Abstract

Kalahandi, a western district of Odisha is a glaring example of a rainfed region with a fragile ecosystem and dominated by large section of underprivileged classes (SC, ST & landless). It was once one of the most backward districts of India due to its repeated dry spell and crop failure in the past and its subsequent poverty got it the distinction as Ethiopia of India. In 1980s, its association with backwardness, starvation death, baby sell was used as symbol by many social activists, planners and politicians and called Kalahandi syndrome. Construction of Indrabati project was a saving grace to the people of the region and helped to revive agriculture to large extent. However there are a large section of the region where irrigation facilities are still inaccessible. Rich in forest resources, gemstone, and bauxite, off late face problems of decrease in water table, excessive erosion, unchecked exploitation of common pool resources, low productivity of agricultural land. A centrally sponsored programme called Integrated Watershed Management Programme (IWMP) has been launched for the period 2010-11 to 2016-17 with an objective to combat several issues and to bring sustainable development. The study is a case study of two micro-watershed viz. Turpi (lat. Ext. -20 06’5"N to 20 05’06"N) and long. Ext.-(83 05’3"E to 83 03’06"N) and Pastipada (lat. Ext.-20 0’5"N to 20 1’57"N) and (long. Ext. 83 6’15"E to 83 6’ 25"E) located in the Bhawanipatna block of the district Kalahandi.

Abbreviations:


Concept and Principle of Watershed Management : A Case Study

Smita Rani Nayak

Introduction

Agriculture plays a vital role in the Indian economy. Major chunk of rural households depend on agriculture as the principal means of livelihood and also an important means of food supplier to the entire population of the country. As per estimate by the Central Statistics Office (CSO), the share of agriculture and allied activities was 15.55%.during 2015-16 at 2011-12 prices. The major problem in India is that agriculture is highly rainfed. In fact, 60% of arable land is rain

Scheduled Caste & Scheduled Tribes, SHG- Self Help Group.

Abstract

Kalahandi a western district of Odisha is a glaring example of a rainfed region with a fragile ecosystem and dominated by large section of underprivileged classes (SC, ST & landless). It was once one of the most backward districts of India due to its repeated dry spell and crop failure in the past and its subsequent poverty got it the distinction as Ethiopia of India. In 1980s, its association with backwardness, starvation death, baby sell was used as symbol by many social activists, planners and politicians and called Kalahandi syndrome. Construction of Indrabati project was a saving grace to the people of the
Absence of irrigation facilities in most part of the country makes the matter further worse. Most part of the country reel with problem of water scarcity. Monsoon, an important source of rainfall to the entire nation, ironically is highly irregular in time, amount and distribution. Hide and seek of the monsoon coupled with absence of proper irrigation facilities have left the predicament of the farmers very precarious and vulnerable. Insufficient water supply during the cropping period cause moisture stress often leading to crop failure. In fact, rainfed agriculture is characterized by low productivity, low income, and low employment. These regions are hotspot of poverty, malnutrition and food insecurity. Inadequate rainfall give rise to serious problems like unemployment, large-scale migration, indebtedness and case of homicide has also been come into limelight.

Therefore conservation of water and controlling surface runoff has become popular demand. A watershed approach solves multiple purpose of water recharge and soil erosion control, control in downstream sedimentation, flood control etc. It also gives priority to socio economic development of a region and encourages public participation. In order to enhance the efficiency of the public it works towards capacity building and educate the dwellers on protection and natural resource conservation.

There are many successful watershed management projects all over India. The best examples are Ralegan Siddhi in Maharastra, Sukhomajri in Haryana, Myrada in Karnataka.

**Methodology**

The preparation of article heavily relied on secondary information. The DPR prepared by the PIA was of immense help. In addition several published and unpublished information prepared by both government and non-government organizations was profusely utilized. Online information was also very useful. Primary data was also collected by focus group discussions and by direct conversations with the residents of watershed. Maps were collected from the ORSAC.

**Watershed and Watershed Management**

Watershed is a geo-hydrological unit where water from the region drains into a common point by a system of channels. In fact it is a basin like land area that captures rainfall and drains into an outlet in the main flow channel. Thus watershed is the land and water area which contribute to a common point. It represents a region of land and water bounded by drainage divide within which the surface run and flows out the watershed through a single outlet into a large river or lake. Hence watershed is a unique blend of climate, geology, hydrology, soil vegetation and the human community.

On the other hand, watershed management refers to planning within watershed boundaries. It has emerged as an important paradigm of planning. The principal objectives of watershed management are to alleviate the conditions of inhabitants, residing within its domain with optimum utilization of its natural resources. In fact, it has become a new tool of regional planning to obtain sustainable development of natural resources like land, water and biomass so that the benefits shall trickle down to the inhabitants within the purview of a watershed. As a matter of fact watershed management is a way of looking at relation among land and water in a watershed to realize optimum production with minimum distribution of the environment.
A watershed is classified depending upon the size, drainage, shape and land use pattern.

1) Macrowatershed (> 50,000 Ha)
2) Sub-watershed (10,000 to 50,000 Ha)
3) Milli-watershed (1000 to 10000 Ha)
4) Micro watershed (100 to 1000 Ha)
5) Mini watershed (1-100 Ha)

The concept of watershed development is an integrated nature with multi-disciplinary activities in the area. At present Ministry of Rural Development and Department of Land Resources, Government of India are funding watershed development programmes under different schemes. These programmes are intended to be taken up in rain-fed and drought-prone areas especially predominated by SC/ST population and preponderance of wasteland. There are six major projects/programs in watershed development programme namely.

- National Watershed Development Project for Rainfed Areas (NWDPRA)
- Watershed Development in Shifting Cultivation Areas (WDSCA)
- Drought Prone Areas Programme (DPAP)
- Integrated Wasteland Development Project (IWRP)
- Desert Development Programme (DDP)
- Employment Assurance Scheme (EAS)

Watershed development programme is people centred programme and people’s participation in the programme has been made mandatory. The people have to form a watershed association and watershed committee for each watershed project compromising all adults residing within a watershed project area. The association and committee are responsible for planning and development of watershed project for its area while developing the plan for the area. These organizations have to take technical assistance from project implementation agency. Besides, the beneficiaries of the programme have to give voluntary donations / provide contribution in terms of labour, raw material, cash etc. for development activities and for operation and maintenance of assets created.

Implementing Agency

The watershed programme is being carried out in desert, drought-prone and rainfed areas. DRDA/Zilla Parishad selects the villages for development of watershed projects. Project implementation agency is also selected by DRDA / Zilla Parishad. Besides, DRDA / Zilla Parishad, there are other institutions through which this programme is being implemented like agricultural universities, research institutions, government undertakings, non-governmental organizations etc.

Beneficiaries

i) Local resident of the watershed area.
ii) Poor families specially SC/ST persons in rainfed areas where economic condition of the people is relatively less due to problems of less production, scanty rain and degradation of land.
iii) Members of SHG and UGs.
iv)Usufruct right given to landless persons out of common resource management.
Objectives of Watershed Management

1. To control damaging runoff and degradation and thereby conservation of soil and water.
2. To manage and utilize the runoff water for useful purpose.
3. To protect, conserve and improve the land of watershed for more efficient and sustained production.
4. To conserve and enhance the water sources within the purview of the watershed.
5. To check soil erosion and to reduce the effect of sediment yield on the watershed.
6. To rehabilitate the deteriorating lands.
7. To moderate the floods peaks at downstream areas.
8. To increase infiltration of rainwater.
9. To improve and increase the production of timbers, fodder and wild life resource.
10. To enhance the ground water recharge, wherever applicable.
11. To mitigate the adverse effects of drought on crops and livestock.
12. To encourage restoration of ecological balance.
13. To promote economic development of village community.

IWMP

It is a centrally sponsored scheme namely; Integrated Watershed Management Programme (IWMP) introduced as per Common Guidelines for Watershed Development Projects, 2008 of Government of India for the period 2010-11 to 2016-17. The unit cost for all projects is Rs.12000/- per ha. The funding pattern is in the ratio 90:10 (Central Share: State Share). Government of India approved 65 projects (610 micro-watersheds) for treatment of 3,35,979 ha with a total project cost of Rs.403.178 crore over a period of four to seven years. The new approach to watershed development provides a paradigm shift in the traditional approach where the role of the government is from that of governance to facilitation. It envisages a bottom-up approach whereby the users’ group themselves decides their work programme.

The basic objective of this scheme is integrated wastelands development based on locally available low cost technology on village/micro watershed plans. The highlights of the scheme are:

- Development of clusters of micro watersheds in a holistic manner rather than piecemeal treatment in sporadic patches.
- Decentralization of decision - making process by involving local panchayati raj institutions, NGOs, government departments and watershed community at the grassroots level. The people given actual decision making powers in terms of project implementation and fund disbursal.
- A three-tier approach addressing hilly/forest regions, intermediate tier or slopes and lastly, plains and flat areas.
- The scheme also aims at creating rural employment opportunities.
- The scheme promotes locally available low cost technology.

Major reasons for selection of watershed:-

- The project areas suffered from acute shortage of drinking water during summer due to decreasing water table.
- There were no assured irrigation facilities in the project areas.
- 40% of the population of both the region constitute ST population having very poor socio-economic conditions.
- Poor household who depended on the NTFP collection for their livelihood, need value addition.
- The project regions constituted large tracts of wasteland, which needed development.
- Lacked proper soil and water conservation measures.
- Region witnessed high degree of seasonal migration.
- Suffered from poor agricultural production.
- Facing large scale deforestation.
- The areas were not covered under any other scheme of treatment, hence it is high time to take care of natural resources of the area and so selected under this scheme for development.

**Stages of Watershed Management:**

Operating under 2008 guidelines the process of IWMP accomplished phasewise giving due importance to bottom up approach and public participation. The implementing agencies play the role of facilitator with the help of WMT. The different stages of watershed management are discussed below.

**Preparatory phase:**

It is the first phase of watershed management whose prime objective is to make ground for implementation of participatory approach and encourage and empower the local institutions (watershed committee, self-help group and user group). It emphasizes not only on active participation of users but also encourages decision making. The Watershed Management Team (WMT) plays the role of facilitation. Some of the important activities during this phase are as follows:

Entry Point Activities (EPA)
Participatory Rural Approach (PRA)
Preparation of Detail Project Report (DPR)

**Entry Point Activities:** This is the first formal project intervention which is undertaken after selection and finalization of the watershed. Community mobilization process is the key in participatory planning process. Effective community mobilization ensures active participation of the villagers in all stages of the project. It is not easy for the WMT to get full participation of the community at the first instance, as the villagers may be sceptical about the external activities. Therefore it is essential to win the faith of the locals and build proper rapport with them. EPA is an activity of benefit in order to win the faith of the community. The activities which were essential and urgently demanded by the locals...
were given first priority. A budget provision has been made in this regard. Some of the entry point activities taken up in the watershed regions prior to the watershed programme are the following:

- Construction of bathing step
- Drying yard
- Repairing of government well
- Construction of road to river
- Drain construction
- Tube well platform repairing
- Construction of welcome pillar
- Wall painting
- Human health camp
- Animal health camp etc.

<table>
<thead>
<tr>
<th>Entry Point Activity</th>
<th>UNIT</th>
<th>UNIT RATE</th>
<th>PHY</th>
<th>FIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Welcome Pillar</td>
<td>No</td>
<td>0.03</td>
<td>2</td>
<td>0.06</td>
</tr>
<tr>
<td>2 Wall painting</td>
<td>Sq.ft</td>
<td>0.00025</td>
<td>400</td>
<td>0.1</td>
</tr>
<tr>
<td>3 Street play/rally</td>
<td>No</td>
<td>0.03</td>
<td>3</td>
<td>0.09</td>
</tr>
<tr>
<td>4 Animal Health Camp</td>
<td>No</td>
<td>0.04</td>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td>5 Human Health Camp</td>
<td>No</td>
<td>0.04</td>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td>6 Sanitation Camp</td>
<td>No</td>
<td>0.02</td>
<td>2</td>
<td>0.04</td>
</tr>
<tr>
<td>7 Tent Materials</td>
<td>Set</td>
<td>0.235</td>
<td>1</td>
<td>0.235</td>
</tr>
<tr>
<td>8 Kitchen Item</td>
<td>Set</td>
<td>0.144</td>
<td>1</td>
<td>0.144</td>
</tr>
<tr>
<td>9 Bathing step</td>
<td>No</td>
<td>0.1447</td>
<td>2</td>
<td>0.2894</td>
</tr>
<tr>
<td>10 Bathroom</td>
<td>No</td>
<td>0.05</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>11 Tube well platform repairing</td>
<td>No</td>
<td>0.05</td>
<td>1</td>
<td>0.05</td>
</tr>
<tr>
<td>12 Drain construction</td>
<td>No</td>
<td>0.1447</td>
<td>2</td>
<td>0.2894</td>
</tr>
</tbody>
</table>
Participatory Rural Appraisal (PRA):

It represents a social action process to bring the locals of the watershed to a common platform, share their views and problems, their capacity and encourage them to participate in the developmental work. The objective of the PRA is to infuse the feelings of greater degree of ownership and responsibility into the rural people for better result and social acceptance of the programme. During the PRA process the following activities were conducted in watersheds during the project period

- Meeting with the villagers
- Social mapping
- Households survey
- Transact
- Resource mapping
- Problem identification
- Focus group discussion
- Discussion with existing Self-help groups

The PRA in the studied watersheds were conducted for two months with regular intervals. Most of the villagers attended the PRA and participated in the discussion. All the events were recorded in different PRA sheets separately with own signature. Some photographs of the events were also attached for memory.

Preparation of Detail Project Report (DPR):

The DPR in fact is a comprehensive report of aims and objectives, the budgetary allocation, the agendas and priorities to be carried out during the project period. Preparation of the DPR includes details of activities to be carried out; selection of beneficiaries and work sites and designs and expenditure of the works. In the DPR, the community problems, need of the people, strategies of developmental intervention, duration of the projects and financial break up against each activity are clearly mentioned. The DPR is prepared on the basis of the baseline information collected prior to the project implementation and PRA information.

Watershed Work Phase

This phase is the most crucial phase of the watershed management programme. It is the crux of the project phase where the DPR is implemented. Some of the important activities carried out as per the guidelines, watershed development 2008 in the studied region are as follows:

a) Ridge Area Treatment involves revival of the health of the catchment area by reducing the volume and velocity of surface runoff, plantation and afforestation, staggered trenching, contour and graded bunding, bench terracing etc.

b) Drainage Line Treatment with combination of engineering and vegetative work such as
earthen checks, gully plugs, loose boulder checks, gabion structures, underground dykes.

c) Development of water harvesting structures like ring well, well, farm pond, percolation tank and other measures.

d) Raising nursery giving priorities local varieties for the purpose of fodder, fuel, timber and horticulture.

e) Land development by controlling soil erosion and retaining soil moisture in situ by taking drainage measures like field bunds, contour and graded bunds, fortified with plantation, bench terracing in hilly terrain etc.

f) Promote innovative agriculture like crop intensity, crop diversification, introduction of water saving technology etc.

g) Promotion of pasture development, backyard poultry, small ruminants and other ruminants (goatery, piggery), mushroom cultivation, backyard gardening and other micro enterprises.

h) Veterinary services for livestock and other livestock improvement measures.

i) Fisheries development in village ponds/tanks, farm ponds etc.

j) Promotion and propagation of non-conventional energy saving devices, biofuels, plantations etc.
According to the norms during “Watershed Works Phase” 56% of the total allocations under field activities will be spent for “Watershed Development Works” including drainage line treatment with different suitable soil conservation measures, which was decided during PRA exercise with the villagers. Similarly 10% of the allocation shall also be spent on production system and micro enterprise including establishment of nursery, production of seeds, crop diversification, adoption of proven/new technologies, agriculture and horticulture activities including livestock management, goatery, poultry etc., which is an important aspect in the watershed development programme. Besides, 1% of the total allocations have to be spent for monitoring and 1% for evaluation.

Consolidation and Withdrawal Phase:

In this phase the resources augmented and economics plans developed in Phase-II are made the foundation to create new nature-based, sustainable livelihoods and raise productivity levels. The main objectives under this phase are:

- Consolidation and completion of various works such as building capacity of the community based organisations to carry out the future agendas during post project period.
- Sustainable development of natural resources.
- Up-scaling of successful experience regarding farm production system/off-farm livelihoods.

Convergence

There are host of development activities under watershed project which has to be carried out on the basis of priorities and popular demand for the common cause. Often the project is marred by paucity of funds. In order to combat such situations there is provision of convergence with different other schemes and organisation for successful implementation and to maintain transparency of all developmental work. In fact convergence literally means interlinking with different schemes for successful implementation of developmental work. A convergence programme is essential for successful sustainable economic development in the entire village. As per guidelines under convergence programme the district administration has to carry out different development activities as per importance and priorities felt. During the project period in the watersheds, convergence was carried out with different schemes like NRHM, MGNREGA, NHM, RWSS and many development activities.

Convergence:

<table>
<thead>
<tr>
<th>Names of Departments with Schemes converging with IWMP</th>
<th>Name of activity/ task/structure proposed under convergence</th>
<th>Phy No.</th>
<th>Estimated Fund Proposed Under Convergence (in lakh.)</th>
<th>Level at which decision for convergence was taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>NREGA</td>
<td>Farm Ponds</td>
<td>10</td>
<td>10.00000</td>
<td>DPC</td>
</tr>
<tr>
<td>NREGA</td>
<td>Construction of Check Dam</td>
<td>2</td>
<td>8.00000</td>
<td>DPC</td>
</tr>
</tbody>
</table>
Guiding Principle of Watershed Management:

1- **Concept of inclusion:** Priority is given on participation of all sections of the society. Particularly participation of poor, women and SC and ST in the project development work is more stressed.

2- **Decentralisation:** Focuses more in decentralisation in the entire process of management, where power shall be delegated to the states, empowering the community and community organisation. The government organisation shall play the role of facilitation.

3- **Facilitating agencies:** Organisation may be government or non-government agencies or voluntary organisations should be selected on the basis of adequate competency and must have required skill and expertise to mobilise and organise community and build capacity and ensure equitable distribution of benefits.

4- **Emphasis on community participation:** Participation of the villagers and local institutions in the entire process of management is made mandatory.

5- **Capacity building and technological input:** Time to time capacity building is emphasized to enhance knowledge and skill of all functionaries in order to discharge their role and responsibilities more effectively. Considerable stress on use of advanced technology, remote sensing techniques are given.

6- Monitoring, Evaluation and Learning given importance to get necessary feedback to undertake time to time improvement in its functioning.

7- **Organizational Restructuring:** Proper co-ordination at national, state, districts and project levels are emphasized with developing effective functional partnership among project authorities, implementing agencies and support organisation.

**References:**

Chatterjee U and BK Mishra- Micro level watershed management and sustainable development through watershed approach: A case study.

Common guidelines of watershed development project- Government of India, 2008

Detailed project report of Pastipada and Turpi watersheds: Facilitated by Project implementing agencies.

Hanumanth Rao CH 2000 – Watershed development in India, recent experiences and engineering issues.
Kanaka, K- Impact and evolution of micro level water resources development and improved agricultural practice crop productive and ecology.

Mireker OD, Mousha AK- Policy intervention in watershed management: The case of Icchaben watershed, Ghana.

Mishra SK - Watershed issues and concerns of drought-prone areas.

Pathak P, AK. Chourasia, SP Wani, R Sudi – Multiple impact of integrated watershed management in the low rainfall.

Sethi R R, A Kumar, SP Sharma, RB Singadhyam 2008 - Water Resources Assessment in Watershed in Odisha.

Sudhister SA Das, U S Pattnaik, P R Chowdhury, 2004 - Upliftment of tribal women through integrated watershed development.

Swaminathan B, K C Srivastav - Dryland Management in India: Backdrop, focus and the future.

Terafe H R, Asfew and S Demissew- The link between Ethnobotany and Watershed Development for sustainable use of land and plant resources in Ethiopia.


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