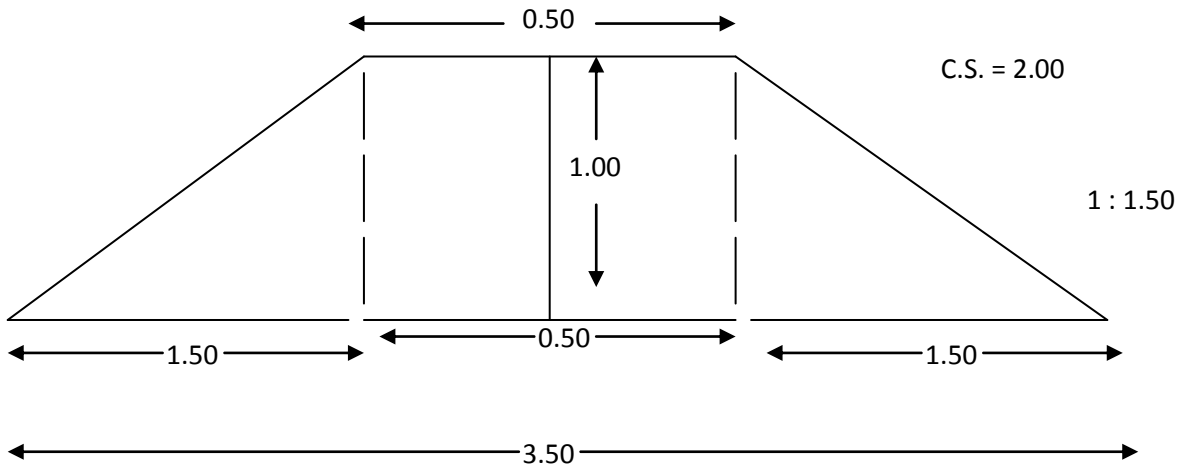


Fig. 3: Field Bunds: Cross Section – 1.67 (Not to Scale)

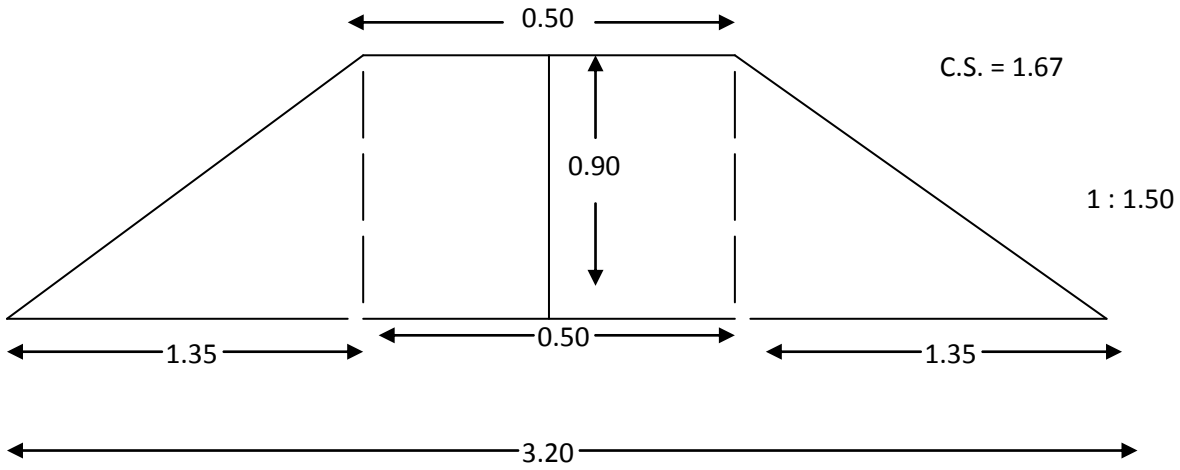


Fig. 4: Field Bunds: Cross Section – 2.00 (Not to Scale)

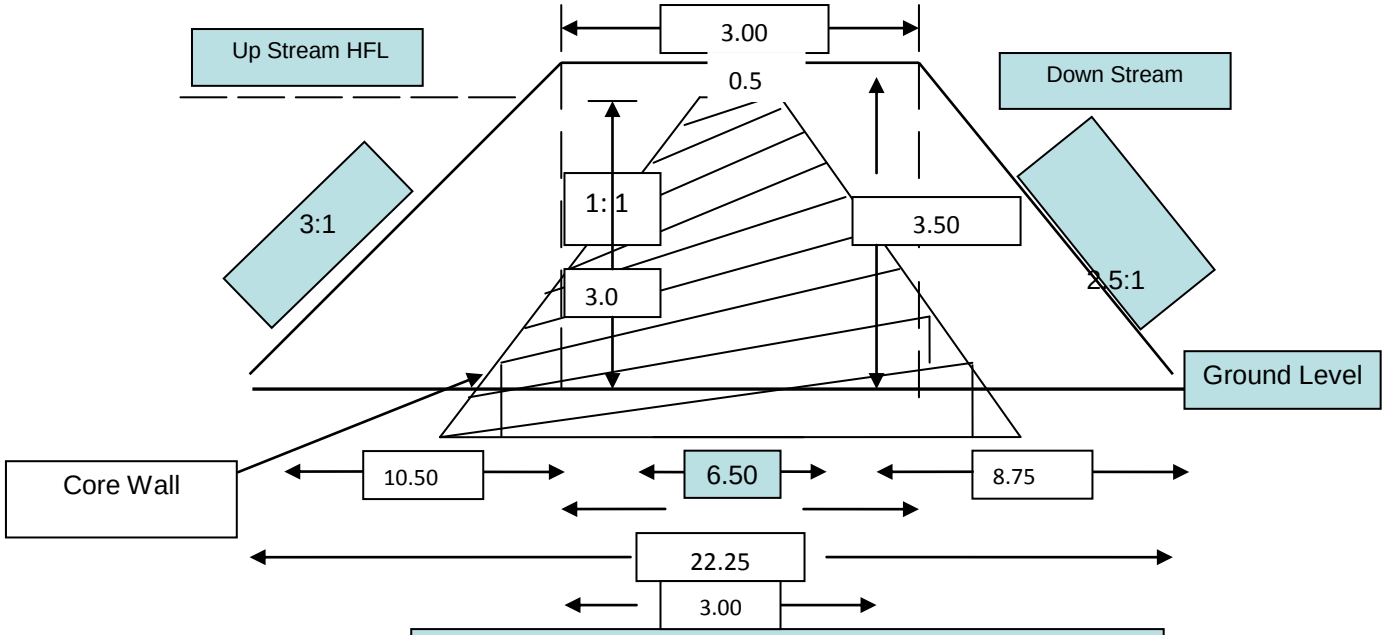


Fig. 39. Design of Earthen Checkdam ($WHB_1$)

Not to scale

# MAPS