# IWMP-6 (Eval)

# Detailed Project Report (DPR)

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# CHAPTER -1

# PROJECT BACKGROUND

## 1.1 Project Background

Eval (IWMP-6) project is located in Santalpur Taluka, Patan District of Gujarat state. The project is a cluster of four micro-watersheds with 6A1B7a2b, 6A1B7a2a, 6A1B7a2c, 6A1B7a1a being their respective codes. The total project area of the watershed is about 1956 Ha, of which 1400 Ha has been undertaken to be treated under Integrated Watershed Management Programme (IWMP) starting year 2009-10.

The nearest town is Santalpur which is about 22 Km from Eval and is well connected by *pucca* road. The project area lies in the edges of salt deserts of Kutch also known as *Rann of Kutch*. The watershed includes only one village of Eval. *Rabari, Koli, Sama* (Muslims) and *SC* communities are the primary inhabitants of the village. The livelihood of these people is primarily based on rainfed agriculture, animal husbandry, wage labour, goat and sheep rearing.

The Project area falls under the Desert Prone area according to DoLR Classification. It is a very poor and desolate village on the border of India and Pakistan. The stretch of unfriendly *Rann* separates this Indian village from Pakistan. The village of Eval was heavily damaged in a massive earth quake on Jan 26, 2001, the epicentre of which was Bhuj(Kutch). This has resulted in post-relief activities in the area, especially the newly constructed cement brick houses with asbestos roofing.

**Table no.1: Basic project information**

| Sl No. | Name of the project | Villages | | Gram Panchayats | Taluka | District | Area of the project | Area proposed to be treated | Total project cost(Rs. in lakh) | PIA |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Name | Census code | | | | | | | |
| 1 | Eval | Eval | 030010022010000 | Eval | Santalpur | Patan | 1956 | 1400 ha | 210 | DWDU Patan |

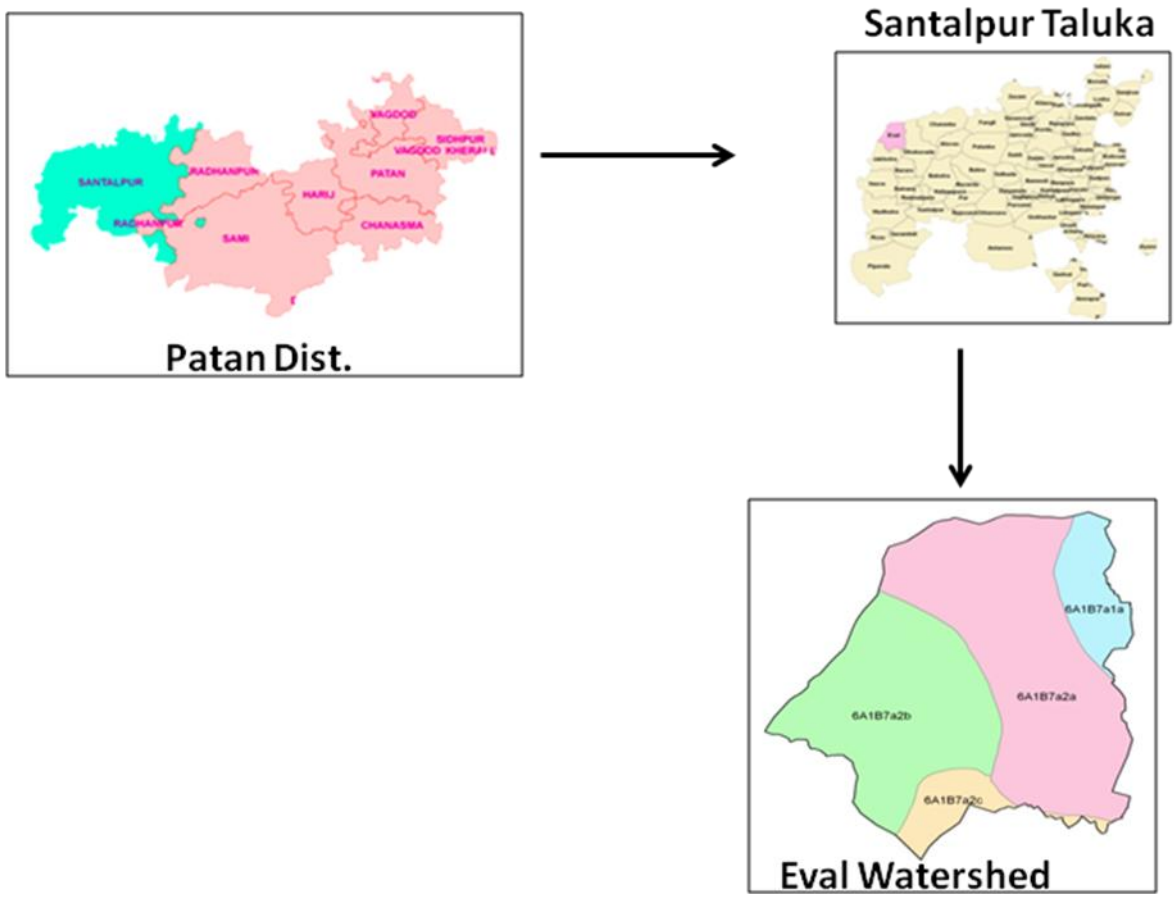


**Figure 1, Geographic location of Eval**

## 1.2 Need of Watershed Development Programme

Watershed Development Programme is prioritised on the basis of thirteen parameters namely Poverty Index, Percentage of SC/ST, Actual wages, Percentage of small and marginal farmers, Ground water status, Moisture Index, Area under rainfed agriculture, Drinking water situation in the area, Percentage of the degraded land, Productivity potential of the land, Continuity of another watershed that has already developed/treated, Cluster approach for plain or for hilly terrain. Based on these thirteen parameters a composite ranking was given to Eval Watershed project as given in *table no. 2.*

The total number of families under BPL is 19, which is less than 20 per cent of the total households of the village. Hence a score of 2.5 is allotted. The percentage of schedule castes in the village is about 30 per cent to the total population; hence a score of 5 was allotted. Rainfed agriculture forms the primary occupation of the village due to the fact that ground water is saline and hence unfit for usage. More than 60 per cent of the farmers are small and marginal by nature and the actual wages earned by the labour is less than the minimum wages hence a composite rank of 5, 3 and 5 are allotted respectively.

Since the rainfall received is erratic and irregular, the moisture index is low and the area is classified under DDP block. Drinking water is problematic in the village. Majority of land is degraded due to inherent salinity and ingress of salt from *Rann.* The soil is very permeable and production of the land can be significantly enriched with the availability of timely irrigation. Eval watershed falls in continuity with other watersheds namely Zazam, Madutra and Jakhotra. Cluster approach was followed taking into consideration four micro-watersheds covering a total area of 1956 Ha. Thus a cumulative score of 106

All the parameters taken together give a cumulative score of 106 to the watershed (reference Table 2.1 below).

Table no. 2: Weightage of the project

| Project name | Project type | Weightage | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IWMP 6 | Desert | i | ii | iii | iv | v | vi | vii | viii | ix | x | xi | xii | Xiii |
| | | 2.5 | 3 | 5 | 5 | 3 | 15 | 15 | 7.5 | 15 | 15 | 10 | 10 | NA |

**Table no. 2.1 Criteria and weightage for selection of watershed**

| S. No. | Criteria | Maximum score | Ranges & scores | | | |
|---|---|---|---|---|---|---|
| i | Poverty index (% of poor to population) | 10 | Above 80 % (10) | 80 to 50 % (7.5) | 50 to 20 % (5) | Below 20 % (2.5) |
| ii | % of SC/ ST population | 10 | More than 40 % (10) | 20 to 40 % (5) | Less than 20 % (3) | |
| iii | Actual wages | 5 | Actual wages are significantly lower than minimum wages (5) | Actual wages are equal to or higher than minimum wages (0) | | |
| iv | % of small and marginal farmers | 10 | More than 80 % (10) | 50 to 80 % (5) | Less than 50 % (3) | |
| v | Ground water status | 5 | Over exploited (5) | Critical (3) | Sub critical (2) | Safe (0) |
| vi | Moisture index/ DPAP/ DDP Block | 15 | -66.7 & below (15) DDP Block | -33.3 to -66.6 (10) DPAP Block | 0 to -33.2 (0) Non DPAP/ DDP Block | |
| vii | Area under rain-fed agriculture | 15 | More than 90 % (15) | 80 to 90 % (10) | 70 to 80% (5) | Above 70 % (Reject) |
| viii | Drinking water | 10 | No source (10) | Problematic village (7.5) | Partially covered (5) | Fully covered (0) |
| ix | Degraded land | 15 | High – above 20 % (15) | Medium – 10 to 20 % (10) | Low- less than 10 % of TGA (5) | |
| x | Productivity potential of the land | 15 | Lands with low production & where productivity can be significantly enhanced with reasonable efforts (15) | Lands with moderate production & where productivity can be enhanced with reasonable efforts (10) | Lands with high production & where productivity can be marginally enhanced with reasonable efforts (5) | |
| xi | Contiguity to another watershed that has already been developed/ treated | 10 | Contiguous to previously treated watershed & contiguity within the microwatersheds in the project (10) | Contiguity within the microwatersheds in the project but non contiguous to previously treated watershed (5) | Neither contiguous to previously treated watershed nor contiguity within the microwatersheds in the project (0) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| xii | Cluster approach in the plains (more than one contiguous micro-watersheds in the project) | 15 | Above 6 micro-watersheds in cluster (15) | 4 to 6 microwatersheds in cluster (10) | 2 to 4 microwatersheds in cluster (5) | |
| xiii | Cluster approach in the hills (more than one contiguous micro-watersheds in the project) | 15 | Above 5 micro-watersheds in cluster (15) | 3 to 5 microwatersheds in cluster (10) | 2 to 3 microwatersheds in cluster (5) | |
| | **Total** | **150** | **150** | **90** | **41** | **2.5** |

**Table no.3: Watershed information**

| Name of the project | No. of watersheds to be treated | Watershed code | Watershed regime/type/order |
|---|---|---|---|
| IWMP 6 –Eval | 4 | 6A1B7a2b, 6A1B7a2a, 6A1B7a2c, 6A1B7a1a | Mini Watershed |

### 1.3 Other developmental projects/schemes running in the Eval village

This village being very back ward, has been on top priority of a number of developmental projects. These programmes are Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Border Area Development Programme (BADP), Total Sanitation Campaign (TSC), Swarnajayanti Gram Swarojgar Yojana (SGSY), Indira Awas Yojana (IAY) and Sardar Awas Yojana (SAY). Besides, previously, one watershed project of 500 ha. has also been completed in this village.

i. **MGNREGS:** Construction of two check dams, deepening of three village pond, two *bori* bunds and afforestation activity has been taken-up under NREGA.

ii. **Border Area Development Programme (BADP):** Two solar street-lamps installed under this scheme. Concrete internal roads, Guttar line in village, one check dam in Government land **,**installation of solar street-lamps has been on action plan of 2010-11.

iii. **Total Sanitation Campaign (TSC):** Eight individual toilets are constructed under TSC programme. All the remaining house hold will be covered under the scheme.

iv. **Swarnjayanti Gram Swarozgar Yojana (SGSY )–** Two families are linked with bank and given loan of Rs. 23000/- with subsidy of Rs 7500/- each for animal husbandry.

v. **Awas Yojana:** (Total 50 house have been constructed in the Eval village under various Awas Yojana (in which under Indira Awas Yojana= 4, Earth Quake = 32, Indira Awas Yojana Earth Quake = 13 and Sardar Awas Yojana = 1

**Table no.4: Developmental programmes running in the project area:**

| S no | Name of the programme/scheme | Sponsoring agency | Objectives of the programme/scheme | Year of commencement | Villages covered | Estimated number of beneficiaries |
|---|---|---|---|---|---|---|
| 1 | Earthquake Rehabilitation and Reconstruction (ERR) Project | WASMO,Department of Water supply | Water tank | 2005 | 1 | 633 |
| 2 | MGNREGS | Rural Development Dept. | Employment | 2009 | 1 | 91 household |
| 3 | IAY | Rural Development Dept. | Housing | 2005 | 2 | 50 |
| 4 | BADP | Central Govt. | | 2009-11 | 1 | |

**Table no. 5: Previous Watershed programmes in the project area**

| S. No | Project name | Year started | Name of villages | No. Of micro watershed | Watershed codes | Area under treatment | Funding source | Nodal agency | PIA | Total cost | Expenditure incurred up to start of IWMP | % financial completion | % physical completion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DDP | 2003 | EVAL | 1 | 6A1B7a2a | 500 ha | govt | DRDA | GSRDC | 300000 | 300000 | 100% | 100% |

**Figure 2, A Synoptic View of Eval**

# CHAPTER – 2

# PROJECT IMPLEMENTING AGENCY

## 2.1. Project Implementing Agency

The Project Implementing Agencies (PIA) is selected by an appropriate mechanism by Gujarat State Watershed Management Agency (GSWMA), the State Level Nodal Agency (SLNA) for Integrated Watershed Management Programme (IWMP) in Gujarat. The PIAs are responsible for implementation of watershed project. These PIAs may include relevant line departments, autonomous organizations under State/ Central Governments, Government Institutes/ Research bodies, Intermediate Panchayats, Voluntary Organizations (VOs).The PIA for Eval watershed Project is District watershed development Unit (DWDU), Patan.

## 2.2 About District Watershed Development Unit(DWDU), Patan

### 2.2.1 The organization and its objectives:

The District Watershed Development Unit (DWDU), Patan is a district level nodal agency and was established on 13 May 2008 to oversee the smooth implementation of watershed projects in the district. The District Development Officer (DDO) is the chairman of the DWDU. The DWDU has dedicated and experienced staff comprising one Project Manager (deputation from Gujarat Forest Department), a technical expert and a multidisciplinary team of agriculture expert, community mobilization expert and Data Entry Operator, civil engineer, MIS coordinator, system analyst, surveyor, and accountant. The objectives of the DWDU, Patan are supervising, planning, implementing, documenting and promoting watershed development projects and related developmental activities in the district as per guidelines. The DWDU, Patan also works as a PIA for some IWMP projects.

### 2.2.2 Programmes/projects of DWDU, Patan:

At present 7 IWMP projects have been sanctioned by Government of India for Patan district. The entry point activities of all the seven IWMP projects have been identified by the respective PIAs in the district. Patan Forest Division is PIA for 5 projects (IWMP-1, 2, 3, 4 & 7) and DWDU itself is PIA for rest of the two projects (IWMP-5 & 6).

Apart from the 7 IWMP projects, DWDU Patan is involved in a total of 290 pre-Hariyali & Hariyali projects (DDP & IWDP); 164 projects are completed and 126 projects are still running in the district. The DWDU, Patan is also monitoring a central government sponsored scheme on "Artificial Recharge of Groundwater through Dugwells" in the district.

**2.3 SWOT Analysis of the DWDU:**

**Strength:**

(1) Dedicated and experienced staff and a multidisciplinary team

(2) Independent District Level Nodal Agency.

(3) Strong linkages with national and state level institutions, agricultural universities, North Gujarat University and NGOs for capacity building and technical guidance

(4) Scientific planning in watershed projects with the help of BISAG, Gandhinagar,

(5) District level monitoring, coordination & Co-operation Committee

**Weakness:**

(1) No permanent office building.

(2) Project area is located adjoining to *Rann of Kutch* (saline desert).

**Opportunities:**

(1) A number of different other development schemes of the government are running; so, there can be horizontal integration and convergence of programmes

(2) Better financial provision under IWMP

(3) Usage of new ICT tools like GIS, GPS

**Threats:**

(1) Rainfall being very scarce and unreliable in the project area, the activities planned to be taken up may yield limited impact

(2) Irregularities in fund flow can derail the smooth functioning

(3) Lack of contribution and cooperation from local people

(4) Low literacy rate in the project are

**Table no. 6: PIA:**

| Sl. No. | Names of project | Details of PIA | |
|---|---|---|---|
| 1 | IWMP-6<br>Eval Project | (i) Type of organization | District Level Nodal Agency (Society) |
| | | (ii) Name of organization | DWDU, Patan |
| | | (iii) Designation & Address | Project Manager,DWDU, Patan |
| | | (iv) Telephone | 2674390 |
| | | (v) Fax | 2567980 |
| | | (vi) E-mail | patdwdu@gmail.com |

**Table no. 7: Staff at PIA level:**

| S. no | Name | Age | Sex | Designation | Qualification | Experience | Job assigned | Monthly remuneration (Rs) |
|---|---|---|---|---|---|---|---|---|
| 1 | J K Makwana | 51 | M | Project Manager | GFS | 28 years | Project Management | 50000.00 |
| 2 | Amaresh Sarkar | 32 | M | Technical Expert | M.Tech. | 3 year | Monitoring | 25000.00 |
| 3 | Rahevar Pradeepsinh, | 28 | M | MDT (Agriculture) | BRS (Agri) | 7 years | Agriculture Development | 14000.00 |
| 4 | Manisha Patel | 39 | F | MDT (CM) | BRS (Agri) | 7 years | Community Mobilization | 12000.00 |
| 5 | Nai Alpesh | 35 | M | MDT (Data Entry Operator) | Basic Computer Course | 4 years | Data Entry | 6000.00 |
| 6 | Harshadbhai R. Pandya | 32 | M | WDT(Agriculture) | BRS(Agri) | 6 Years | Agriculture Development | 8000.00 |
| 7 | Devayaniben Thakkar | 32 | F | WDT(Community Mob.) | MA (Home Science) | 3 Years | Community Mobilization | 8000.00 |
| 8 | Darshit jani | 28 | M | WDT (Data Entry Operator) | PGDCA | 2 Years | Data Entry | 5000.00 |

# CHAPTER – 3

# BASIC INFORMATION OF THE PROJECT AREA

3.1. **Geography and Geo-hydrology**

### 3.1.1 Land use pattern:

The net geographical area of Eval watershed is about 1956 ha out of which 26% is forest area. The forest area is mainly divided into two parts; one part is hilly while other lies in *rann* of Kutch which is devoid of any sort of vegetation. About 31.5% of land is under agriculture which is completely rain-fed; mainly a *Kharif* crop is taken. About 41% of the total land is classified under wasteland of which 60 percent is cultivable and rest is uncultivable and hilly. The watershed consists of thorny species of *Prosopis juliflora* which was mainly broadcasted to stop the spread of desert.

**Table no. 8: Land use pattern:**

| S. No. | Names of villages | Geographical Area of the village (ha) | Forest Area (ha) | Land under agricultural use (ha) | Rain-fed area (ha) | Permanent pastures (ha) | Wasteland | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cultivable (ha) | Non-cultivable (ha) |
| 1 | Eval | 1956 | 524 | 618 | 618 | 15 | 481 | 333 |

### 3.1.2 Soil and topography:

Eval watershed project (EWP) falls under North West Gujarat Agro Climatic Zone. The soil is mainly sandy loam and saline. The soil is brown to very dark grayish brown in surface colour. The depth of soil is moderate to deep about 25 to 75 cm. The predominant texture of soil is loamy sand and silt and clay. The soil fertility is very poor with low nitrogen, phosphorus and potash. The soil falls in *Aridsol* and *Inseptisols order*. The topography of the area is moderate ranging from 0-10% slope.

**Table no. 9: Soil type and topography:**

| S. No. | Name of the Agro-climatic zone covers project area | Area in ha | Names of the villages | Major soil types | | Topography |
|---|---|---|---|---|---|---|
| | | | | a)Type | b) Area in ha | |
| 1 | North West Gujarat Agro climatic zone | 1456 | Eval | Sandy Loam (Saline) | 1456 | Flat to moderate slope |

**Table no. 10: Flood and drought condition:**

| S.No | Village | Flood (Incidence) | Drought (Incidence) |
|---|---|---|---|
| 1 | Eval | Nil | Once in 3 Years |

**Table no. 11: Soil Erosion**

| Cause | Type of erosion | Area affected (ha) | Run off (mm/ year) | Average soil loss (Tonnes/ ha/ year) |
|---|---|---|---|---|
| Water erosion | | | | |
| a | Sheet | 1156 | 124 | - |
| b | Rill | 720 | 320 | 20% |
| c | Gully | 80 | 240 | 15% |
| | | | | |
| Sub-Total | | 1400 | | |
| Wind erosion | | 1400 | NA | 25% |
| Total | | | | |

**Table no. 11.2: Soil Salinity/Alkalinity (Salinity ingress)**

| **Name of the Village** | **Survey Number** | **Soil pH** | **Type of Salinity (Inherent/Ingress)** |
|---|---|---|---|
| Eval | 103,105,106 (Almost all the land area near Rann) | 9.3 | Inherent |

**Table no.12: Climatic conditions**

| Sl. No. | Year | Rainfall (in mm) | Temperature (˚C) | | Highest intensity of Rainfall (mm in a day) |
|---|---|---|---|---|---|
| | | | Max. | Min. | |
| 1 | 2004 | 453 | 43 | 4 | 64 |
| 2 | 2005 | 427 | 44 | 6 | 60 |
| 3 | 2006 | 582 | 43 | 5 | 130 |
| 4 | 2007 | 560 | 45 | 3 | 165 |
| 5 | 2008 | 311 | 44 | 4 | 50 |
| 6 | 2009 | 254 | 45 | 5 | 35 |

The rainfall is scanty which has resulted in recurrent phenomenon of drought in every two to three years. The average rainfall of this area is about 430 mm (from past five year data) with a highest intensity of 84 mm within span of a day. This uneven distribution is leading to runoff of soil every year to the streams, rivulets and depressed area of Rann of Kutch.

**Table no. 13: Physiography and relief**

| Project name | Elevation(MSL) | Slope range (%) | Major streams |
|---|---|---|---|
| Eval | 42 meters | 0-15 % | NA |

### 3.1.3 Land and Agriculture:

Lack of surface water source and high salinity of ground water has limited the sufficient base for irrigation as well as for drinking purpose. The average land holding is about 2.41 ha ranging from 1 to 4 ha. Lack of irrigation source forces the majority of the farmers to migrate to ensure their livelihood. This affects directly the demographic profile of the village. The major crops cultivated by the farmers are Jowar (Sorghum) and Bajra (Pearl millet). Some of the farmers take up rain-fed castor crop if rainfall is good. The land conservation measures such as earthen bunds and farm bunds in the area will help them to take up a *rabi* crop of mustard or cumin in the residual moisture.

**Table no. 14: Land ownership details**

| S No | Village | Total owned land (in ha) | | | |
|---|---|---|---|---|---|
| | | Gen | OBC | SC | ST |
| | Eval | 389 | 978 | 586 | 0 |

**Table no. 15: Agriculture**

| S.No | Village | Net sown area(ha) | | |
|---|---|---|---|---|
| | | One time | Two times | Three times |
| | Eval | 1400 | NA | NA |

**Table no. 16: Irrigation**

| S No | Village | Source 1 : Canal | | | Source 2 : Check dam / Pond | | | Source 3 : Well | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Availability months | Net area | Gross area | Availability months | Net area | Gross area | Availability months | Net area | Gross area |
| | Eval | 0 | 0 | 0 | 0 | 0 | 0 | 7 Months | 12 | 12 |

**Table no. 17: Crop details:**

| S.No | Village | Kharif (Monsoon) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Bajara | | | Jowar | | |
| | | Area (ha) | Production (000'kg) | Productivity (kg/ha) | Area (ha) | Production (000'kg) | Productivity (kg/ha) |
| 1 | Eval | 311 | 155.5 | 500 | 188 | 45.1 | 240 |

| Sl no | Village | Rabi (Winter) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Castor | | | Jeera | | |
| | | Area (ha) | Production (000'kg) | Productivity (kg/ha) | Area (ha) | Production (kg) | Productivity (kg/ha) |
| 1 | Eval | 140 | 56 | 400 | 12 | 2400 | 200 |

### 3.1.4 Livestock:

The village has 44 cows, 41 buffaloes, 7 bullocks, 434 goats and 372 sheep. Majority of *rabari* community depends on goat and sheep rearing for their livelihood. Cows and buffaloes are of local breed. Lack of rain and surface water has reduced the fodder and pasture availability for their animals. This leads to heavy migration to other parts of the state with their herds of goats and sheep. Milk production is so low that there is no dairy cooperative in the village.

**Table no. 18: Livestock**

| Sl no | Village | Buffalo(Lit/annum) | | Cow(Lit/annum) | | Total Milk (Buffalo+Cow) | Goat | | Sheep | Bullock | Hen | Others |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No | milk | No | Milk | (Lit/annum) | No | Milk | | | | Camel |
| 1 | Eval | 41 | 450 | 44 | 385 | 17431 | 434 | | 372 | 7 | | 42 |

**Table no. 19 : Drinking water**

| Sl no | Village | Ground water table (m) | Source of drinking water | Availability in months | Quality |
|---|---|---|---|---|---|
| 1 | Eval | 28 | Well | 12 | Slightly Saline |

**Table no. 20: Details of Common Property Resources**

| S. No. | Names of project | CPR Particulars | Total Area (ha) Area owned/ In possession of | | | | Area available for treatment (ha) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Pvt. persons | Govt. (Specify dept.) | PRI | Any other (Pl. Specify) | Pvt. persons | Govt. (Specify dept.) | PRI | Any other (Pl. Specify) |
| | | Wasteland/ degraded land | 414 | | | | 300 | 33 | | |
| | | Pastures | 15 | | | | | | | |
| | | Orchards | 0 | | | | | | | |
| | | Village Woodlot | | | | | | | | |
| | | Forest | | | | | | 524 | | |
| | | Village Ponds/ Tanks | | | | | 12 | | | |
| | | Community Buildings | | 3 | | | | | | |
| | | Weekly Markets | | | | | | | | |
| | | Permanent markets | | | | | | | | |
| | | Temples/ Places of worship | | 2 | | | | | | |
| | | Others (Pl. specify) | | | | | | | | |

**Household Census Survey**

**Survey no. wise data Collection**

**Figure 3 Baseline Data Collection at Eval watershed**

### 3.2. Socio-Economic Profile

#### 3.2.1 Demographic Status:

Eval watershed project has a total of 137 households with a population of 633 (*as per base-line survey)* out of which 340 are male and 293 female .The sex ratio is 862 female to 1000 male. There are 19 BPL families. The average family size is 5. The literacy rate is very low *i.e.* 17.7 per cent; male literacy rate is 29.7 per cent (of total male population) and female literacy rate is as low as 3.75 per cent (of total female population). It is noticeable that only five persons have reached up to ninth standard. The major castes in the village are Koli, Sama(minority), Rabari and Schedule Caste . Majority of population is involved in agriculture and animal husbandry.

**Table no. 21: Demographic information**

| S no | Village | Population | Population | | | SC | | | ST | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Male | Female | Total | Male | Female | % | Total | Male | Female |
| 1 | Eval | 633 | 340 | 293 | 31 | 17 | 14 | 5 | 0 | 0 | 0 |

**Table no. 22: Literacy rate**

| Sl no | Village | Literacy | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | % | Male | % | Female | % |
| | Eval | 112 | 17.7 | 101 | 29.7 | 11 | 3.75 |

**Migration Pattern:**

People migrate during summer season to different parts of the state like Gandhidam, Dantiwada, Bhuj and Suarashtra as daily wagers, agricultural labours and construction workers. Lack of fodder availability and grazing land for smaller ruminant force these people to migrate to other places.

**Table no. 23: Migration details**

| Sl no | Village | Total population | Migration | | | Migration by months | | | Main reason for migration | Income during migration / month |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total | Male | Female | Up to 3 months | 3-6 months | More than 6 months | | |
| 1 | Eval | 633 | 60 | 34 | 26 | 12 | 33 | 16 | Lack of fodder | Rs 3000/month |

**Table no. 24: Poverty**

| S no | Village | Total BPL Household | BPL | | | % of BPL HH | Total Land less HH | % of land less HH |
|---|---|---|---|---|---|---|---|---|
| | | | 0-16 | 16-20 | Total | | | |
| 1 | Eval | 19 | 3 | 16 | 19 | 13.8 | 11 | 7.2 |

**Infrastructure facilities:**

Eval watershed is well connected with Santalpur Taluka with *pucca* roads. The village has electricity connectivity under *Jyotigram Yojana* of the State Government. Nearly 75 per cent of households in the village have their personal electric meters. Eval village has a primary school with all facilities like four personal computers. For middle and higher secondary education, the students have to go to *Vahuva* village which is about 9 kilometres away. This also contributes to lower education level of the people. The village do not have a Primary Health Centre for which villagers have to go to *Madhutra* which is 14 Km. away. The village comes under a Group Panchayat with Panchayat office at Vahuva village.

**Table no. 25: Village infrastructure**

| S no | Village | Pucca road to the village (Y/N) | Schools | | | Colleges (Number) | Post Office (Distance) | Banks (Number) | Distance from nearest market yard | Milk collection centre (Number) | Milk cooperative (Number) | Other cooperatives / CBIs (Number) | Any other institution |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | LP | UP | HS | | | | | | | | |
| | Eval | Y | Y | N | N | N | N | N | 22 km | N | N | N | - |

**Table no. 26: Facilities / HH assets**

| Sl no | Village | HHs with electricity | HHs with safety latrines | HHs with phones | | HHs with vehicle | | HHs with TV set | HHs with cooking gas | HHs with Drinking water | HHs with fridge |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Land line | Mobile | 2-wheeler | 4-wheeler | | | | |
| | Eval | 87 | 7 | N | 38 | 3 | 1 | 5 | N | N | 4 |

### 3.3. Livelihood pattern:

The villagers earn their livelihood from animal husbandry and agriculture and during lean seasons they migrate for daily wage labourers in salt pans of Santalpur and as agriculture labour in other parts of the state. Another major occupation of the people is gum collection and Charcoal making using the wood of *prosopis* which they collect from the community land or forest.

**Table no. 27: Per capita Income**

| S No | Village | Agriculture (in Rs.) | Animal husbandry (in Rs.) | Casual labour (in Rs.) | Others (in Rs.) | Total (in Rs.) |
|---|---|---|---|---|---|---|
| 1 | Eval | 4446.6 | 688.4 | 1850 | 900 | 7885 |

### Dependence on Common Property Resource

The vast majority of the denizens of this region depend on Common property resources. Most of them continue to live a virtually hand-to-mouth existence. Their pathetic poverty seems, in fact, to have further worsened in recent years, as their traditional pasture lands have been rapidly depleting due to over-grazing and persistent drought-like conditions in the region. This has forced large numbers of families living around the *Rann* to literally 'charcoal the desert'. Around two decades ago, in a bid to check the advance of the encroaching desert, the government authorities arranged for a thorny desert bush, commonly known in India as the *Babul* (*Acacia nilotica* ) and in *rann* as the *Jangli* or *Ganda Baval* (*Prosopis juliflora*) to be imported from Israel and to be broadcasted in semi-desert parts of northern Kutch. This bush grows about ten feet and further spreads laterally like a wild fire. The cutting of *Ganda Baval* was banned in this area three years ago. But now, almost every family in this area supplements its meagre income by felling the tree and burning its wood in large pyramid-shaped piles to make charcoal, or *kolsa* as it is locally called.

**Table no.28: Dependence on Forest/CPR**

| Sl no | Village | Charcoal making | | Fodder | | Total income (Rs) |
|---|---|---|---|---|---|---|
| | | % sells | Income (Rs) | % sells | Income | |
| 1 | Eval | 100 | 50000 | 0 | Self Consumption | 50000 |

**Table no. 29: Livelihood pattern (Occupational distribution)**

| Sl no | Village | Total workforce | Agriculture | Animal husbandry (AH) | Agriculture + AH | Casual labour | Services | Handicraft | Salt Pan Labours |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Eval | 321 | 243 | 70 | 70 | 78 | 0 | 0 | 50 |

### 3.4. Comparative data of the crop productivity of the area: project area vs. District vs. State vs. Country vs. World:

"The term productivity in general means the total output per unit of factor input. For example land productivity means output per hectare of land. Productivity is an average and is calculated by dividing the total output of a particular crop by the total cultivated area under that crop."

Data are made available by the Baseline survey (for Eval village), Handbook of Agriculture, ICAR publication 2006(For Gujarat and India), and Final district plan (DAP) of Dept. of Agriculture (for Patan). The results indicate that Eval village has very low productivity compared to world, India, Gujarat and Patan. The productivity is low not only because that the land is unproductive or the farmer's lack the skills to manage their crop but also due lack to of source of irrigation, salty water and scarcity of rain.

The Eval village comes under arid zone. So farmers grow crop according to the rainfall. If they get good rainfall they generally grow high value crops like mustard, cumin, Bengal gram etc. In case of low rainfall they go for sorghum, castor, and pearl millet. So we can say that monsoon decides cropping patterns of Eval village.

The world productivity of castor is 984 kg/ha. In India, it is grown in about 7.3 lakh hectares with a production of 8.0 lakh tonnes and productivity of 1,094 kg/ha. Gujarat alone produces about 80% of the total castor of our country from 50% of the area with a record productivity of about 1950 kg/ha. Patan district has very good productivity 2100 kg /ha. The Eval project area has only 400 kg/ha productivity. It is very low compare to district, State, India and world.

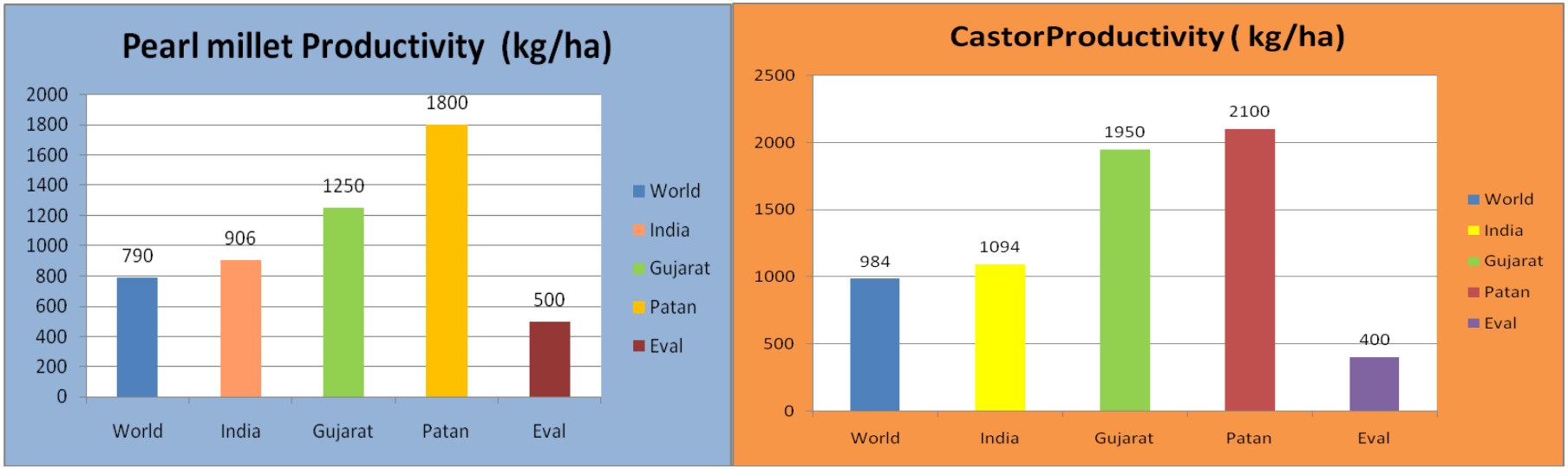


**Figure 5 , Compartative Productivity of Pearl millet and Castor,Eval**

Pearl millet is the fourth most important grain crop next to rice,wheat and sorghum.The crop is cultivaed for grain as well as fodder in the semi arid tropical regions. Pearl millet traditionally is an indispensable component of dry-land farming system. In world pearl millet productivity is 984 kg/ha

and India has 1094 kg/ha of Bajara productivity and Gujarat is far better than world and India. The productivity of pearl millet is 1800 kg/ha for Patan, whereas for Eval village, it is only 500 kg/ha.

Rapeseed (mustard) is the second most important oilseed crop after groundnut,contributing nearly 25-30% of the total oilseed production in the country.The world productivity of Rapeseed-mustard is 829 kg/ha.We can see that Eval village has very low productivity in comparison to Patan,Gujarat,India and world.

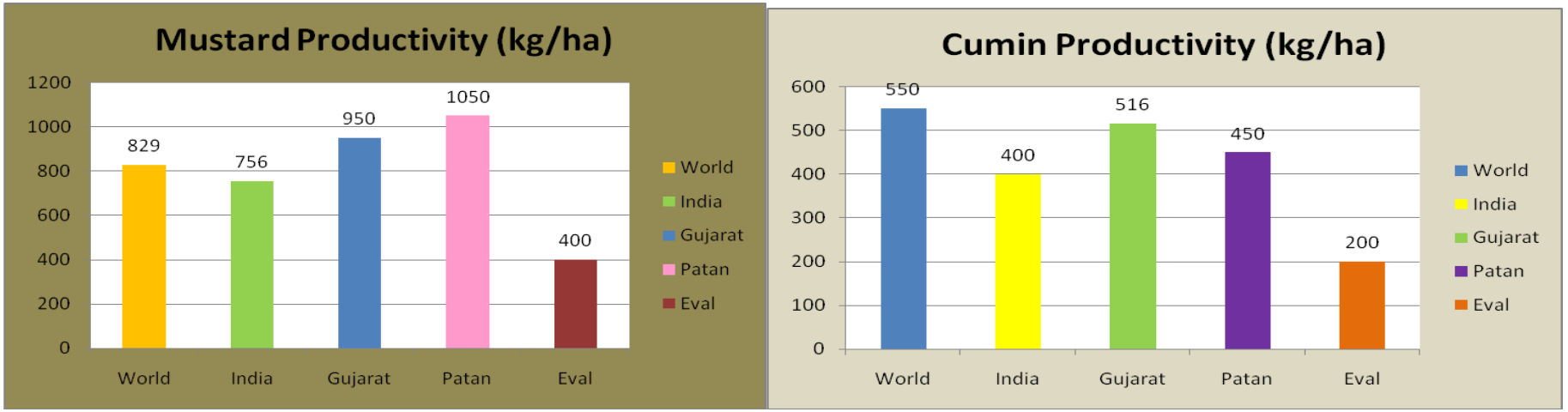


**Figure 6, Compartative Productivity of Mustard and Cumin,Eval**

The world and India productivity of cumin are 550 kg,400 kg per hectare respectively.Gujarat is a major cumin producing state in India with the productivity of 516 kg/ha.Cumin productivity of patan is 450 kg/ha and Eval village has very poor productivity with 200 Kg/ha.

**The Eval project area has low productivity because of the following reasons:**

**i) Full dependence on monsoon:**

Eval village is dependent on monsoon. Water is essential input in agriculture. Due to the absence of proper irrigation facility,100% of the total cultivated area depends on the uncertain monsoon. Therefore, the suceess or failure of the monsoon determines the success or failure of agriculture production.The rainfall is unreliable due to two factors: untimely and inadequate.

**ii) Low use of fertilizer per unit cropped area:**

Farmers do not use sufficient fertilizer due to lack of water, scarcity of fertilizer in market and insufficient money for fertilizer. Many a times they don't get fertilizer at the right time.

**iii) Traditional farming methods:**

This also leads to low productivity. There is a lot of ignorance about the use of new farming methods and technologies such as multiple cropping. They don't use FYM and other input in a proper way; that is why they don't get 100% output. So these factors contribute to low productivity.

**iv) Lack of adequate farm machinery:**

Even today a large number of farmers in Eval use wooden ploughs and bullocks. They don't have adequate machinery like seed drill. So, old machineries take more time in tillage practices.

**v) Lack of finances for farmers:**

In Eval most of the farmers are marginal and small. They do not have enough money to buy good quality seeds, machinery and other inputs.

**vi) Lack of good quality seeds and fertilizers:**

Good quality seed, fertilizer and pesticide are important factor in agriculture productivity. The use of good quality leads to higher land productivity. In Eval, however, there are two limitations in the use of fertilizer. First these fertilizers are most useful in irrigated condition. But

in Eval 100 per cent of land depend on rainfall. In Eval mostly farmers use nitrogenous fertilizers especially urea. This has resulted in disproportionate use of fertilizer depleting the quality of land.

**vii) Lack of other facilities such as storage and marketing:**

5-10% of agriculture product damage after harvesting due to scarcity of proper storage and proper market for sale. So he sells to local traders at the low prices. Farmers mainly face proper means of transportation and roads. And second problem is farmers don't have proper storage facilities.

# CHAPTER – 4

# WATERSHED ACTIVITIES

**Watershed Activities**

Watershed management as a strategy has been adopted by Government of India especially in the rain-fed regions of semi-arid tropics. 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.

**4.1. Scientific Planning:**

**i) Cluster Approach**

This envisages a broader vision of Geo-hydrological unit which involves treating a cluster of micro-watershed. The Eval Project consists of four micro- watersheds namely 6A1B7a2b, 6A1B7a2a, 6A1B7a2c, 6A1B7a1a as their respective codes. Further Eval watershed project is in continuation with other watershed projects namely Zazam, Jakhotra and Madhutra 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 *Talati* –cum *mantri.* 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 of watershed has 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, 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. Various tools like Matrix ranking, Venn Diagram were 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, BPL Population, 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 modelling

Hydrology modelling 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. 30: 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 |
| | Hydro-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 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 | No |
| | 9. Automatic water level recorders & sediment samplers | No |
| | Any other (please specify) | |

### 4.2. Institution building

#### 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 is 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. A watershed Committee was formed accordingly in Eval village. Since the watershed has only one village so no separate watershed sub-committee was formed in the village. Capacity building training to the watershed committee is given by WDT.

The watershed committee has a pivotal role to play during and after the project implementation period.

**Table no. 31: 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 | Educa-tional qualifi-cation | Function/s assigned# |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Under progress | Sama Jilubha Kernaji | President | M | | | | 1 | | | | | | | | |
| 2 | | | Sama Khanji Chandhaji | | M | | | | 1 | | | 1 | | | | | |
| 3 | | | Sama fulbai sahebji | Member | F | | | | 1 | | 1 | 1 | | | | | |
| 4 | | | Rabari Hirabhai Mahadevbhai | Member | M | | | 1 | | | | | 1 | | | | |
| 5 | | | Rabari Pababhai mashrubhai | Member | m | | | | | | 1 | | | | | | |
| 6 | | | Harijan Velabhai Bhikhabhai | Member | M | | | | | | | | | | | | |
| 7 | | | Sama Sonbai Lakhji | Member | F | | | | | | | | | | | | |
| 8 | | | Jajeja Ajitsinh shivabha | Member | M | | | | | | | | | | | | |
| 9 | | | Sama Lakhaji Velji | Member | M | | | | | | | | | | | | |
| 10 | | | Kodi laxmiben poparbai | Member | F | | | | | | | | | | | | |
| 11 | Eval Watershed committee | | Vaghela Zilubha Pratapsing | Secretary | M | | | | | | | | | | | | |

**ii )Self Help Group**

Self Help Groups are motivated, small homogenous groups organized together through credit and thrift activities. Self help group initiative especially for women help uplift their livelihood. Generally self help groups include landless and poor women.

Before formation of the SHGs, during PRA activities, Focussed Group Discussions (FGDs) were held with the women, which came up with the following observations:

a) Lack of proper credit facilities due to low intervention of formal financial credit institution.
b) Excessive exploitation of weaker section by money lenders
c) Lack of attitude for saving among poor people
d) Lack of knowledge on credit and thrift activity and banking.

With a detailed discussion with some of the local NGOs working in the area like SEWA, it was planned to have some capacity building training regarding SHG activities. It was also proposed to have some livelihood activities which will promote women empowerment.

**Table no. 32: SHG details**

| S. No. | Total no. of registered SHGs | | | | No. of members | | | | No. of SC/ST in each category | | | No. of BPL in each category | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | With only Men | With only Women | With both | Total members | Categories | M | F | Total | M | F | Total | M | F | Total |
| 1 | 0 | 3 | 0 | 27 | (i) Landless | | 6 | 6 | | | | | | |
| | | | | | (ii) SF | | 5 | 5 | | | | | | |
| | | | | | (iii) MF | | 2 | 2 | | | | | | |
| | | | | | (iv) LF | | 1 | 1 | | | | | | |
| Total | 0 | 3 | 0 | 27 | | | 14 | 14 | | | | | | |

Focused Group discussion(Farmers)

Focused Group Discussion (Women)


**Figure 7 , Focused Group Discussion with villagers**

Focused Group Discussion (Women)

Women Discussing their handicraft works

**Figure 8 , Focused Group Discussion with villagers**

**User Group:**

User Groups are normally formed to manage an activity or asset created under the programme on a long term basis. The user group collect user charges from their members, oversee the works and manage the benefits.

It was decided that each group would formulate certain internal rules and have a feeling of ownership with community spirit.

**Table no. 33: UG detail**

| S. No. | Total no. of UGs | | | | No. of members | | | | No. of SC/ST in each category | | | No. of BPL in each category | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | Both | Total | Categories | M | F | Total | M | F | Total | M | F | Total |
| 1 | 5 | 0 | 0 | 5 | (i)Landless | 7 | | 7 | | | | | | |
| | | | | | (ii) SF | 2 | | 2 | | | | | | |
| | | | | | (iii) MF | 10 | | 10 | | | | | | |
| | | | | | (iv) LF | 5 | | 5 | | | | | | |
| Total | 5 | 0 | 0 | 5 | | 24 | | 24 | | | | | | |

### 4.3. Physical activities to be undertaken under IWMP, Eval

#### 4.3.1 Entry Point activity (EPA)

EPA activities are taken up under watershed projects to build a rapport with the village community at the beginning of the project; generally, certain important works which are in urgent demand of the local community are taken up. A group Discussion was conducted with watershed Development Committee regarding the EPA activity, It was conveyed to the WC that an amount of Rs. 8.4 Lakh was allotted for EPA activity, which was 4 per cent of total allocated budget. The villagers discussed various activities which they felt is important but after a brief discussion it was conveyed to them that only those activities can be taken, which revive the common natural resources. It was also taken into priority that there should be an instrument of convergence which will result in sustainability of activities.

**Table no.34: Entry point activities (EPA) (All financial figures in lakh Rs.)**

| S. No. | Names of Villages | Amount earmarked for EPA | Entry Point Activities planned | Estimated cost(Rs. in Lakh) |
|---|---|---|---|---|
| 1 | Eval | 8.4 | Repair of well | 0.50 |
| | | | Building of Animal water Trough | 1 |
| | | | Toilet in village (70 units) | 2.1 |
| | | | Rain water harvesting structure ( 25 @ 0.6 contribution) | 3.75 |
| | | | Deepening of village pond | 1.05 |

Only water source of the village

A Team member understanding the difficulty of villager

**Figure 9,Well Specified by Villager for Entry Point Activity(EPA)**

### 4.3.2. Watershed Development Works:

Watershed development works are to be done during second phase of watershed project. A multi-tier ridge to valley sequence approach should be approached towards implementation of watershed development projects. A net budget of 50 percent is allotted for this work.

**Ridge Area Treatment Plans:**

It is very important to treat the ridge as this is where the major water resources originate. This involves mainly hilly and forest region in Eval watershed. For the ridge area treatment of Eval watershed following structure are been Proposed after interaction between the watershed committee, Range Forest Officer (RFO) and other field staff of forest.

1. Stone Bunding
2. Staggered Contour Trenches
3. Border Contour Trenching with Tree plantations
4. Grass seeding

**1. Stone Bunding**

A bund constructed out of stone along the contour or across the stream is called as stone wall. It is adopted where the water velocity is high and where basically stone of radius 100-150 mm is available. It helps in:

- Control of erosion by reducing the slope of the cultivated land
- Increasing the infiltration of rainwater

**Main advantages as compared to the normal contour bunding in Eval are:**

- Eval has much steeper slopes
- The region has shallow soil depth.
- It is a more permanent structure if well maintained
- It is self – stabilizing

**1. Staggered contour Trenches**

Trenches are any form of depression or micro pit constructed over the land surface in order to prevent soil erosion and to absorb rainwater in non arable lands. Trenches are constructed along the contours (called contour trenches) on hill slopes above 15% with vegetative supports for forestry and horticulture land uses. Contour trenches are used both on hill slopes as well as on degraded and barren waste lands for soil and moisture conservation and afforestation purposes. The trenches break the slope and reduce the velocity of surface runoff. It can be used in all slopes irrespective of rainfall conditions (i.e. in both high and low rainfall conditions), varying soil properties. For vegetative support forage grasses as well as economic trees can be planted. Periodical maintenance by way of unearthing of the trenches and depositing on the downhill side ought to be given due attention by the beneficiaries themselves. SCT are been planned to be drawn in the hilly terrain where slope is not so steep.

**2. Border Contour Trenching:**

It is planned to draw a border contour trench with the following specifications (table no.40.4 and 40.5) to collect the runoff below the hills so that plantation of trees can be taken up.

**Slope treatment:**

The second tier treatment is the slope treatment. This is generally done on agricultural land or waste land. This generally includes water conservation or surface water storage structures. This being highly labour intensive, will involve more of manual labour; so, funds from National Rural Employment Guarantee Scheme (NREGS) can be taken.

Following structures are been proposed in these areas

a. Earthen Bund
b. Waste Weir
c. Afforestation

**Table no.35: Details of activities of preparatory phase (All financial figures in lakhs)**

| S. No. | Name of villages | Initiation of village level institution | Capacity building | IEC activities | Baseline survey | Hydro-geological survey | Technical support agencies | Printing DPR and mapping of project Area | Estimated Cost (Rs. in lakh) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Eval | 2.1 | 5.2 | 2.1 | 0.63 | 0.21 | 2.1 | 0.26 | 12.6 |

**Table no.36: Activities related to Surface water resources in the project areas (all financial figures in lakh Rs.)**

| S. No. | Village name | Type of structures | Proposed target | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Construction of new structures | | | | Total target | | |
| | | | No. | Area to be irrigated (ha) | Storage capacity(lit) | Estimated cost(in lakh) | Area to be irrigated (ha) | Storage capacity | Estimated cost(in lakh) |
| 1 | Eval | (i) Pond | 15 | 15 | 15000 | 4 | 15 | 15000 | 4 |
| | | (ii) Percolation tank | 1 | 0 | 10,000 | 5 | 0 | 10,000 | 5 |
| | Total | | 16 | 15 | 25,000 | 9 | 15 | 25,000 | 9 |

**Table no. 38: Activities related to livelihoods by Self Help Groups (SHGs) in the project areas**

| S. No. | Names of Villages | Major activities of the SHGs | | |
|---|---|---|---|---|
| | | Name of activity | No. of SHGs involved | Average annual income from activity per SHG(in Rs. Approx) |
| 1 | Eval | Vermi composting | 2 | 72000 |
| | | Cumin processing and packaging | 2 | 40000 |
| | | Nursery Raising | 2 | 50000 |
| | | Handicraft | 1 | 40000 |
| | | Fodder Bank | 1 | 1.4(in Lakh) |

**Table no. 39: Other activities of watershed works phase – Proposed target**

| S. No. | Name of villages | Ridge area treatment | | Nursery raising | | Land development | | Crop demonstrations | | Fodder Land development | | Total Estimated cost (Rs. In lakhs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (in ha) | (in lakh) | (in ha) | (in lakh) | (in ha) | (in lakh) | (in ha) | (in lakh) | (in ha) | (in lakh) | |
| | Eval | 500 | 40.7 | 0.25 | 2 | 1100 | 55.8 | 5 | 2 | 15 | 5.47 | 105.97 |

**Table no.40: Details of engineering structures in watershed works***

| S. No. | Village name | Name of structures | Type of treatment | | | Type of land | | | Executing agency | Target | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (i) Ridge area (R) | (ii) Drainage line (D) | (iii) Land dev. (L) | (i) Pri-vate | (ii) Community | (iii) Others (pl. specify) | (i) UG (ii)SHG (iii) Others (pl. specify) | No. of units (No./ cu.m./ rmt) | Estimated cost (Rs. in lakh) | | | | Expected month & year of completion (mm/yyyy) |
| | | | | | | | | | | | M | W | O | T | |
| | | Staggered trenching/Stone bunding(SCT) | R | | | | C | F | Forest | 60,000 | | | | 29.3 | May-2012 |
| | | Border contour Trenching(BCT) | R | | | | C | F | Forest | 10,000 | | | | 11.4 | May-2012 |
| | | Earthern Bunds | L | | | P | C | | DWDU | 5 | | | | 12.3 | January-2013 |
| | | Waste Weir | L | | | P | C | | DWDU | 2 | | | | 4.5 | Feb-2013 |
| | | Field bunds | L | | | P | | | DWDU | 300 | | | | 39 | May-2015 |
| | | Percolation Tank | L | | | | C | | DWDU | 1 | | | | 4.5 | May-2014 |
| | | Farm Pond | L | | | P | | | DWDU | 15 | | | | 4 | Dec-2015 |
| | Total | | | | | | | | | | | | | | |

**Table No. 40.1: Technical Specification of stone bund**

| Particulars | Value | Units |
|---|---|---|
| Top width of bund | 0.5 | m |
| Bottom width of Bund | 1.3 | m. |
| Depth above ground level | 0.55 | m. |
| Depth of Foundation | 0.2 | m. |
| **Cross section of bund** | 0.68 | sq. m |
| Proposed Area | 250.00 | ha. |

**Table No. 40.2: Technical Details of Staggered Contour Trenches**

| Particulars | Value | Units |
|---|---|---|
| Trench Length | 4.00 | m. |
| Trench Width | 0.45 | m. |
| Trench Depth | 0.45 | m. |
| No. Of Trenches Per ha. | 120 | nos. |
| | | |
| Proposed Area | 500.00 | ha. |

**Table No 40.3 Quantity Calculation: SCT**

| S. No. | Description | Unit | No. | Length (M.) | Width (M.) | Depth (M..) | Quantity (Cum) |
|---|---|---|---|---|---|---|---|
| 1 | Layout of Contour Lines | Meter | | 2,40,000.00 | | | 2,40,000.00 |
| 2 | **General Work** | | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | Meter | 2 | 2,40,000.00 | | | 4,80,000.00 |
| 3 | **Earth Work** | | | | | | |
| | Earth work in excavation in foundation/trench upto 1.5 meter depth. Compaction of bottom, correction of sides, refilling of blank spaces with soil and disposal of remaining soil upto 50mr. | Cu.m. | 60,000 | 4 | 0.45 | 0.45 | 48,600.00 |
| | a) In ordinary/soft soil | Cu.m. | | | | | |
| | b) In hard soil/clay/murrum | Cu.m. | | | | | |
| | c) Fragmented rock | Cu.m. | | | | | |
| | d) ordinary rock | Cu.m. | | | | | |
| 4 | Vegetative Work | | | | | | |
| | Sowing of seed on the constructed ridge | Meter | 60,000 | 4 | | | 2,40,000.00 |
| 5 | Supply of Stylo/Dhaman Seed @ 4 gm/Meter in two lines | Kg | 2 | 2,40,000.00 | | | 1,920.00 |
| 6 | Overseeding of grasses in between two furrows including seed treatement and pallet making etc. complete @ 8 kg/ha | Kg | | 500 | 8 | | 800 |

Table No 40.4: Technical Details of Border Contour Trench

| Particulars | Value | Unit |
|---|---|---|
| Trench Length | 10,000.00 | m. |
| Trench Type | Trapezoidal | |
| Trench Depth | 1.00 | m. |
| Trench Width | 2.00 | m. |
| Trench Top Width | 5.00 | m. |
| Trench Cross Section | 3.50 | sqm. |

**Table no 40.5: Quantity Calculation of Border Contour trench**

| S. No. | Description | Unit | No. of Structures | Length (M.) | Width (M.) | Depth (M..) | Quantity (Cum) |
|---|---|---|---|---|---|---|---|
| 1 | Layout of Contour Lines | Meter | 1 | 10,000.00 | | | 10,000.00 |
| 2 | General Work | | | | | | |
| | Dag Belling 2.5 to 5.00 cm deep | Meter | 2 | 10,000.00 | | | 20,000.00 |
| 3 | Earth Work | | | | | | |
| | Earth work in excavation in foundation/trench upto 1.5 meter depth. Compaction of bottom, correction of sides, refilling of blank spaces with soil and disposal of remaining soil upto 50mr. | | | 10,000.00 | 3.5 | 1 | 20,000.00 |
| | a) In ordinary/soft soil | Cum | | | | | |
| | b) In hard soil/clay/murrum | Cum | | | | | |
| | c) Fragmented rock | Cum | | | | | |
| | d) ordinary rock | Cum | | | | | |
| | **Vegetative Work** | | | | | | |
| 4 | Sowing of forestry seed on bunds in two lines | Meter | 2 | 10,000.00 | | | 20,000.00 |
| 5 | Supply of Forestry (Afforestation @10 m distance) | Kg | | 10,000.00 | | | 1000 |

**Earthen Bund**

**Table no 40.6: Technical details of Earth Bund No. 1 on Survey no. 87**

| Particulars | Value | Units |
|---|---|---|
| Structure Length | 1200.00 | m |
| Structure Height | 1.00 | m |
| Upstream Slope | 2:1 | - |
| Downstream Slope | 1:1 | - |
| Bund Top Width | 1.00 | m |
| Structure Base Width | 4.00 | m |
| Structure Cross Section | 2.5 | sqm |

**Table no 40.7: Quantity Calculation of Earth Bund No.1 Survey no. 87**

| S. No. | Description | Unit | No. of Structures | Length (M.) | (SqM..) | Cross Section (Cu. M.) |
|---|---|---|---|---|---|---|
| 1 | **General Work** | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 2 | 1000 | | 2,000.00 |
| 2 | **Earth Work** | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | Cum | | 1000 | 2.5 | 2,500.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Table no 40.8: Technical details of Earth Bund No. 2 on Survey no. 104**

| Particulars | Value | Units |
|---|---|---|
| Structure Length | 1000.00 | m |
| Structure Height | 1.00 | m |
| Upstream Slope | 2:1 | - |
| Downstream Slope | 1:1 | - |
| Bund Top Width | 1.00 | m |
| Structure Base Width | 4.00 | m |
| Structure Cross Section | 2.5 | sqm |

**Table no 40.9: Quantity Calculation of Earth Bund No.2 Survey no. 104**

| S. No. | Description | Unit | No. of Structures | Length (M.) | (SqM..) | Cross Section (Cu. M.) |
|---|---|---|---|---|---|---|
| 1 | **General Work** | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 2 | 900 | | 1,800.00 |
| 2 | **Earth Work** | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | Cum | | 900 | 8 | 7,200.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Table no 40.10: Technical details of Earth Bund No.3 on Survey no. 425**

| Particulars | Value | Units |
|---|---|---|
| Structure Length | 900.00 | m |
| Structure Height | 2.00 | M |
| Upstream Slope | 2:1 | - |
| Downstream Slope | 1:1 | - |
| Bund Top Width | 1.00 | M |
| Structure Base Width | 7.00 | M |
| Structure Cross Section | 8 | sqm |

**Table no 40.11: Quantity Calculation of Earth Bund No.3 Survey no. 425**

| S. No. | Description | Unit | No. of Structures | Length (M.) | (SqM..) | Cross Section (Cu. M.) |
|---|---|---|---|---|---|---|
| 1 | **General Work** | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 2 | 300 | | 600.00 |
| 2 | **Earth Work** | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | Cum | | 300 | 8 | 2,400.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Table no 4012: Technical details of Earth Bund No. 4 on Survey no. 427**

| Particulars | Value | Units |
|---|---|---|
| Structure Length | 300.00 | m |
| Structure Height | 2.00 | m |
| Upstream Slope | 2:1 | - |
| Downstream Slope | 1:1 | - |
| Bund Top Width | 1.00 | m |
| Structure Base Width | 7.00 | m |
| Structure Cross Section | 8 | sqm |

**Table no 40.13: Quantity Calculation of Earth Bund No.4 Survey no. 427**

| S. No. | Description | Unit | No. of Structures | Length (M.) | (SqM..) | Cross Section (Cu. M.) |
|---|---|---|---|---|---|---|
| 1 | **General Work** | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 2 | 300 | | 600.00 |
| 2 | **Earth Work** | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | Cum | | 300 | 8 | 2,400.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Table no 40.14: Technical details of Earth Bund No. 5 on Survey no. 299**

| Particulars | Value | Units |
|---|---|---|
| Structure Length | 1500.00 | m |
| Structure Height | 1.00 | m |
| Upstream Slope | 2:1 | - |
| Downstream Slope | 1:1 | - |
| Bund Top Width | 1.00 | m |
| Structure Base Width | 4.00 | m |
| Structure Cross Section | 2.5 | sqm |

**Table no 40.15: Quantity Calculation of Earth Bund No.5 Survey no. 299**

| S. No. | Description | Unit | No. of Structures | Length (M.) | (SqM..) | Cross Section (Cu. M.) |
|---|---|---|---|---|---|---|
| 1 | **General Work** | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 2 | 1500 | | 3,000.00 |
| 2 | **Earth Work** | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | Cum | | 1500 | 2.5 | 3,750.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Farm Pond:**

There is very little qualitative difference between a pond/tank, which usually serves the population of a village, and farm pond, which serves an individual agricultural field. Farm ponds greatly vary in size depending upon the rainfall. These have only a few metres of length and width and are built across the flow path of natural drainage channels. Surplus water from one pond spills over to a lower pond. In some cases a series of farm ponds are built on one single stream. Each pond caters to the irrigation needs of one farm and also augments ground water recharge.

**Table No. 40.16: Technical Details of Farm Pond**

| Particulars | Value | |
|---|---|---|
| Pond Length | 25.00 | M. |
| Pond Width | | |
| Pond Depth | 2.50 | M. |
| Side Slope | 2: 1 | |

**Table No. 40.17: Quantity Excavation for Farm Pond**

| Sr No | Description | Unit | Pond Top Area (Sq.m) | Pond Bottom Area (Sq.m) | Depth (M) | Quantity (Cum) |
|---|---|---|---|---|---|---|
| 1 | General Work | | | | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | | | | 90.00 |
| 2 | Earth Work | | | | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, upto 1.5 meter lift and 50 meter lead. | | 500.00 | 300.00 | 2.50 | 1,000.00 |
| | a) ordinary soil | Cum | | | | |
| | b) hard soil | Cum | | | | |

**Table No. 40.18: Technical Details of Farm Bund**

| Particulars | Value | |
|---|---|---|
| Bund Length Per Ha. | 400.00 | M. |
| Proposed Area(area of farm) | 1.00 | Ha. |
| Total Bund Length For Proposed Area | 400.00 | M. |
| Top Width | 0.50 | M. |
| Side Slope | 1:1 | |
| Height | 0.50 | M. |
| Base Width | 1.50 | M. |
| Cross-Section of Farm bund | 0.50 | SqM. |

**Table No. 40.19, Quantity Excavation for Farm bund**

| Sr. No | Description | Unit | Quantity |
|---|---|---|---|
| 1 | General Work | | |
| | Clearing bushes / Dag Belling 2.5 to 5.00 cm deep | M | 800.00 |
| 2 | Earth Work | | |
| | Construction of earthen bund (dry of moist) excavation and laying in 15 cm layer, breaking of clods, separating leaves and small stones, dressing and compaction with sheep foot roller or hand rammer, uptp 1.5 meter lift and 50 meter lead. | Cum | 200.00 |
| | a) ordinary soil | Cum | |
| | b) hard soil | Cum | 200.00 |
| 3 | Vegetative Work | | |
| | Sowing of seed on the constructed ridge | M | 400.00 |
| 4 | Supply of Stylo/Dhaman Seed @ 4gm/m in(single line) | Kg | 1.60 |

**Table no.41: Details of activities connected with vegetative cover in watershed works**

| S. No. | Name of village | Name of structure/ work | Type of treatment | | | Type of land | | | Executing agency | Target | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (i) Ridge area (R) | (ii) Drainage line (D) | (iii) Land dev. (L) | (i) Private | (ii) Community | (iii) Others (pl. specify) | (i) UG (ii)SHG (iii) Others (pl. specify) | Area (ha) | No. of plants | Estimated cost (Rs. in lakh) | Expected month & year of completion (mm/ yyyy) |
| | | Afforestation | R | | L | | C | F | Forest | 15 | 1560 | 0.56 | May-2013 |
| | | Plantation/Grass Seeding(SCT,BCT) | R | | L | | C | F | Forest | 40 | | 5 | May-2012 |
| | | Fodder | | | L | | C | | SHG | 15 | | 5.5 | Jan-2012 |
| | | Nursery raising | | | L | | C | | SHG | 5 | | 2 | May-2012 |
| | Total | | | | | | | | | | | 13.06 | |

**Table No. 41.1: Technical Details of Afforestation Activities**

| Particulars | Value | |
|---|---|---|
| **Crop Name** | **Ailanthus** | |
| Plant To Plant Spacing | 8.00 | M |
| Row to Row Spacing | 8.00 | M |
| Pit Length | 1.00 | M |
| Pit Width | 1.00 | M |
| Pit Depth | 1.00 | M |
| No. of Plants | 156 | Nos. |
| Plantation Area | 10.00 | ha. |
| No. of Plants per ha | 1,560 | Nos. |
| Gap Filling | 20 | % |

**Table No. 41.2: Cost Estimation for afforestation activity**

| S. No. | Description | No. | Length (m.) | Width (m.) | Depth (m.) | Unit | Quantity | Rate | Amount |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Digging of pits for plants in Ordinary murum | 1,560 | 1 | 1 | 1 | Cum | 1,560.00 | 10 | 15600 |
| 2 | Plants samplings for plantation in Govt. pasture area, sampling not less than 30 cm. height | 1,560 | | | | Nos. | 1,560.00 | 10 | 15600 |
| 3 | Transportation of plants from nursery to camp site up to 5Km | 1,560 | | | | Nos. | 1,560.00 | 1 | 1560 |
| 4 | Loading and unloading of plants | 1,560 | | | | Nos. | 1,560.00 | 1 | 1560 |
| 5 | Rehandling of plants from camp site to actual planting site upto 200m. | 1,560 | | | | Nos. | 1,560.00 | 1 | 1560 |
| 6 | Cost of fertiliser & insecticides incl. application | 1,560 | | | | Nos. | 1,560.00 | 10 | 15600 |
| 7 | Weeding and Hoeing two times (Twice in year) | 1,560 | | | | Nos. | 1,560.00 | 2 | 3120 |
| | | | | | | | Total | | 54600 |

**Table no.42: Details of allied / other activities**

| S. No. | Name of village | Name of activity | Type of land | | | Executing agency | Target | |
|---|---|---|---|---|---|---|---|---|
| | | | (i) Private | (ii) Community | (iii) Others (pl. specify) | (i) UG (ii)SHG (iii) Others (pl. specify) | Estimated cost (Rs. in lakh) | Expected month & year of completion (mm/yyyy) |
| | Eval | Crop demonstration | Private | | | | 2 | |
| | | Backyard poultry | Private | | | SHG | 0.5 | |
| | | Small ruminants | Private | | | | 2 | |
| | | Animal Husbandry | Private | | | | 12.5 | |
| | | Animal camp | | Community | | | 1 | |
| | | Composting | | Community | | | 0.5 | |
| | | Animal Nutrient | Private | | | | 0.5 | |
| | | Nursery Raising | | Community | | SHG | 2 | |
| | | Total of Livelihood intervention | | | | | 21 | |
| | | Fodder bank | | Community | | SHG | 5.5 | |
| | | Vermicomposting | | Community | | SHG | 2.3 | |
| | | Cumin packaging | | Community | | SHG | 3.5 | |
| | | Handicraft- wool | | Community | | SHG | 3 | |
| | | Milk collection centre | | Community | | WC- sub committee | 1 | |
| | | SHG revolving fund | | Community | | | 5 | |
| | | Rain gun sprinkler | | Community | | SHG | 7 | |
| | | **Total of the Production system intervention** | | | | | **27.3** | |

**Production System-1: Fodder bank for Eval Watershed**

**Introduction:**

"The fodder bank technology is a farming practice whereby leguminous shrubs and grass species are grown on a farm to provide fodder for livestock sector." It provides a wide range of animal products that are rich in high quality proteins and have the potential as good and sustainable sources of income in many areas. However, lack of fodder in terms of quality and quantity, is one of the major constraints towards the low productivity of cattle in Eval watershed Project.

The fodder bank ensures fodder availability which in turn reduces the distressed migration of the people resulting in sustainable livelihood opportunities and enhances natural resource security in the project area.

**Objective of a fodder bank:**

1. Build a local fodder bank and organize the distribution of fodder during drought and scarce situation.
2. Establish and maintain village fodder farm in the community grazing area, and allocate the community land for fodder production, in association with dairy co-operatives.
3. Control regulates and charge in the community grazing and pastures lands.
4. Undertake the distribution of fodder seeds and slips in the village.

**Primary problem of the project**

Eval village comes under totally rainfed agriculture because of this migration percentage is very high. Soil is very suitable for fodder crop mainly sorghum but due the scarcity of irrigation water only one crop can be taken throughout the year. So fodder bank play an important role to solve this problem. Majority of farmers own less than 2.5ha of land for food and fodder production but lack of irrigation water has made these lands unproductive. The concept of fodder bank can overcome the problem of seasonal feed shortage, migration and poor animal performance.

It is the milch animal, which is the worst affected during these periods of drought, due to lack of productivity of sufficient fodder and water. As a result, the poor are forced to let go with their animals in search of fodder and green pastures to other parts of the state. This eventually this leads to colossal loss of income generating assets, poor demographic profile of village and low education level of their children.

Even in good years, during the harvesting season, the poor tend to sell their crop residue or fodder to earn cash. At such time when supply is higher than demand, they are not able to sell fodder at remunerative prices. The same fodder is bought back by them, mostly at higher prices during the months of scarcity.

To meet the critical needs of fodder, especially for the poor families and protect them from inordinately high prices during the summer months, fodder banks are proposed to be setup at the village level

**Feasibility of Fodder Bank:**

A detailed survey and Focused Group Discussion was conducted in Eval watershed area. The number and type of cattle as well as the fodder production capacity of the village was collect during these surveys. In focused group discussion several factors like the various types of fodder available locally, the quantity of fodder to be stored in the fodder bank, the size of fodder bank, the amount of finances required to operate a fodder bank etc were discussed with the farmers, User group and Watershed committee. The fodder bank should be sustainable and towards that, the sale price of fodder should cover operating costs and losses in storage. All these decisions were taken jointly with the member of operating fodder bank.

**Table 34 .1 Primary Model for A Fodder Bank**

| | | | |
|---|---|---|---|
| A. | Total Dairy farmers | 70 | |
| | No. of Cattle to be catered by one fodder bank. | No. of adult animals | No. of calves |
| | | 100 | 50 |
| | Total | 150 | |
| | Fodder requirement per day (10kg dry fodder for adult and 4kg for calf). | 1000 kg( per Day )+500 kg( per Day )= 1500 Kg | |
| | Fodder requirement for 180 days. | 2700 quintal | |
| | Fodder come from community land | 15 hec *150=2250 quintal | |
| | Cost of cultivation for fodder production (See table no. 34.2.1) | 72,500 Rs | |
| | Remaining requirement for 120 days | 2700-2250=450 quintal | |
| | Total Cost<br>Avg. procurement rate in harvesting season, Rs.600 per Qt. including transportation | 600*450= Rs.2,70,000/- | |
| | Net Cost of Fodder Production<br>(cost of cultivation + Cost of procurement) | 3,42,500 | |
| B. | Area development for fodder bank Land required Approx. 3000 $m^2$<br>(preferably land will be allotted by Gram Panchayat @ Rs.600 per month) | Rs 7200 | |
| C. | Total Cost for Fodder bank (1year)<br>(A+B) | Rs. 3,49,700/- | |

**Table no: 34.2, Cost of cultivation for fodder production**

| Cost Detail | Unit cost |
|---|---|
| 1. Cost for tillage | 4.5 hour*15 hec*400 Rs=27000 Rs |
| 2. Cost for seed | 12 kg seed *15 hec *100=18000 Rs |
| 3. Cost for fertilizer | 10,000 Rs |
| 4. Cost for irrigation | 10,000 Rs |
| 5. Depreciation cost of C1. (5%) | 7500 Rs |
| **Total cost for 15 hec** | **Rs. 72,500** |

**Table No. 34.2.1. Initial investment for fodder bank**

| | | |
|---|---|---|
| A. | Total Cost for Fodder bank (1year)<br>(A+B+D) | Rs. 3,49,700/- |
| B. | C1.Fencing + Weighing machine + Small shed + Other tools. | Rs.1,50,000 |
| C. | Required labour for fodder bank management<br>(2 person @2000 per month for each) | Rs.48,000 |
| D. | Total initial cost | Rs.5,47,700 |

**Table No. 34.3, Revenue and return Details.**

| S. No | Return Details | Cost (in Rs.) |
|---|---|---|
| 1 | Cost of fodder Per Kg | = 3,49,700/270000 |
| | | 1.30 Rs/kg |
| 2. | Selling Price of Fodder | Rs 2 /Kg |
| 3. | Net selling Price | Rs. 5,40,000 |
| 4. | Net Profit | Rs 1,90,300 |

**Production of Fodder:**

We will produce 2250 quintal fodder from community land of Gram Panchayat and for remaining requirement we can fulfill by two ways first one buy the fodder at the time of harvesting and second we can take land on lease agreement from some other government as well as private agency.

**Technical Support/Assistance:**

To ensure proper technical support for fodder bank and smooth functioning of activities the required technical assistance may be taken from Krishi Vigyan Kendra (KVS), Dept. of Agriculture, Dairy and DWDU.

**Advantages:**

The importance of a fodder bank can be well understood. The fodder banks will provide much needed relief and self-reliance to poor in the village especially in drought condition. Specifically, the advantages are:-

- It will reduce migration during drought condition.
- Farmers can purchase and sale of fodder at village level, thus doing away with costs incurred by them to carry out these transactions at the city market.
- It can reduce in overall market prices of fodder during the lean season.
- Ensure availability of fodder during the lean season at affordable and reasonable prices.
- Reduced distress sale of cattle due to non –availability and / or non-affordability of fodder.
- Higher incomes for the poor as cattle will have enough fodder even during the lean season
- Increase employment opportunities at the village level associated with the sale, purchase and storage of fodder.

**Production System - 2: Vermicompost unit for Eval village**

One of the important occupations of the villagers is animal husbandry. At present, the animal waste is not used by the villagers as agricultural input. If the farmers start realising the benefits of compost and vermicompost in particular, the productivity of their land can increase manifold. As part of direct livelihood support, the villagers (mainly land less) are going to receive cows, buffaloes and small ruminants. These animals in turn are going to produce more waste, which can be used to prepare vermicompost.

It is planned that a vermicompost unit by another SHG would be supported by the project. The SHG members, with the help of hired manpower, can collect animal-dung. They would process this dung to prepare vermicompost and sell it to the farmers in the village or outside, as per demand.
The process of composting crop residues using earthworms comprise spreading the agricultural wastes and cow dung in layers of 1.5 m wide and 0.9 m high beds of required length. Earthworms are introduced in between the layers @ 350 worms per $m^3$ of bed volume. The beds are maintained at about 40 - 50% moisture content and a temperature of 20 - 30$^o$ C by sprinkling water over the beds. The earthworms being voracious eaters consume the biodegradable matter and give out a part of the matter as excreta or vermi-castings. The vermi-casting containing nutrients are rich manure for the plants.

**About The Worms**

*Eisenia fetida, Eudrilus eugeniae, and Perionyx excavatius* are some of the species for rearing to convert organic wastes into manure. The worms feed on any biodegradable matter ranging from coir waste to kitchen garbage and Vermicomposting units are ideally suited to locations / units with generation of considerable quantities of organic wastes. One earthworm reaching reproductive age of about six weeks lays one egg capsule (containing 7 embryos) every 7 - 10 days. Three to seven worms emerge out of each capsule. Thus, the multiplication of worms under optimum growth conditions is very fast. The worms live for about 2 years. Fully grown worms could be separated and dried in an oven to make 'worm meal' which is a rich source of protein (70%) for use in animal feed.

**Use**

Vermi compost has more nutrient compare to other manures and fertilizer; so, by the use of vermicompost we can reduce use of chemical fertilizer. Vermicompost not only supply nutrient but also improve quantity of hormones for plant growth, improves the soil structure leading to increase in water and nutrient holding capacities of soil.

**Components of a commercial unit**

**Sheds**

Eval village has high temperature in summer; so, a shed structure is needed for the vermicompost unit. It can be made by the use of concrete pillars. While designing the sheds adequate room has to be left around the beds for easy movement of the labourers attending to the filling and harvesting the beds.

**Vermi-beds**

Scientific bed side is 75 cm - 90 cm thick depending on the provision of filter for drainage of excess water. The whole bed area should be above the ground. The bed should have a uniform height over the entire width to the extent possible to avoid low production owing to low bed volumes. The proper bed width should not be more that 1.5 m to allow easy access to the centre of the bed.

**Land**

About 125 square meter of land will be required to set up a vermin compost production unit in Eval village. It should have at least 2-3 sheds each of about 180-200 sq.ft. It should have a good watering arrangement and other equipments as required because moisture is very essential for vermicompost production.

**Seed Stock**

This is very important thing because worms multiply at the rate of 350 worms per $m^3$ of bed space over a period of 6 month to a year.

**Fencing**

The entire area has to be fenced to prevent the animals and other unwanted elements. These could be estimated based on the length of the periphery of the farm.

**Water Supply System**

50% moisture content has to be maintained all the time. Water for the purpose would come from a well nearby.

**Machinery**

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

**Estimate for a vermicompost unit:**

- Requirement of nitrogen for 1 hectare sorghum fodder production=90 kg.
- 1.6% N available in vermin compost .
- 90 kg N fulfill by the use of 90/1.6*100= 5625 kg vermicompost (5.5 ton).
- Need of vermicompost to fulfill the requirement of nitrogen for 15 hectare 5.5*15 =82.5 (80 ton).
- 45 kg phosphorus required for 1 hectare sorghum fodder production.
- Requirement of phosphorus for 15 hectare fodder production 15*45=675 kg.
- Supply of phosphorus through vermin compost 0.7/100*80000=560 kg.
- Remaining requirement of phosphorus 675-560=115 kg.
- Remaining dose of phosphorus will be supplied by rock phosphate.

One compost cycle need 45 days so we need 8 cycle for 80 ton vermin compost production.

**Table: 42.4: Model for A Vermi-compost Unit**

| S. No | Particulars | Quantity | Rate (Rs.) | Amount (Rs.) |
|---|---|---|---|---|
| 1 | Wooden ballies (3 m long) | 20 | 50 | 1000 |
| 2 | Wooden (4 m long) | 25 | 60 | 1500 |
| 3 | Shade mats for covering the roof | 125 | 25 | 3125 |
| 4 | Binding wire for tying wooden ballies & mats | 20 Kg | 50 | 1000 |
| 5 | Labour charges for erection of sheds | 20 | 100 | 2000 |
| 6 | Shovels, spades, crowbars, iron baskets, | | | 2500 |
| 7 | Weighing scale (100 kg capacity) | 1 | 2000 | 2000 |
| 8 | Cow dung | 10 ton | 800 | 8000 |
| 9 | Worms @ 3 kg per ton | 30 kg | 80 | 2400 |
| 10 | Formation of vermin bed with agro-waste, cow dung and worms | 20 bed | 250 | 5000 |
| 11 | Miscellaneous | | | |
| | Total cost | | | 28,525 Rs. |
| | **Cost for 8 cycles** | | | **2,28,200 Rs.** |

**Table No.42.5: Returns from vermicomposting**

| **Benefits** | |
|---|---|
| 1. Sale of vermin compost of 80 tones @ Rs.3500/- per ton | 80*3500=2,80,000 Rs |
| 2. Sale of worms @ 5 kg per ton of compost and Rs. 50 per kg | 400*50=20,000 Rs |
| Total | 3,00,000 Rs/- |
| **Net benefit** | **3,00,000-2,28,200=71,800 Rs/-** |

**Production System - 3: Cumin Packaging**

Cumin is an important crop of the area. Though very few farmers produce cumin in the village, there is ample scope for cumin cultivation in the village as demonstrated by a leading farmer who owns a fresh water open-well and can irrigate his fields. With availability of good quality ground water due to the watershed activities, many a farmer can cultivate cumin as Patan district has ahigh productivity of cumin. This cumin can be cleaned, graded and packed at the village level to fetch better price in the market.

Equipment like sealing machine etc will be provided after training. Cumin seeds can be packaged in polythene bags of various sizes according to the market demand.

1. Grading of cumin*:* Grading of cumin seed will be done according to size of cumin seed and moisture content.
2. Packaged in polythene bags of various sizes (100g, 200g, and 400g) according to the market demand.
3. The bags should be sealed to prevent moisture entering ct.
4. Labelling of it with following information the name of the product, brand name (if appropriate), details of the manufacturer (name and address), date of manufacture, expiry date, weight of the contents

**Table no.43: Details of activities in the CPRs in the project areas**

| S. No. | Name(s) of the villages | CPR particulars | Activity proposed | Target | | |
|---|---|---|---|---|---|---|
| | | | | Target area under the activity (ha) | Estimated expenditure (Rs.) | Expected no. of beneficiaries |
| **1** | Eval | Waste land | Fodder Development | 15 | 5.5 | 100 household |

## 4.4. Capacity Building:

Capacity Building is the process of assisting the group or individuals to identify and address issues and gain the insights, knowledge and experience needed to solve problems and implement change.

There is a realization in the development sector that there is a need to appraise the success of development interventions by going beyond the conventional development targets and measures of success (e.g. in the form of commodities, goods and services) to take into account improvements to human potential. Capacity building of stakeholders is also increasingly viewed as an important factor in developmental projects that involve participation of stakeholders at all levels for effective implementation of projects.

**Scope of capacity building at Eval Village**

- Alternative Land Use Plan
- Scientific technique of Soil and Moisture conservation
- Improved and Scientific agriculture practices
- Fodder development and Management
- Afforestation
- Meteorological Information
- Dairy Development and Management
- Rural Craft
- Income Generation Activities
    - Stiching
    - Food Processing
    - Post Harvest management practices

**Table no. 44: Capacity Building Institution:**

| S. No. | Name of the Training Institute | Full Address with contact no., website & e-mail | Type of Institute# | Area(s) of speciali-zation$ | Accreditation details | Trainings | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Reference Year | No. of trainings assigned | No. of trainees to be trained |
| 1 | Krishi Vigyan Kendra | Samoda, Patan | Research Institutes | Agriculture/ Horticulture/ Animal Husbandry | GoI | 2012-2014 | 3 | 80 |
| 2 | Dantiwada Agril. University | Banaskantha | University | Agriculture/ Horticulture/ Animal Husbandry | GoI | 2012-2014 | 3 | 30 |
| 3 | VRTI | Kutch | NGO | Capacity Building | Society Reg. Act | 2011-2012 | 2 | 50 |
| 4 | BISAG | Gandhinagar | Space application | Remote Sensing | GoG | 2010-2015 | 3 | 3 |

**Table no. 45: Capacity Building plan:**

| S. No. | Village | Project Stakeholders | Total no. of persons | No. of persons to be trained | No. of training programmes | Estimated cost(in lakh) |
|---|---|---|---|---|---|---|
| 1 | Eval | PIA | 5 | 5 | 4 | 34000 |
| | | WDTs | 3 | 3 | 4 | 20400 |
| | | UGs | 60 | 10 | 1 | 57000 |
| | | SHGs | 56 | 56 | 1 | 67200 |
| | | WCs | 16 | 16 | 1 | 25600 |

**Table no.46: Information, education and Communication Activities:**

| S. No. | Activity | Executing agency | Estimated expenditure (Rs.) | Outcome (may quantify, wherever possible) |
|---|---|---|---|---|
| | Street plays | Local Drama Groups | 5000 | Awareness for the importance of watershed projecta |
| | Video shows | DWDU Patan | 3000 | |
| | Pamphlets and posters | DWDU Patan | 2000 | |
| | Banners, Hoardings | DWDU Patan | 3000 | |

# CHAPTER – 5

# BUDGETING

**Budgeting**

The first step in budgeting is dividing the cost of the project into various component s as detailed in the common guidelines and done accordingly in table no. 47. It helps us in further identifying activities under different components and allocate appropriate funds.

**Table no. 47: Budget at a glance**

| Budget Component | Cost requirement |
|---|---|
| **Net Project Cost** | **210** |
| -Administrative Costs | 21 |
| -Monitoring | 2.1 |
| -Evaluation | 2.1 |
| **Preparatory phase:** | 21 |
| -Entry point activities | 8.4 |
| -Institution and capacity building | 10.5 |
| -Detailed Project Report (DPR) | 2.1 |
| **Watershed Works Phase:** | |
| -Watershed Development works, | 105 |
| -Livelihood activities for the asset less persons, | 21 |
| -Production system and micro enterprises | 27.3 |
| **Consolidation Phase** | 10.5 |
| **Total** | 210 |

**Table no. 48: Village component wise budget available under IWMP**

| Sl no | Village | Activity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | EPA | Institution and CB | DPR | Watershed development Work | Livelihood for asset less | Production system and Microenterprises | Consolidation | Total |
| 1 | Eval | 8.4 | 10.5 | 2.1 | 105 | 21 | 27.3 | 10.5 | 210 |

**Table no. 49: Village wise gap in funds requirement**

| S. No. | Village | Total cost requirement | Total funds available under IWMP | Gap in funds requirement |
|---|---|---|---|---|
| 1 | Eval | 228.86 | 210 | 18.86 |

**Table no.50: Details of Convergence of IWMP with other Schemes**

| **S. No.** | **Village** | **Activity to be carried out** | **Fund made available to IWMP due to convergence (Rs. in lakh)** | **Scheme with which convergence took place** | **Reference no. of activity/ task/ structure in DPR** | **Level at which decision for convergence was taken** |
|---|---|---|---|---|---|---|
| 1 | Eval | Staggered trenching/Stone bunding(SCT) | 10.26 | NREGS, Forest | | District level |
| | | Border contour Trenching(BCT) | 4.6 | NREGS, Forest | | District level |
| | | Earthern Bunds | 2 | NREGS, Forest | | District level |
| | | Percolation Tank | 2 | NREGS, Forest | | District level |
| | Total | | 18.86 | | | |

# CHAPTER - 6

# EXPECTED OUTCOMES

## 6.1 Expected Outcomes

### 6.1.1 Employment

Employment has always been a problem in the village. The principal occupations of the people are dry land agriculture, animal husbandry and casual labour work. However, rain fall being very limited and erratic, agriculture suffers, i.e. at best they can take only a single crop, which keeps them partially engaged for about 4 months. Lack of fodder makes animal husbandry very difficult too. So, animal husbandry does not keep them engaged full time. Thus the people mainly depend upon casual labour, either in the village itself or outside it.

The project plans for creation of both wage employment and self employment opportunities. Wage employment would be created by engaging people in watershed physical works like construction of earthen bunds, farm bunds, village pond, plantation, etc. Self employment would be created by providing the people with cash support in the form of direct livelihood activities like agriculture, animal husbandry and enterprise development.

**Table no. 52: Employment in Project area**

| S. NO. | Names of Villages | Wage employment | | | | | | | | | | Self employment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. of mandays | | | | | No. of beneficiaries | | | | | No. of beneficiaries | | | | |
| | | SC | ST | Others | Women | Total | SC | ST | Others | Women | Total | SC | ST | Others | Women | Total |
| 1 | Eval | 2790 | 0 | 43920 | 22420.8 | 46710 | 31 | 0 | 488 | 249 | 519 | 23 | 3 | 130 | 90 | 156 |

### 6.1.2.Migration

Low rainfall results in very little fodder availability in the locality. The relatively well off farmers bring fodder from Mehsana (approximately 100kms away) collectively; but the resource poor cannot afford it. On account of agriculture and animal husbandry providing only part time employment for some part of the year, the people migrate for a better half of the year for wage labour.

Employment opportunities in the local area as mentioned above will ensure lessening seasonal migration from the area.

**Table no. 53: Details of seasonal migration from Project area**

| Sl. No. | Names of villages | No. of persons migrating | | No. of days per year of migration | |
|---|---|---|---|---|---|
| | | Pre-project | Expected post project | Pre-project | Expected post project |
| 1 | Eval | 42 | 09 | 120 | 30 |

### 6.1.3 Ground water table

Rainfall has been scanty but demand for ground water has been increasing all the time. The ground water table thus has depleted over the years. Presently it stands at 28 m.

Proper water harvesting structures and percolation tanks would go a long way in increasing water table depth from 28 m in the pre-project level to 25 m in the post project period.

**Table no. 54: Details of average ground water table depth in the project areas (in meters)**

| S. No. | Names of Villages | Sources | Pre-Project level | Expected Increase/decrease (Post- Project) |
|---|---|---|---|---|
| 1 | Eval | Open wells | 28 | -3 |
| | | Bore wells | NA | NA |
| | | Others (specify) | - | - |

### 6.1.4 Drinking water

The village has two dug wells on which they depend for their drinking water. Many an effort at finding sweet water at different other places in the same village has failed. A farmer called Khan bhai has a well in his farm and he allows the villagers to take water from the well. There is another well in a common land too; but the water is not as good as the other well. WASMO has constructed a tank to store water brought through pipeline from Khan bhai's well.

As a result of the watershed activities, it is expected that the quantity and quality of drinking water would improve.

**Table no. 55: Status of Drinking water**

| S. No. | Names of Villages | Availability of drinking water (no. of months in a year) | | Quality of drinking water | | Comments |
|---|---|---|---|---|---|---|
| | | Pre-project | Expected Post project | Pre-project | Expected Post-project | |
| 1 | Eval | 11 | 12 | Saline with high TDS | Potable | |

### 6.1.5 Crops

Agriculture primarily depends upon water; but this is what is lacking in Eval village. The surface water is scanty due to low rainfall and ground water is saline, which is unfit for crop production.

All this can change with the integrated land and water management during the watershed project. The planned earthen bunds would prevent the saline water from the Rann of Kutch to mix with the sweet rain water and also help percolate sweet water underground, and preserve some moisture in the soil. This will help in additional area coming under cultivation and increasing productivity too. The farmers can take more than one season of crops. Different varieties of crops can be taken.

**Table no. 56 : Details of crop area and yield in the project area**

| Name of village | Name of crops | Pre-project | | Expected Post-project | |
|---|---|---|---|---|---|
| | | Area (ha) | Average Yield (Qtl) per ha. | Area (ha) | Average Yield per ha (qtl) |
| Eval | **Kharif** | | | | |
| | Sorghum (Jowar) | | 150 (fodder) | 14 | 200 (fodder) |
| | Pearl Millet (Bajra) | | 5 | | 10 |
| | **Rabi** | | | | |
| | Castor | | 4 | | 10 |
| | Cumin | | 2 | | 4 |
| | Mustard | | 4 | | 8 |
| | **Zaid** | | | | |
| | Sorghum (fodder) | | | | 150 (fodder) |
| | Village total | | | | |
| | | | | | |
| Project total | | | | | |

### 6.1.6 Horticulture

**Table no. 57: Area under horticulture**

| S. No. | Name of Village | Existing area under horticulture (ha) | Area under horticulture proposed to be covered through IWMP |
|---|---|---|---|
| | Eval | 0 | 25 |

### .1.7 Vegetative cover

There is negligible area under tree cover. The village has a forest area of 524ha which consists of only Juliflora Prosopis (ganda babool). Trees like Neem and _Alianthus_are seen just here and there, not concentrated in any area.

It is planned that 15 ha land to be covered under new plantation.

**Table no. 58: Forest/vegetative cover**

| S. No. | Name of Village | Existing area under tree cover (ha) | Area under tree cover proposed |
|---|---|---|---|
| 1 | Eval | 524 | 539 |

### 6.1.8 Livestock

The village has quite a good of livestock population. These include cows, bullocks, buffaloes, goats, sheep and camels. The interventions like provision of good quality cows and buffaloes, the establishment of a fodder bank and other such related activities would spur up the dairy development in the village. It is expected that the post project period would see a substantial increase in livestock population and yield from them.

**Table no. 59: Details of livestock in the project areas (for fluids please mention in litres, for solids please mention in kgs. and income in Rs.)**

| S. No. | Name of Village | Type of Animal | Pre-Project | | | Expected Post-project | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | No. | Yield | Income | No. | Yield | Income | |
| 1 | Eval | Milch-animals | | | | | | | |
| | | Cow(per animal/day) | 41 | 2 | 16 | 55 | 5 | 20 | |
| | | Buffalo(per animal/day) | 44 | 3 | 20 | 70 | 5 | 25 | |
| | | Draught Purpose animals | | | | | | | |
| | | Camel | 42 | - | | | | | |
| | | Animals for other purpose | | | | | | | |
| | | Goat (Meat: Rs/kg) | 434 | | 100 | 450 | | 100 | |
| | | Sheep (Meat: Rs/kg)) | 372 | | 100 | 400 | | 100 | |

**Linkages**The direct livelihood activities need good forward and backward support. Without such support system the activities may fail to deliver the desired results. These linkages would involve credit, machinery, input supply, marketing, etc.

**Table no. 60: Backward-Forward linkages**

| S. No. | Project | Type of Marketing Facility | Pre-project (no.) | During the project (no.) | Post-project (no.) |
|---|---|---|---|---|---|
| 1 | Eval | **Backward linkages** | | | |
| | | Seed certification | | | |
| | | Seed supply system | | 1 | 1 |
| | | Fertilizer supply system | | | |
| | | Pesticide supply system | | | |
| | | Credit institutions | - | Bank-1 | Bank-2 |
| | | Water supply | | | |
| | | Extension services | | KVK | KVK |
| | | Nurseries | | | |
| | | Tools/machinery suppliers | - | | |
| | | Price Support system | | | |
| | | Labour | | | |
| | | Any other (please specify) | | | |
| | | **Forward linkages** | | | |
| | | Harvesting/threshing machinery | | | |
| | | Storage (including cold storage) | | | |
| | | Road network | | | |
| | | Transport facilities | | | |
| | | Markets / Mandis | | Collective marketing system | Collective marketing system |
| | | Agro and other Industries | | Cumin processing/packaging-1 | 1 |
| | | Milk and other collection centres | | Milk collection centre-1 | 1 |
| | | Labour | | | |
| | | Any other (please specify) | | Fodder bank-1 | 1 |
| | | | | Vermi-compost unit-1 | 3 |
| | | | | Animal vitamins (50 lt) | Animal vitamins (100 lt) |

**Logical Framework Analysis**

| Components | Activities | Outputs | Effect | Impact |
|---|---|---|---|---|
| **Village Institution Formation** | § Formation of Watershed Committee, User Group | § One Watershed Committee each village<br>§ Number of User group depending on the coverage of particular intervention | § Project can be implemented and managed in a democratic and participatory way ensuring equity. | § Unity and prosperity in the village management.<br>§ People's Participation and positive perception towards the programme |
| **Strengthening Village Institutions** | § Organise training and awareness programme for Village institutions<br>§ Capacity building workshops and exposure visits User Group and Watershed Committee<br>§ Failitating and monitoring the functioning of UGs and WCs<br>§ Strengthen linkages between UGs and WCs and Panchayat Institutions.<br>§ Gender sensitisation of UGs and WCs to increase inclusiveness of samuh decision-making.<br>§ Sensitise village communities to involve children and youth in development. | § awareness camps to be organised.<br>§ trainings and exposure visits UGs and WCs to be held<br>§ Capacity building workshops to be organised<br>§ 1 Federations of UGs and WC to be formed. | § Quality of management of common resources improved.<br>§ Quality of distribution of benefits between people improved.<br>§ Increased awareness amongst women about village resources.<br>§ Women participation enhanced in decision-making of GVCs.<br>§ Involvement of youth and children in village development increased. | |

| | | | | |
|---|---|---|---|---|
| **Fund Management** | § Improve management and utilisation of UGs and WCs.<br><br>§ Prepare communities to explore other sources of income for UGs and WCs. | § UGs and WCs operating bank account and managing resources on their own | § Purpose, frequency and volume of use of the fund enhanced.<br><br>§ Volume of funds generated for UGs and WCs from other sources of income increased. | |
| **Ecological Restoration** | § Protection, treatment and regeneration of common and private lands<br><br>§ Protection, treatment and regeneration of forest lands<br><br>§ Plantation of fruits and forest species<br><br>§ Impart trainings, conduct meetings and organise exposure visits for communities, village volunteers and staff to effectively plan, execute and monitor activities<br>§ Identification and promotion of non-timber forest produce based income generation activities | § Common and private lands to be brought under new plantations and agro-horti-forestry like Neem, Adusa, prosopis, Banyan and Peepul<br><br>§ Forest lands to be brought under new plantations and protection<br><br>§ Trainings, exposure visits and meetings to be organised for communities, village volunteers and staff<br><br>§ Income generation intervention promoted | § Fodder availability from common and private lands increased.<br><br>§ Accessibility to common and forest lands increased with removal of encroachments and resolution of conflicts. | § Better Ecological order in the area<br><br>§ Increase in the proportion of households having more security of fodder<br><br>§ Reduction in drudgery of fodder and fuel collection, especially women |

| | | | | |
|---|---|---|---|---|
| **Rainfed Area Development** | § Treatment of land through improved soil and moisture conservation practices on watershed basis | § Land to be brought under improved soil moisture conservation practices | § Improved productivity of treated land | § Increase in proportion of households having more security of food |
| | § Promotion of good agricultural practices- horticulture, improved crop and vegetable | § Good agricultural practices to be promoted | § Increased availability of water in wells | |
| | | § Organic farming to be promoted | § Increase in annual agriculture production | § Increase in contribution of agricultural income to the household income |
| | | § Fodder banksto be established | § Farmers adopt organic farming practices | |
| | § Promotion of organic farming practices | § Agriculture based livelihood income generation activities to be promoted | § Fodder security of farmers enhanced. | |
| | § Formation of Fodder banks to increase fodder security and promote dairy development among communities | § Water harvesting structures to be constructed | § Increase availability of water for 9 to 12 months | |
| | § Identification and promotion of agri-produce based income generation activities like grading, processing and packaging. | § Drip Irrigation facilities to be distributed among farmers | § Increased availability of water for livestock | |
| | § Promotion of better Irrigation practices like drip irrigation | § Approx 15000 person days of employment to be generated | § Availability of irrigation water established | |
| | § Impart trainings, conduct meetings and organise exposure visits of communities, village volunteers and staff to effectively plan, execute and monitor activities | § Trainings, exposure visits and meetings to be organized for communities, village volunteers and staff | § Farmers take two crops in a year | |

| | | | | |
|---|---|---|---|---|
| | | | § Increase in agricultural productivity of land<br>§ Availability of drinking water enhanced | |
| **Women's Socio-political and economic empowerment** | § Formation & Strengthening of women's SHG groups | § Women's SHG groups to be formed | § Enhanced capacities of leaders of women's group in taking initiatives to solve problems at different levels. | § Position of women in household, community, society (politically, socially and economically) as perceived by women and community at large |
| | § Capacity building of womenfolk | § Federation of Women's SHGs to be formed | | § Performance enhancement of SHGs in terms of participation, decision-making, leadership and fund management. |
| | § Capacity building of SHG leaders and accountants | § Trainings to be conducted for preparation of woollen products from sheep and goats | § Improved access to credit for livelihood purposes. | § Equality & Equity in gender relations at home (decision making, expenditure, children's education, health) |
| | § Linking SHGs with external financial institutions | | § Increased household income. | |

# CHAPTER -7

# QUALITY AND SUSTAINABILITY ISSUES

## 7 Quality and Sustainability Issues

### 7.1 Plans for Monitoring and Evaluation

A Web-based GIS System is being developed for monitoring and evaluating the project in its planning & implementation phases. The system would be available on a public domain and can be accessed by all the stakeholders of the project. The system shows the entire state of Gujarat and all of those areas selected over the next 18 years. Filtering allows the user to zoom onto one particular project. Details related to soil type, Land-use classification, inhabitation etc., can be obtained village-wise. Furthermore, survey-number wise details related to ownership, irrigation source, yield etc., can also be accessed by the users of the system. This system is being used for pooling up the details obtained from the DPR. In other words, the DPR is made available online in the form of a database which will help the stakeholders know areas of importance viz., already treated areas/historical works in the area, proposed areas for treatment etc., for further treatment and planning. The system would also show the satellite imageries of various years from the project inception stage to the project closing stages. This allows the user to evaluate the effectiveness of the treatment and thereby plan corrective measures for the project area. The system would serve as an aiding tool to the planners and evaluators for judging the efficacy of the project.

Yet another component of the Web-based GIS system is the Mobile based Monitoring & Evaluation System, which will help the ground staff alias WDTs (Watershed Development Team) to transmit information from the ground level to the central server. Also, any higher-up official in charge of the project can obtain information regarding the project area on their mobile phone by means of an SMS. The system works in the following manner. The WDT equipped with a GPS instrument marks the latitude-longitude information of various treatment areas during the DPR. The probable sites are then transferred onto the central server. During the works phase, any progress in the treatment areas is reported to the server by means of an SMS by the WDT. Similarly, any nodal officer or higher-up official can view the progress in a project by means of summarized reports generated over frequent periods of time.

### 7.2 Plans For Project management:

The Project management of any watershed programme is very important. It mainly depends upon the community organisation and the village level institutes.In Eval, watershed committee and various user group have been formulated for post project operation and maintenance of assets created during project period. Major emphasis will be on equity and sustainable benefit of the project even after implementation stage. A proper link-up will be built during project period with various institutes and capacity building organisation. They will act as a major kingpin during post implementation for scaling up the successful experience during project.

### 7.3 Watershed Development Fund:

The major source of financial assistance after post implementation period is watershed Development Fund. The contribution of it will comes mainly fund the following:

### 7.4 User Charges:

Various user groups will be formed in village. These user groups will collect user charges according to the designated rules formed during the formation of user group. These funds will be transferred to the WDF funds as per these formulated rules. The secretary of watershed committee (WC) shall maintain the records of the following.

# CHAPTER -8

# MAPS

# Cadastral Map

Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval

Draft Copy
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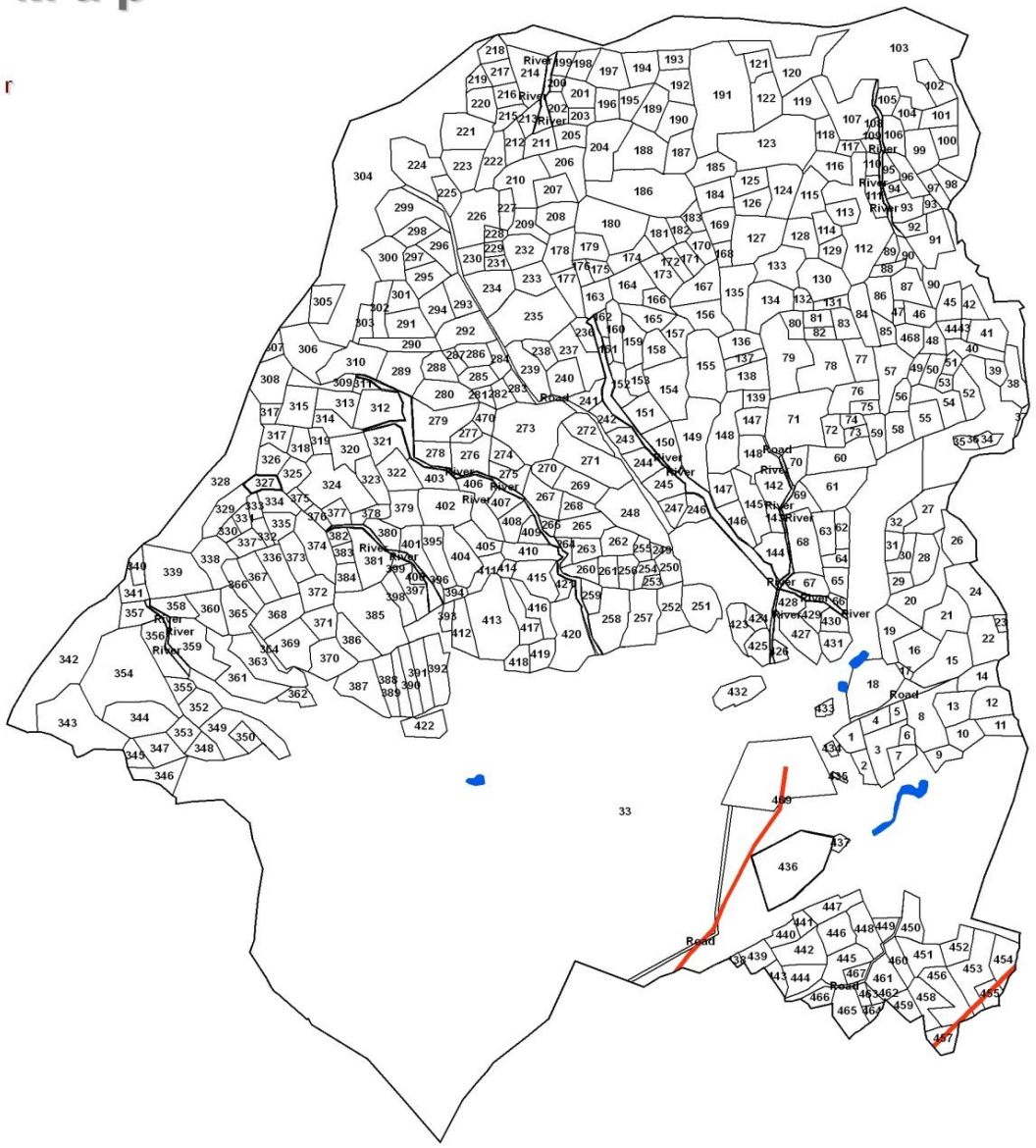


**Legend**

- Village Boundary
- River/Waterbody
- Road
- Cadastral Boundary

0 0.1 0.2 0.4 0.6 0.8 km

Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
Data prepared from IRS Satellite data of 2008-09
Contours height is relative

Prepared for
GSWMA, Gandhinagar

Prepared by:
BISAG
ISO 9001:2000
ISO 27001:2005
Dept of Science & Technology, Govt. of Gujarat, Gandhinagar

# Drainage Map

Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval

Draft Copy
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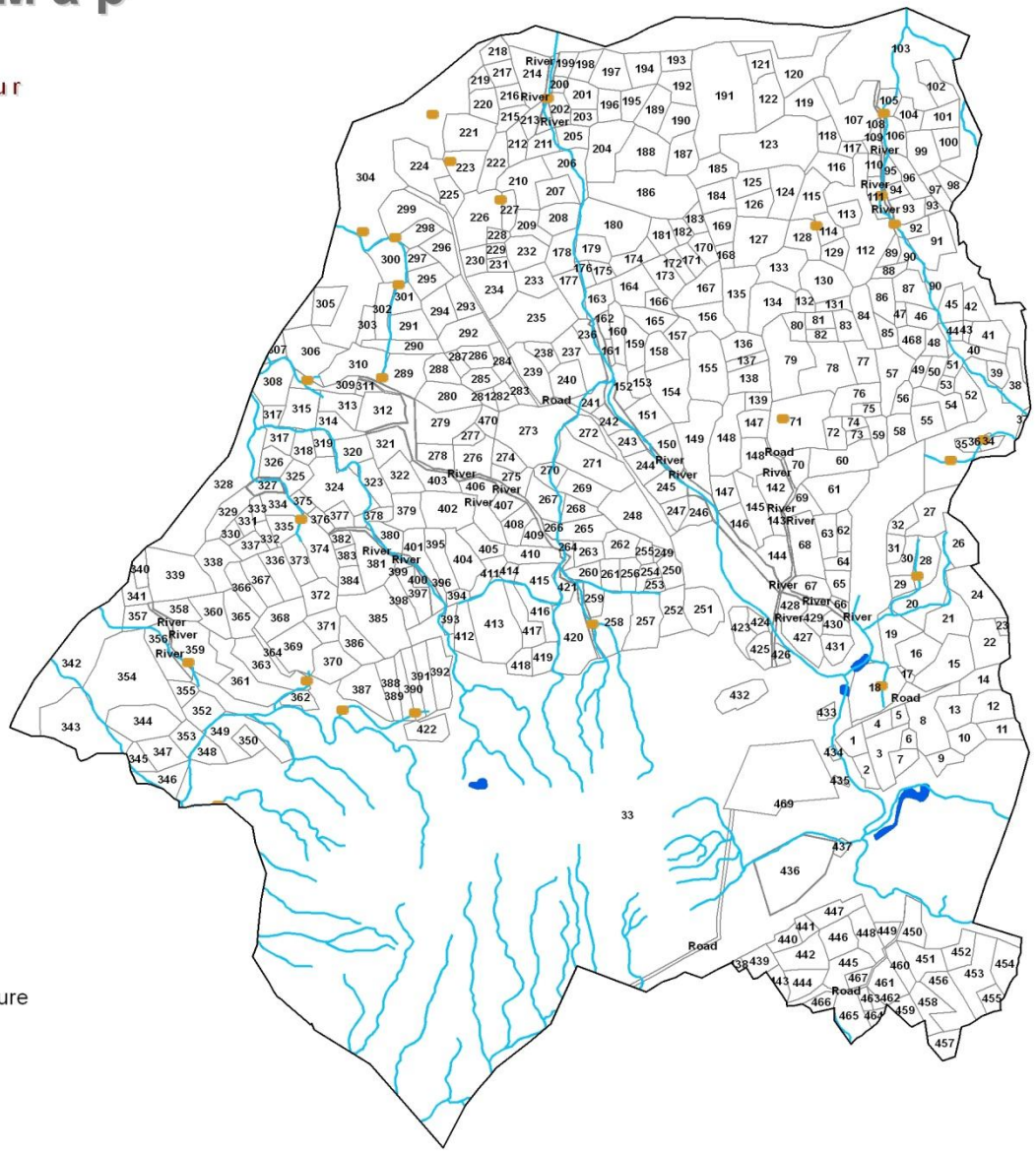



## Legend

- Existing Water Storage Structure
- Drainage
- Village Boundary
- River/Waterbody
- Cadastral Boundary

0 0.1 0.2 0.4 0.6 0.8 km

Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
Data prepared from IRS Satellite data of 2008-09
Contours height is relative

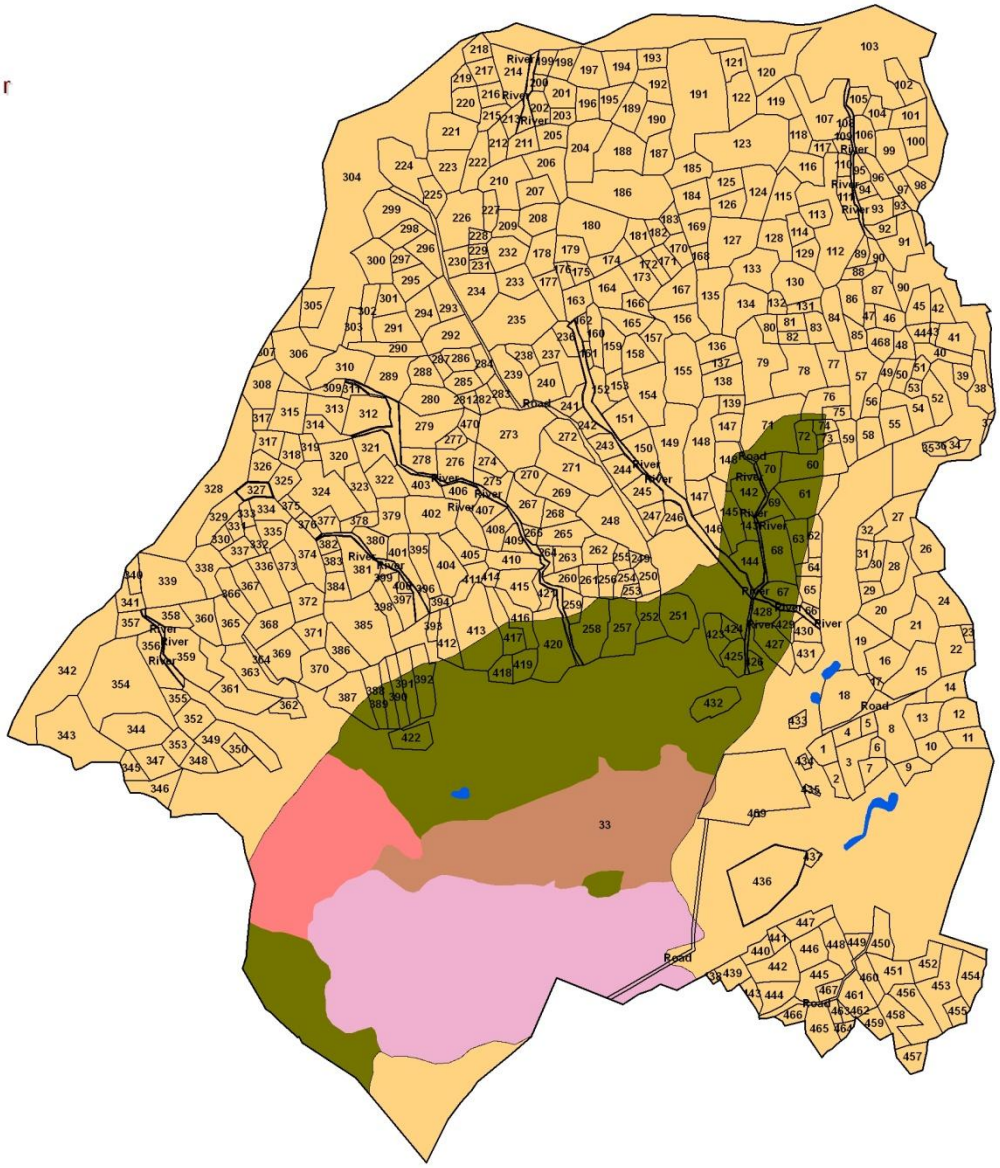
Prepared for
GSWMA, Gandhinagar

Prepared by:
BISAG
ISO 9001:2000
ISO 27001:2005
Dept of Science & Technology, Govt. of Gujarat, Gandhinagar

# Slope Map

Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval

Draft Copy
For official use only



## Legend

- Village Boundary
- River/Waterbody
- Cadastral Boundary

**Slope**

- 0-1%
- 1-3%
- 3-5%
- 5-10%
- 10-15%

Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
Data prepared from IRS Satellite data of 2008-09
Contours height is relative

Prepared for
GSWMA, Gandhinagar

Prepared by:
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ISO 9001:2000
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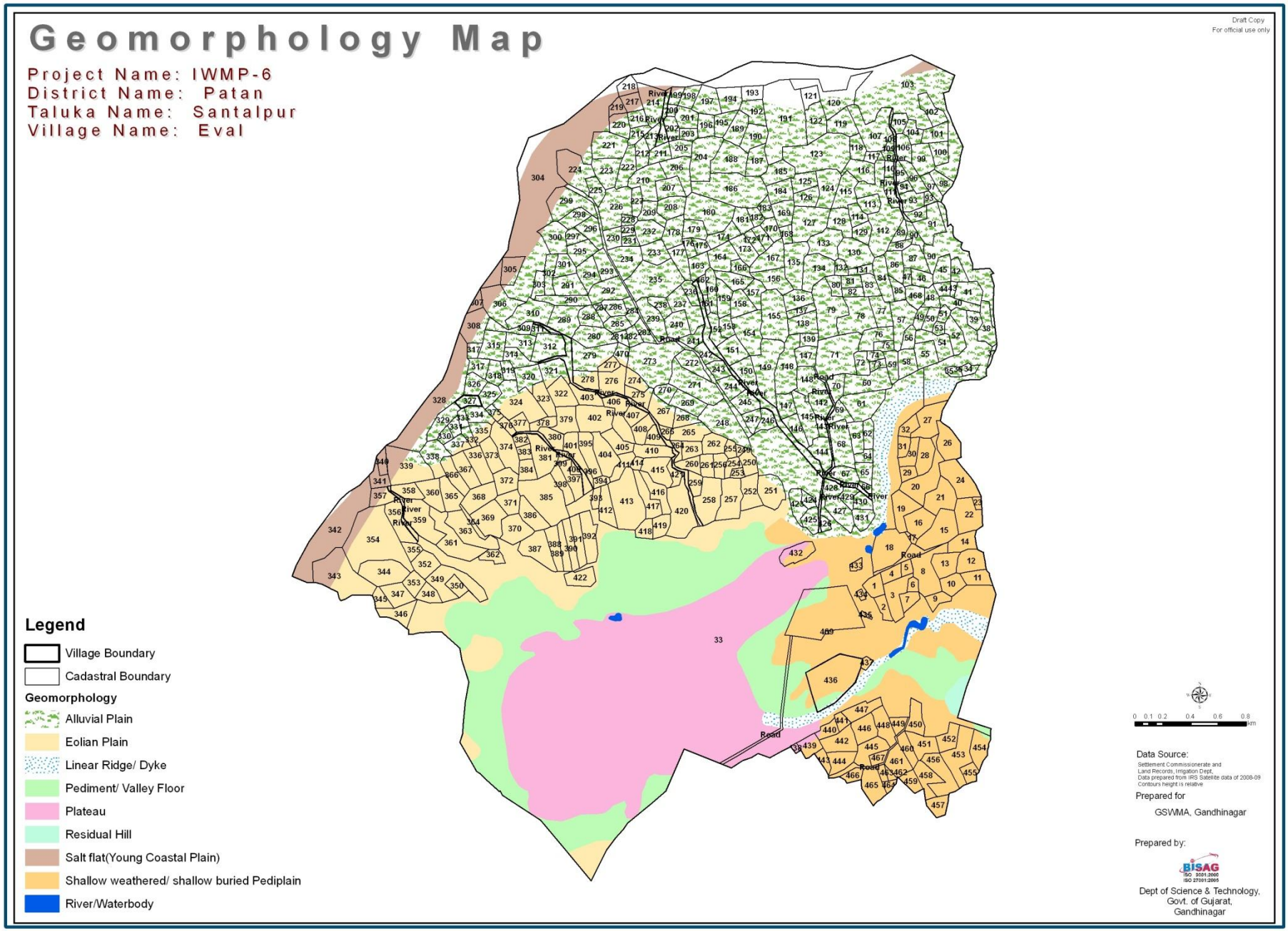
Gandhinagar


Geomorphology Map
Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval
Draft Copy
For official use only
Legend
Village Boundary
Cadastral Boundary
Geomorphology
Alluvial Plain
Eolian Plain
Linear Ridge/ Dyke
Pediment/ Valley Floor
Plateau
Residual Hill
Salt flat(Young Coastal Plain)
Shallow weathered/ shallow buried Pediplain
River/Waterbody
Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
Data prepared from IRS Satellite data of 2008-09
Contours height is relative
Prepared for
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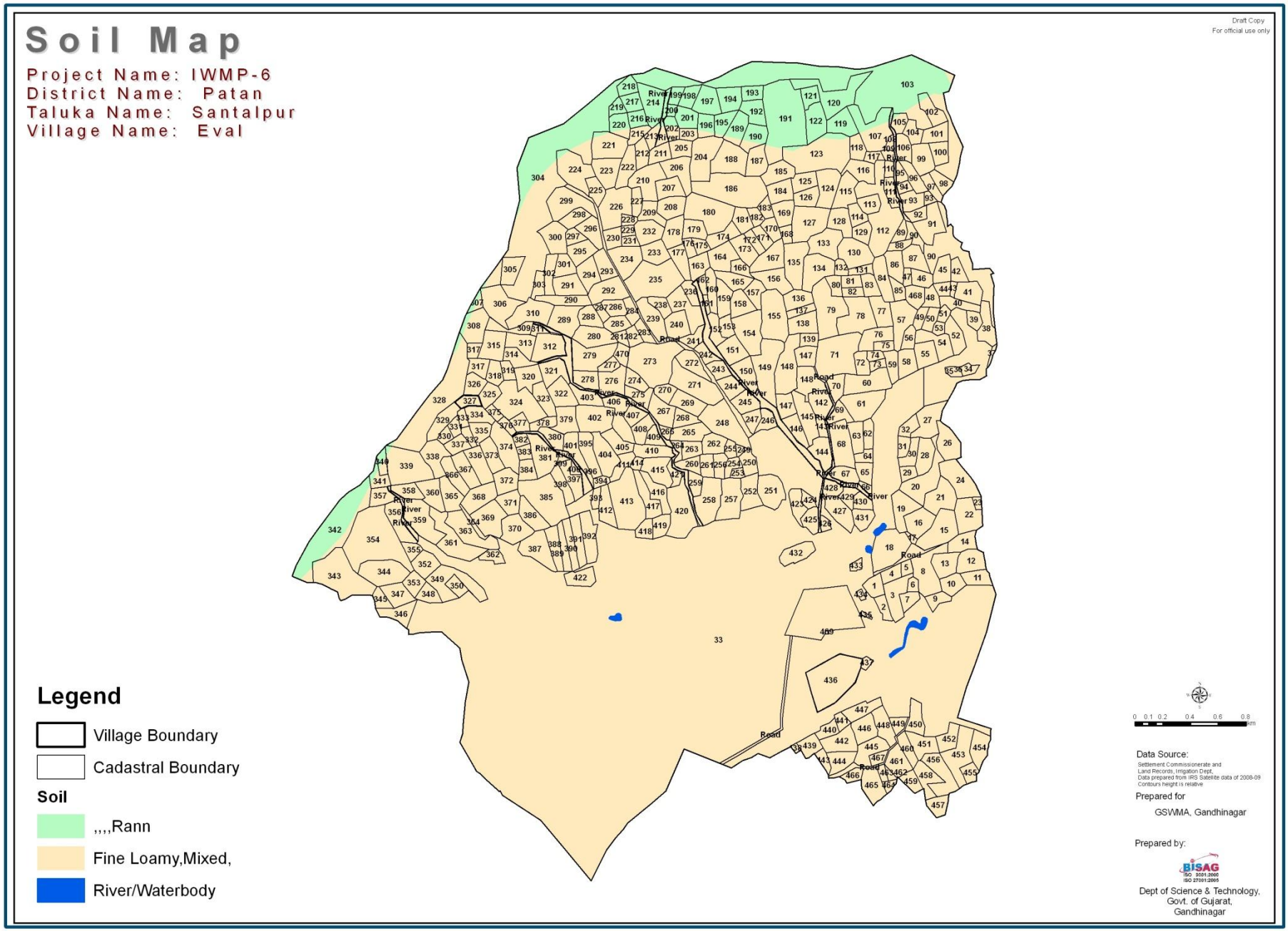
Soil Map
Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval
Draft Copy
For official use only
Legend
Village Boundary
Cadastral Boundary
Soil
,,,,Rann
Fine Loamy,Mixed,
River/Waterbody
Road
River
0 0.1 0.2 0.4 0.6 0.8 km
Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
Data prepared from IRS Satellite data of 2008-09
Contours height is relative
Prepared for
GSWMA, Gandhinagar
Prepared by:
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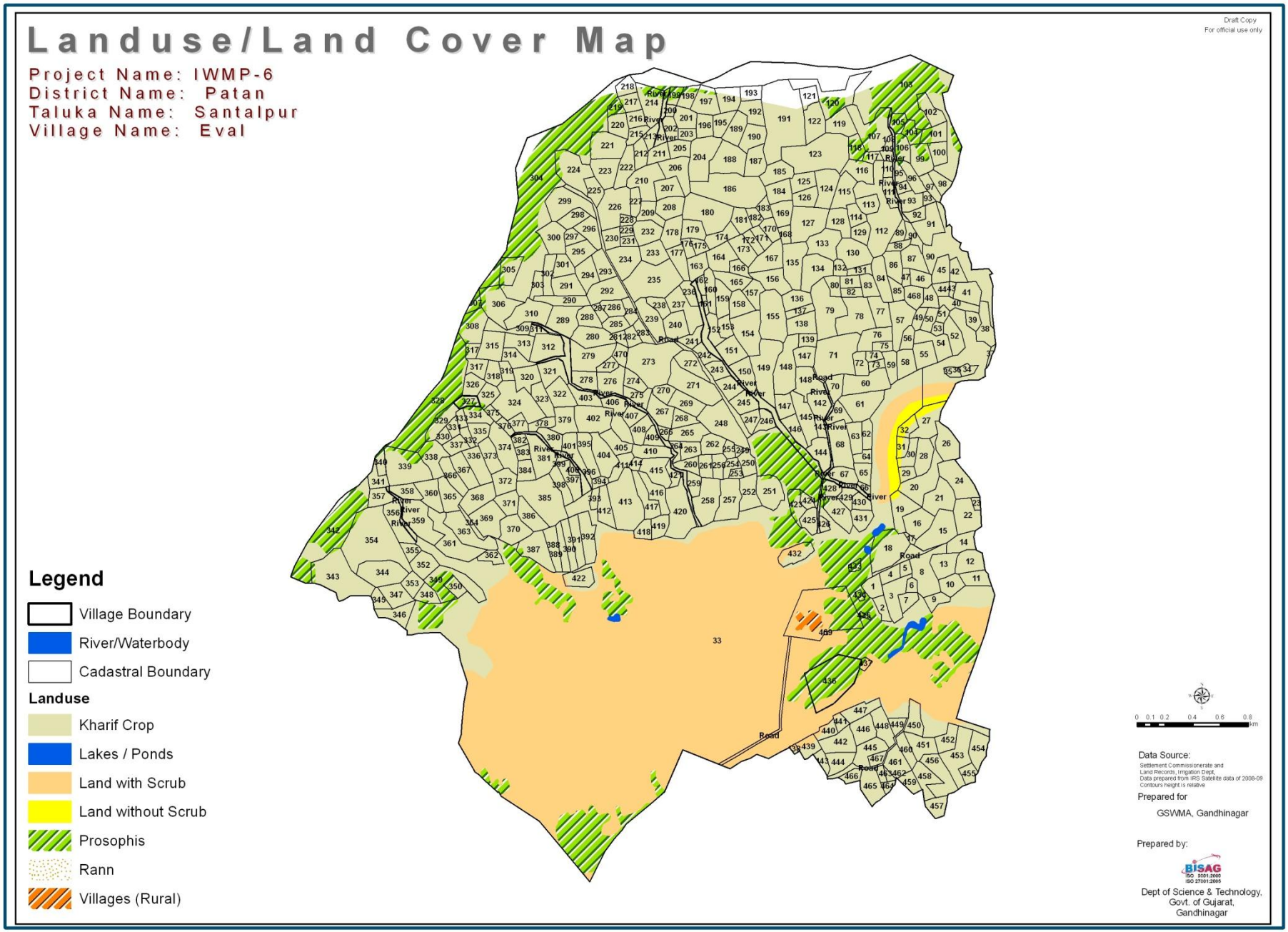
Gandhinagar


Landuse/Land Cover Map
Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval
Draft Copy
For official use only
Legend
Village Boundary
River/Waterbody
Cadastral Boundary
Landuse
Kharif Crop
Lakes / Ponds
Land with Scrub
Land without Scrub
Prosophis
Rann
Villages (Rural)
0 0.1 0.2 0.4 0.6 0.8 km
Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept.
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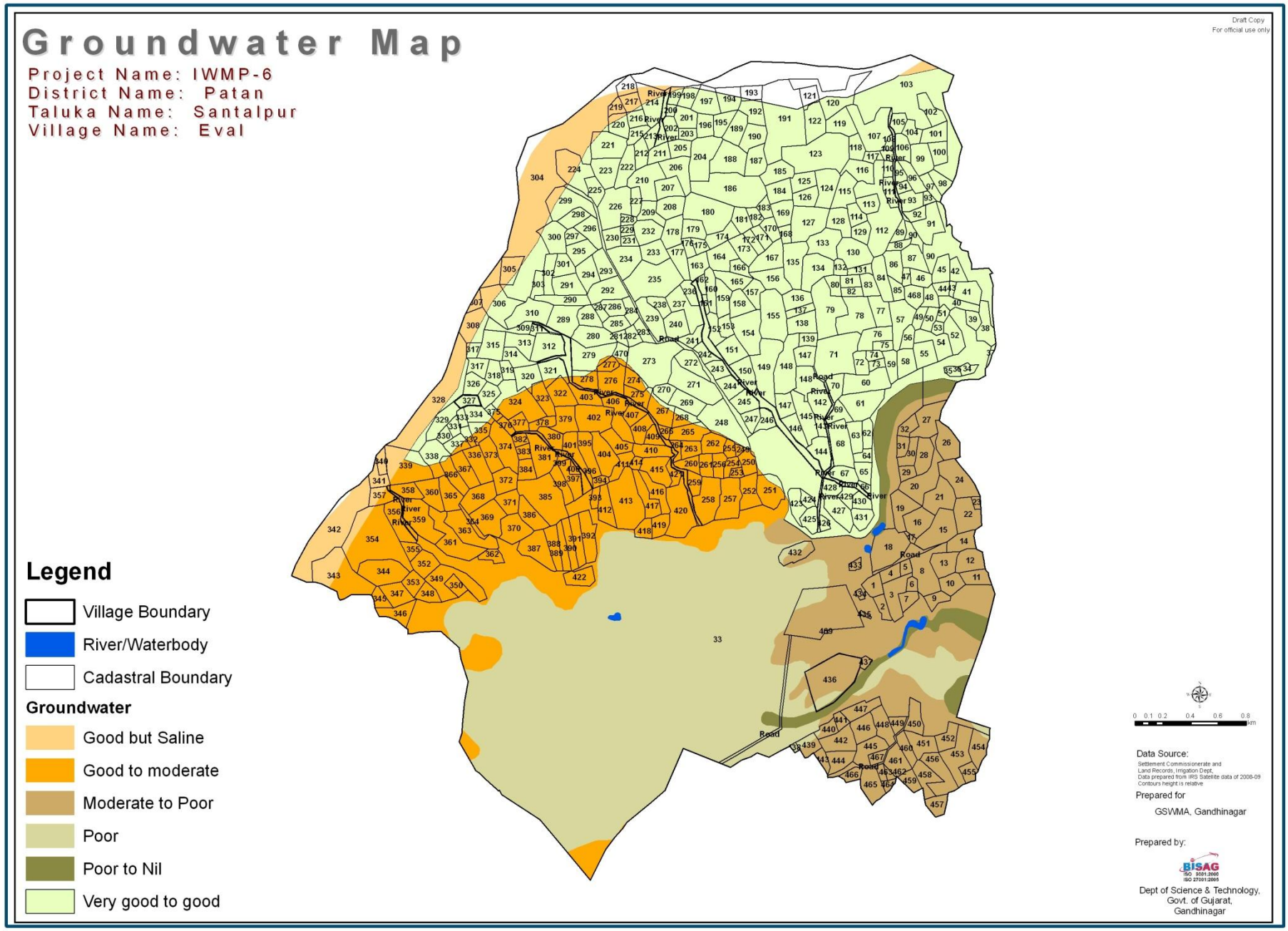
Groundwater Map
Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval
Draft Copy
For official use only
Legend
Village Boundary
River/Waterbody
Cadastral Boundary
Groundwater
Good but Saline
Good to moderate
Moderate to Poor
Poor
Poor to Nil
Very good to good
Data Source:
Settlement Commissionerate and Land Records, Irrigation Dept, Data prepared from IRS Satellite data of 2008-09 Contours height is relative
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ISO 9001:2000
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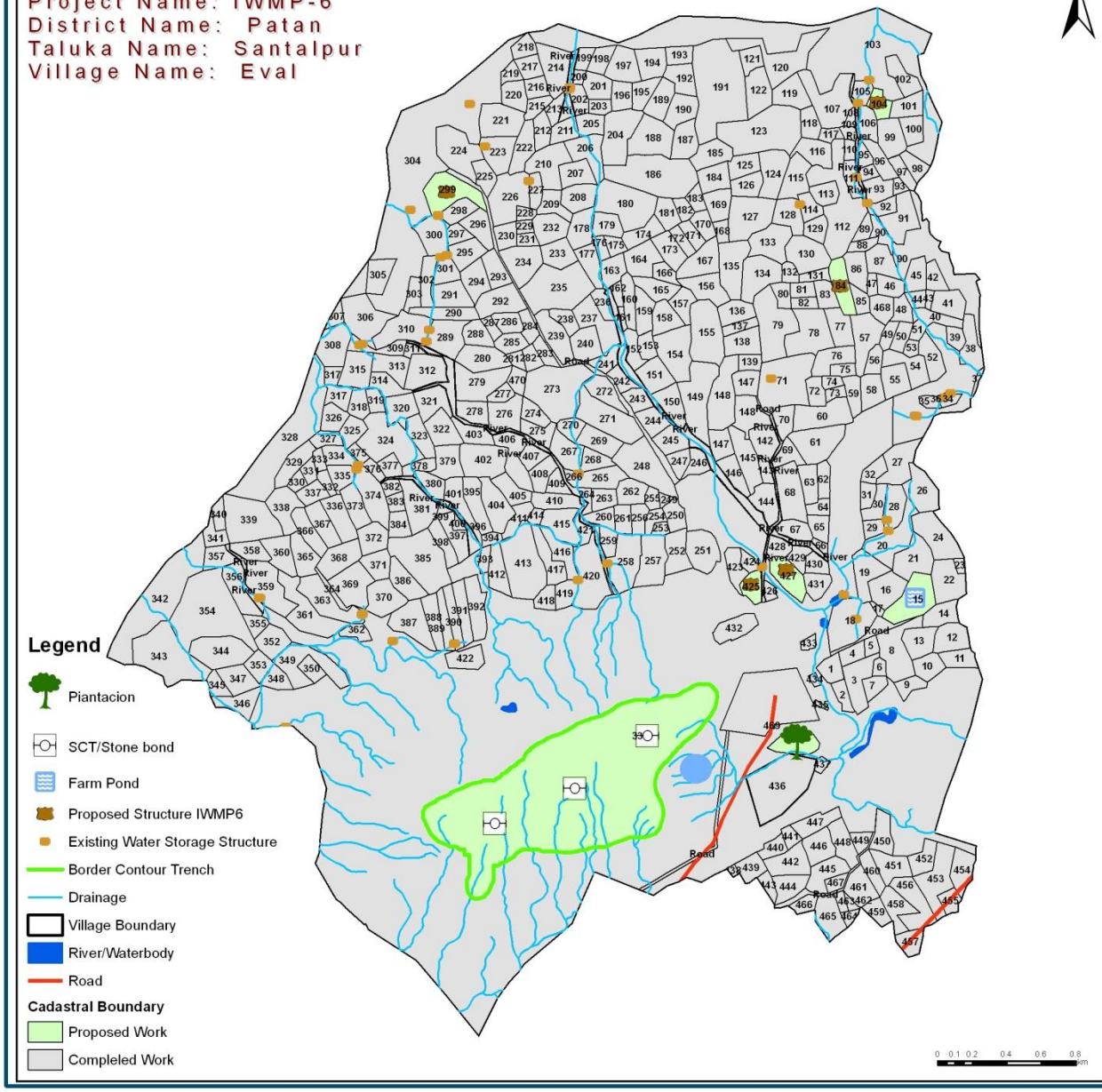
Dept of Science & Technology, Govt. of Gujarat, Gandhinagar

# PROPOSED ACTION PLAN MAP

Project Name: IWMP-6
District Name: Patan
Taluka Name: Santalpur
Village Name: Eval

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## Activities Proposed Under IWMP 6

### Entry Point Activities (EPA)

| Entry Point Activities planned | Estimated cost |
|---|---|
| Repair of well | 0.5 |
| Building of Animal water | 1 |
| Toilet in village (70 units) | 2.1 |
| Rain water harvesting structure ( 25 @ 0.6 | 3.75 |
| Deepening of village pond | 1.05 |

### Watershed Activities

| Type of structures | No. of units (No./ cu.m./ rmt) | Estimated cost(in lakh) | Survey No. |
|---|---|---|---|
| Staggered trenching/Stone bunding(SCT) | 60,000 | 29.3 | 33 |
| Border contour Trenching(BCT) | 10,000 | 11.4 | 33 |
| Earthern Bunds | 5 | 12.3 | 84,104,425 427,299 |
| Waste Weir | 2 | 4.5 | 33,427 |
| Field bunds | 300 | 39 | |
| Percolation Tank | 1 | 4.5 | 33 |
| Farm Pond | 15 | 4 | |
| Afforestation | 10 | 0.56 | 33 |

### Livelihood Activities

| S.No | Name of activity | No. of SHGs involved |
|---|---|---|
| 1 | Vermi composting | 2 |
| 2 | Cumin processing and packaging | 2 |
| 3 | Nursery Raising | 2 |
| 4 | Handicraft | 1 |
| 5 | Fodder Bank | 1 |

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