

Watershed management in India

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Abstract

India occupies approximately 2.4% of the total geographical area of the world, while it supports over 15% of the world population. Unprecedented population pressure and demand of society on scarce land, water and biological resources and the increasing degradation of these resources is affecting the stability and resilience of our ecosystems and the environment as a whole. Therefore, the productive agriculture lands in the country are in constant process of varying degrees of degradation and are fast turning into wastelands. It is precisely to restore this ecological imbalance by developing the degraded non-forest wastelands. To harness the full potential of the available land resources and prevent its further degradation, wasteland development is of great significance. The problem of degraded land, water and its management is complex and multi-dimensional and its development aims to develop human resource in watershed development and management and generate awareness about the importance of sustainable development and maintenance of existing work force working in the watershed development and develop skill in the rural youth to work in the watershed development based on watershed management approach and developing natural resources on sustainable basis.

Keywords - watershed management, land resources.

Introduction:

Land, water and vegetation are the three basic resources of the life support system. The ecosystem tends to become fragile and precariously balanced due to rapid increase in human and bovine population, over exploitation of natural resources to meet their food, fodder and fuel requirement and unscientific management of these resources. The effective conservation and management of land, water and vegetation resources aimed at obtaining optimum and sustained return from these resources without degrading them can be achieved by adopting watershed as basic unit of development. Watershed being a natural hydrological entity, it responds most effectively to various engineering, biological and cultural treatments. Monitoring of runoff and silt at the outlet of the watershed can help assess the impact of various treatments aimed at conserving soil and water, and protecting vegetation. Watershed management involves protection of land against all forms of degradation, restoration of degraded land, sediment control, pollutants control, and prevention of floods, etc.

Definitions:

1) Watershed

i) Watershed is an area above a given drainage point on a stream that contributes water to the flow at that point.

ii) Watershed is a natural unit draining runoff water to common point of outlet.

iii) The watershed is geohydrological unit or a piece of land that drains at common point. Catchments basin or drainage basin are synonymous of watershed.

2) Watershed Management

A Watershed is a topographically delineated area that is drained by a stream system. Watershed is made up of its physical and hydrological natural resources as well as human resources. Management of a watershed thus entails the rational utilization of land and water resources for optimum production but with minimum hazard to natural and human resources. Therefore, watershed management is the process of guiding and organizing land use and use of other resources in a watershed to provide desired goods and services without adversely affecting soil and water resources. Embedded in this concept is the recognition of the interrelationships among land use, soil and water and the linkages between uplands and downstream areas.

Objectives of the watershed management:

1. Generate data on hydro-meteorological, soil, nutrient and process-related parameters at watershed level in different agro-ecological zones of the country through instrumentation.
2. Carry out modeling studies on watershed hydrology.
3. Develop Spatial Decision Support Systems (SDSS) for land and water management at the watershed scale.
4. Assess the impact of on-site and off-site management structures for soil and water conservation.

Watershed management and India:

The concept of watershed management is as old as the concept of crops grown under irrigated conditions

and this concept led to development of tanks/reservoirs for increasing the production to meet the demand of ever growing population – since ages. Different rulers in different regions realized and executed works based on the availability of funds, needs of the people, available natural resources in the area, etc., to meet population demands and requirement of food needs. The beneficiaries were taxed and revenue was collected from them. Sir Arthur Cotton submitted two reports during 1844 and 1845 to the then British Government after surveying entire area from Papi hills to Sagaram in Godavari river area and this made the construction of a storage type barrage at Dhawaleswaram in Godavari district for utilizing river water for agricultural development in the area. The need to maintain better environment and preserve natural resources like soil, water and vegetation was realized by early rulers and managed through different kinds of village institutions (eg. village level officials, Gram Panchayat, village rulers/administrators) in different regions. Punishments were awarded if attempts were made to damage natural resources.

After India achieved Independence, the importance to executive authorities at village level has gradually declined in India due to changes in policies in the democratic setup and liberalization of spirit of freedom. This led to more damage to vegetation in rural areas leading to deterioration in environment through soil degradation. Hence, Government of India and different provincial Governments took up amelioration measures such as, afforestation measures, soil conservation measures, run-off water utilization programmes, etc. However, expected results did not forth come on constant and continuous basis. Therefore, Government of India launched watershed development programmes (WDPs) in 1983-84 in a big way to conserve and utilize natural resources for enhanced and productivity and higher socio-economic status. Up-scaling of watershed development programme was carried out by spending about Rs. 100,000 millions per annum since then till now. Though, it has been carried out since 1983-84, the impact of watershed programme is to be evaluated for evolving better strategies/policies to preserve, conserve and utilize natural resources for betterment of ever growing population.

Integrated Watershed Management Programme (IWMP):

The Department of Land Resources, Ministry of Rural development, Government of India is implementing centrally sponsored programmes of Integrated Wasteland Development Programme (IWDP), Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP) for development of waste/degraded lands through watershed approach. The three programmes were implemented on the basis of separate norms, funding patterns and technical components based on their respective objectives. While DDP focused on reforestation

to arrest the growth of hot and cold deserts, DPAP concentrated on non-arable lands and drainage lines for in situ soil and moisture conservation, agro-forestry, pasture development, horticulture and alternate land uses. IWDP, on the other hand, adopted pasture development, soil and moisture conservation as prominent activities on wasteland under government, community or private control. The common theme was sustainable management of land and water resources.

In order to bring about integration of all the area development programmer, a new programme with the title Integrated Watershed Management Programme (IWMP) has been launched for integrated planning, sustainable outcomes, and rural livelihoods of the communities. All the three area development programmes has been covered under Integrated Watershed Management Programme (IWMP) which is to be implemented by a Dedicated Agencies, which will be operational at National, State and District levels. The key features of this Integrated Watershed Management Programme are:

I. Delegating Powers to States: States will now be empowered to sanction and oversee the implementation of watershed projects within their areas of jurisdiction and within the parameters set out in these guidelines.

II. Dedicated Institutions: There would be dedicated implementing agencies with multi-disciplinary professional teams at the national, state and district level for managing the watershed programmes.

III. Financial Assistance to Dedicated Institutions: Additional financial assistance would be provided for strengthening of institutions at the district, state and national level to ensure professionalism in management of watershed projects.

IV. Duration of the Programme: With the expanded scope and expectations under this approach, the project duration has been enhanced in the range of 4 years to 7 years depending upon nature of activities spread over 3 distinct phases viz., preparatory phase, works phase and consolidation phase.

Major Activities of the Watershed project are:

- 1) Soil & moisture conservation measures like terracing, trenching, vegetative barriers etc.
- 2) Planting & sowing of multi-purpose trees, shrubs, grasses, legumes and land development
- 3) Encouraging natural regeneration
- 4) Promotion of agro-forestry and horticulture
- 5) Wood substitution and fuel-wood conservation measures
- 6) Measures needed to disseminate technology

7) Training, extension and creation of a greater degree of awareness among the participants

8) Encouraging peoples' participation

Issues before Watershed Management

1) Watershed projects have not been succeeded to generate sustainability because of failure of implementing agencies to involve the people. For watershed projects to be sustainable community management systems are needed and they can succeed only with farmers contribution and their commitment to time and resources

2) It has been noticed in many cases that the stakeholders were neither involved in selection of project ingredients nor encouraged to participate in various project activities. The entire process of watershed development involved participation by Government Departments and local contractors with a clear top down approach with least involvement of the watershed communities. Consequently, there has been a supply demand mismatch leading to inadequate attention to local needs and aspiration of the watershed communities resulting inefficient implementation and inadequate sustainability.

3) Since watershed is a land bases activity, the benefits of watershed management accrued

mainly to farming community where as the livelihood security of the landless families have not been taken care of through the project intervention.

4) The portfolio of alternate livelihood opportunities created for the beneficiaries due to intervention through watershed management could not cope with stress and shock and the primary stakeholders could not maintain those activities after the completion of project period

5) In majority of the cases sustainability had been causality mainly due to absence of primary

stakeholders in project planning and implementation stages.

6) Withdrawal mechanism has not been properly spelt out by the project implementing agencies for which local community level institutions did not come up to own the project. Due to lack of capacity and involvement of the

community at project completion stage, the assets created under the project could not be maintained with the involvement of local community which ultimately affected long run sustainability of the project.

Conclusion:

A balance between economic and environmental objectives and consideration of all interactions of the watershed system are important criteria in watershed management. This balance is necessary for countries at various stages of development. Conflicts are increasing over shared water resources between agriculture, industry, and urban domestic use as well as between State governments. Sustainable water management is thus crucial for economic development and livelihood of the people. In a country like India, where a lot of running water goes waste, it becomes very important to apply the technology of watershed management to solve its annual problems of droughts and floods.

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