

# Model Watershed Programme

## Problem/Need

South Chotanagpur region of Jharkhand is characterized by undulatory topography, poor soil fertility and fairly isolated villages. Homogenous groups live in hamlets called tolas and several tolas together constitute a village. The tolas and villages have their common weekly market places (*haats*), which also serve the purpose of social meeting places. Most of the villages have arable, forest and barren land in various proportions. The main activities of the inhabitants are rainfed agriculture and collection of minor forest produce, which are sold in the local haats. Although the average rainfall is good, yet quite often the spacing of the rain is erratic, leading to failure of main crop. The main crop is upland gora paddy. This is often rotated with millet and gondli (a type of grass seed), which are suited only for upland. Since rainfed agriculture is undependable, in the event of crop failure the villagers either resort to collection and sale of wood or migrate out of the state in search of sustenance. Normally these migrants return to their village before the paddy season.

Agro-climatic conditions are suitable here for horticulture and forest. The source of ground water is primarily water-bearing cracks in igneous rocks. In some areas sand entraps serve as ground water source.

## Approach/Strategy

The following strategy suggests itself for the watershed model:

- Identification and broad survey for watershed following a participatory mode; formation of village level S&T group.
- Based on this survey, preparation of an integrated watershed development plan including the structure of implementation, services and technology delivery system.
- Involvement of villagers, Block and Panchayat level functionaries during the entire process of survey, planning and implementation of the plan.

The following approach may be adopted:

- Organizing groups and committees and their capacity building.
- Detailed planning and projectisation – participatory.
- Convergence of programme, activities and projects.
- Informal banking system – monetised and non-monetised.
- Formation/stabilization of implementation structure by hands-on work experience.
- M&E by workshop, interaction and focused group discussion.
- Process documentation for replication.

## Technology Package

Various soil and water conservation measures, required for watershed development programme, are as follows:

### ⇒ Engineering measures

**i) Graded Bunding:** Small earthen barriers are provided in agriculture land at 5-8 percent slope. They control the effective length of slope and thereby reduce the gain in velocity of run-off flow to avoid gully formation. The main objectives of bunding are:

1. To increase the time of retention of rainwater where it falls, and thereby allow more opportunity for water to be absorbed in the soil.
2. Converting a long slope into several smaller ones so as to minimize velocity and thereby reduce the erosive power of runoff water.
3. To provide field-to-field access for man and animals for undertaking agronomic operation.
4. To divert run-off water, either for water harvesting purposes or for saving lower lands.

**ii) Bench Terracing:** On sloping and undulating land, intensive farming can be adopted only with bench terracing. It consists of construction of step-like fields along contours by half cutting and half filling. The original slope is converted into level fields and thus all hazards of erosion are eliminated. All the manure and fertilizers applied are retained in the field. In sloping irrigated land, bench terracing helps in proper water management. Bench terraces can be formed mostly in tarn land and converted in chaura khet where slope varies from 5-10 percent.

**iii) Gully Plugging:** These are earthen embankments usually constructed for blocking the active and erosion prone gullies for their stabilization. The main objectives of gully plugs are:

1. To encourage vegetation, for stabilization of gullies.
2. To reduce silt load going downstream.
3. To increase ground water exchange.

**iv) 5% Model:** Ponds are constructed in 5% of the total area where the slope is about 2-3%. Main objectives of the model:

1. To irrigate the lower paddy field.
2. To control the soil erosion.
3. To maintain the moisture in the soil.

**v) Moisture Pits:** Moisture pits are constructed in upper land (Tarn) where slopes are about 3% and more. It is made in the corner of the field and its soil is used in constructing the bund in that particular field. The size of pits depends on area of the field. In 100 decim. land the pit can be made of 20' length, 10' breadth and 3½' depth. Main objective of moisture pits:

1. To control the soil erosion.
2. To retain the moisture in the lower part of the field.

### ⇒ Vegetative Measures

- i) **Plantation in agriculture land:** Various fuel, fodder and timber species are raised along with soil and water conservation measures discussed above.
- ii) **Plantation in forest areas:** Degraded lands are regenerated by this.
- iii) **Horticulture:** Different fruit species are raised in Individuals land or Bari lands.
- iv) **Plantation in field bunds:** Trees are grown on the field bunds of tarn lands where the slopes are 10-15%.
- v) **Nursery:** A permanent nursery is set up for raising seedlings of the various species.

### ⇒ Water Harvesting Structure

**i) Farm Pond:** Farm ponds are small which are made in tarn land (in middle of the paddy fields) where the slope is between 8-10%. Their size is generally 80' (length), 40' (breadth) and 10' (depth). The main objectives of the farm ponds are:

1. To reduce soil erosion.
2. To irrigate the paddy fields in lower part of the farm pond. It also helps in irrigating the vegetable field.

3. For fish culture (seasonally).

**ii) Water-Harvesting Tank:** These are constructed in Don land where irrigation by pump is possible and where the slopes are 5% to 8%. The size of water harvesting tank depends on the area and flow of rainwater. Objectives of the water-harvesting tank are:

1. To check the rainwater.
2. To control erosion of upper layer of soil.

Water thus collected can be used for irrigation, fishery and general purpose like bathing and other uses. Tank silt can be used as fertilizer on tarm land.

### System Design

There are two major factors in the system:

- Maintenance and operation of the developed infrastructure.
- Convergence of regular programmes of Government through the developed structures for continuation of the growth process.

The Watershed Development Committee (WDC) has taken charge of planning and organizing the function of maintenance operation and effective utilization of the social infrastructure developed in the watershed. The actual work in the watershed will be done by the corresponding Tola committees. The resources for operation and maintenance of the developed infrastructure will be mobilized from the following channels:

- Regular contribution by the committee members, either cash or kind, to the development fund created during implementation of the project.
- In case of minor repairs, the Tola committee will arrange for the labour requirement for the work. Materials, if required, will be costed from the common development fund.
- Some of the regular programmes of Block/Panchayat have got provision for maintenance cost. Advantage of this may be taken.
- Operation and maintenance cost of other infrastructure that will provide benefit to individual beneficiaries (like Biogas plant) will be borne by them. Irrigation unit, wood-based gasifier unit, processing unit, etc. will be run on commercial basis, for which the entrepreneurs have been trained and promoted during the project period.

### Economics

The Budget provided for a watershed of 500 hectares area in different schemes of Govt. of India depends on the problems of that area and eco-system, which are as under:

Ecosystem	Programme	Budget (Rs. per ha)
Hot sandy arid	DDP	5000
Hot arid	DDP	4500
Cold arid	DDP	5000
Semi arid	DPAP	4000
Dry sub humid	DPAP	3000
Other		4000

### Helpline:

#### **Society for Rural Industrialization**

146, H.B. Road,  
Lalpur, Ranchi – 834 001  
Ph: - 0651-305574