

Watershed development programme in Bihar

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Abstract

Effective use of land and water is fundamental to growth and sustainable development. The concept of watershed management has evolved to ensure effective use of both natural and social capitals. Thus, the watershed development programmes include land, water, and human resources as essential components. The watershed programme is primarily a land-based programme, which is increasingly being focused on water, with its main objective being to enhance agricultural productivity through increased in situ moisture conservation and protective irrigation for socio-economic development of rural people. It has been essential in a country like India where the majority of the population depends on agriculture and about 60 per cent of the total arable land (142 million ha) in the country is rain-fed. A large portion of the rain-fed areas (65% of arable land) in India is characterized by low productivity, high risk, and uncertainty, low level of technological change and vulnerability to degradation of natural resources. Over the years, the sustainable use of land and water has received wider attention among policy makers, administrators, scientists, and researchers.

A watershed approach is a system-based approach that facilitates the holistic development of agriculture, forestry and allied activities in the proposed watershed. It also forms an appropriate unit for analyzing the development-linked resource problems, designing the appropriate solutions of identified problems and eventually testing the efficacy of the measures taken up.

Watershed Development Programmes (WDPs) have been accorded high priority in India's development plans. These programmes have been initiated in India to improve and sustain productivity and the production potential of the dry and semi-arid regions of the country through the adoption of appropriate production and conservation techniques. The WDP

approach seeks to improve and develop all types of lands- government, forest, community and private lands- that fall within a particular watershed. It is a holistic approach to improve and develop the economic and natural resource base of dry and semi-arid regions. The programmes have stressed upon the improvement of wasteland, runoff reduction, water conservation and protective irrigation

mechanism in all areas including desert prone areas and drought prone areas.

Development programmes, envisaged under its purview include almost every activity which concerns land, water, and biomass production. Experiences have shown that watershed as a base is very effective in use and management of land and water resources. With increasing awareness about the problems related to the environment,

use of watershed terminology is becoming popular and moreover in view of their potential for growth, improvement in income levels and augmenting the natural resource base of the disadvantaged regions of the country.

Objectives :

- To mitigate the adverse effects of drought on crops and livestock.
- To control desertification.
- To encourage restoration of ecological balance and
- To promote economic development of village community.

History of watershed development programme in India and Bihar : About 60 per cent of the total arable



land (142 million ha) in India is rain-fed, characterized by low productivity, low income, low employment with a high incidence of poverty and a bulk of fragile and marginal land. The rainfall pattern in these areas is highly variable both in terms of total amount and its distribution, which lead to moisture stress during critical stages of crop production and makes agriculture production vulnerable to pre and post production risk. Watershed development projects in the country have been sponsored and implemented by Government of India from the early 1970s onwards. Various watershed development programme like Drought Prone Area Programme (DPAP), Desert Development Programme (DDP), River Valley Project (RVP), National Watershed Development Project for Rainfed Areas (NWDPRA) and Integrated Wasteland Development Programme (IWDP) were launched subsequently in various hydro-ecological regions, those were consistently being affected by water stress and drought like situations.

The entire watershed development programme was primarily focused on the structural-driven compartmental approach of soil conservation and rainwater harvesting during the 1980s and before. In spite of putting efforts for maintaining soil conservation practices (example, contour bunding, pits excavations etc.), farmers used to plow out these practices from their fields. It was felt that a straightjacket top-down approach cannot make the desired impact in watersheds and mix up of individual and community-based interventions are essential.

Definition of watershed : A watershed also called a drainage basin or catchment area, is defined as an area in which all water sowing into it goes to a common outlet. People and livestock are an integral part of the watershed and their activities affect the productive status of watersheds and vice versa. From the hydrological point of view, the different phases of the hydrological cycle in a watershed are dependent on the various natural features and human activities. Watershed is not simply the hydrological unit but also socio-political-ecological entity which plays crucial role in determining food, social, and economic security and provides life support services to rural people.

There are six major projects/programmes in watershed development programme namely,

- National Watershed Development Project for Rain-fed Areas (NWDPRA)
- Watershed Development in Shifting Cultivation Areas (WDSCA)
- Drought Prone Areas Programme (DPAP)

- Desert Development Programme (DDP)
- Integrated Wasteland Development Project (IWDP)

– Employment Assurance Scheme (EAS)

Success of watershed projects in Bihar :

- They devote significant resources to social issues.
- A high proportion of staff members has experience and skills in social mobilization.
- Project leaders are fully committed to participation and, in most cases; donors or senior officials apply pressure to ensure participatory approaches.
- Project monitoring explicitly checks whether local organizations of users have been formed.
- Staff members have an incentive to undertake participation.
- Communities, being organized, have the capacity to influence how the field staff works.

Components of watershed management :

Entry point activity (EPA) : Entry Point Activity is the first formal project intervention which is undertaken after the transect walk, selection of the watershed. It is highly recommended to use knowledge-based entry point activity to build the rapport with the community. Direct cash-based EPA must be avoided as such activities give a wrong signal to the community at the beginning for various interventions. Details of the knowledge-based EPA to build rapport with the community ensuring tangible economic benefits to the community members are described here.

Land and water conservation practices : Soil and water conservation practices are the primary steps of the watershed management program. Conservation practices can be divided into two main categories: 1) *in-situ* and 2) *ex-situ* management. Land and water conservation practices, those made within agricultural fields like the construction of contour bunds, graded bunds, field bunds, terraces building, broad bed and furrow practice and other soil moisture conservation practices, are known as *in-situ* management. These practices protect land degradation, improve soil health, and increase soil moisture availability and groundwater recharge. Moreover, construction of check dam, farm pond, gully control structures, pits excavation across the stream channel is known as *ex-situ* management. *Ex-situ* watershed management practices reduce peak discharge in order to reclaim gully formation and harvest the substantial amount of runoff, which increases groundwater recharge and irrigation potential in watersheds.

Watershed components for cropping system in Bihar:

- Land development including in situ soil and moisture conservation measures like contour and graded bunds fortified by plantation, bench terracing in hilly terrain; and nurseries for fodder, timber, fuel wood, horticulture, and non-timber - forest produce
- Afforestation including block plantations, agroforestry, and horticultural development. Shelter-belt plantations, sand dune stabilization, etc.
- Drainage line treatment with a combination of vegetative and engineering structures.
- Development of small water harvesting structures such as low-cost farm ponds, nalla bunds, check dams and percolation tanks and groundwater recharge measures.
- Renovation and augmentation of water resources, desiltation of tanks for drinking water and irrigation.
- Pasture development either by itself or in conjunction with plantations.
- Repair, restoration, and upgrading of existing common property assets and structures in the watershed to obtain optimum and sustained benefits from previous public investments.
- Crop demonstrations for popularising new crops and crop varieties or innovative crop management practices.
- Promotion and propagation of non-conventional energy saving devices and energy conservation measures.

Watershed management approaches in Bihar:

Integrated approach : This approach suggests the integration of technologies within the natural boundaries of a drainage area for optimum development of land, water, and plant resources to meet the basic needs of people and animals in a sustainable manner. This approach aims to improve the standard of living of common people by increasing his earning capacity by offering all facilities required for optimum production. In order to achieve its objective, integrated watershed management suggests to adopt land and water conservation practices, water harvesting in ponds and recharging of groundwater for increasing water resources potential and stress on crop diversification, use of improved variety of seeds, integrated nutrient management, and integrated pest management practices, etc.

Consortium approach : Consortium approach emphasizes on collective action and community participation including of primary stakeholders, government and non-government organizations, and other institutions. Watershed management requires multidisciplinary skills and competencies. Easy access and timely advice to

farmers are important drivers for the observed impressive impacts in the watershed. These lead to enhance awareness of the farmers and their ability to consult with the right people when problems arise. It requires multidisciplinary proficiency in the field of engineering, agronomy, forestry, horticulture, animal husbandry, entomology, social science, economics, and marketing. It is not always possible to get all the required support and skills-set in one organization. Thus, consortium approach brings together the expertise of different areas to expand the effectiveness of the various watershed initiatives and interventions.

Watershed development and its impact on livelihoods :

So what has been the impact of these new initiatives on the livelihoods of the poor? Given their relatively recent history, it is difficult to make a detailed assessment of the performance of WSD programmes. Anecdotal evidence and impact assessments of individual projects (particularly of donor and NGO-implemented projects) suggest several positive trends:

- Increase in cropping intensity and yields of both irrigated and dryland crops.
- Reduction in the threat of drought to crop and livestock production.
- Increase in milk production (livestock systems move from open grazing and towards crossbreeds).
- Recharge of groundwater.
- Decline in sedimentation downstream.
- Improved fodder production.
- More livestock managed under stall-fed conditions.
- Year-round availability of drinking water.
- Creation of employment opportunities for landless labour.
- Diversification of the village economy into artisanal and other activities as people gain the confidence to approach banks for credit Reduction in Runoff from 70% to 22%, and in soil loss from 41t/ha to 1.9t/ha.
- Rise in water table from 12m to 6m depth; increase in number of wells dug by villagers from 12 to 483.
- Increase in proportion of irrigated land from 9.6% to 69%.
- Area sown under *Kharif* and *Rabi* increased by 85% and 233%.
- Cultivation in *Zaid* for first time extensive switch to higher value crops.
- Over 300 ha of arable wasteland brought into crop

production.

- Seven-fold increase in fuelwood offtake.
- Switch from cow dung to firewood as fuel.
- Fodder planted on almost 150 ha of field bunds and gully plugs.
- Dry fodder production increased by 235%.
- Switch from livestock species previously relying on open grazing.
- Towards higher quality stall-fed drought and milch animals.
- Former herders find employment as agricultural labourers.
- Increased soil fertility.
- Creation of village investment funds from the sale of produce.
- Commons (fuel, fodder) and the creation of a revolving fund for small loans at nominal interest.

Limitations of watershed programmes in Bihar :

- Lack of people's participation.
- Field staff unfamiliar with participatory approaches.
- Insecurity about fund availability at the grass root level.
- Limited time for preparatory activities.
- Little emphasis on cohesive group formation.
- Lack of transparent criteria for selecting areas and villages.
- Limited human resource capabilities.
- Lack of involvement of senior government functionaries and line agencies.
- Weak horizontal linkages among various agencies at the district level.
- No exist protocol for withdrawal after project completion.
- Plethora of watershed development programmes with different guidelines and cost norms.

Common approach to watershed development :

- Convergence of selected programme components/activities with commonality in approach.
- Rationalization of unit cost norms depending on the nature of programme content, work items, and institutional arrangements.
- Feasibility of territorial delineation to be decided in terms of eligibility criteria, ministerial mandate, programme focus and development objectives.
- Scope for enlarging the process of capacity building involving local bodies, non-governmental organizations (NGOs), community groups and extension functionaries.
- Broad basing of financial resources through inter-institutional credit linkages.
- Unified approach supporting programme measures and building a suitable institutional framework for ensuring long-term sustainability.

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