



EVALUATION OF WATERSHED DEVELOPMENT PROGRAMMES IN INDIA

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Introduction:

Watershed is a geographical area that drains to a common point and makes it as an attractive unit for technical efforts to conserve soil and maximize utilization of surface and subsurface water for crop production (Kerr *et al.*, 2000). It is a hydrologic unit that has been used both as a bio-physical unit and as a socio-economic and socio-political unit for planning and implementing resource management activities. It assumes importance in India where 60 per cent of the cropped area is rainfed and is characterized by low productivity, water scarcity, degraded natural resources and widespread poverty. The Government of India (GOI) launched Watershed Development Programmes (WDPs) in 1983-84 to conserve and utilize natural resources for enhanced productivity and higher socio-economic status. Different ministries of Government of India like Ministry of Agriculture and Farmers Welfare (MoAFW), Ministry of Rural Development (MoRD) and Ministry of Environment and Forest (MoEF) are involved in the implementation of watershed in the country.

Watershed Development Programme

Watershed Development Programme is a simple soil and water conservation programme to the Integrated Rural Development Programme (IRDP) with more people participation. Both central and state govt. and international donors have been implementing it across the country. It is a land based technology that would help to conserve and improve in sit moisture, check soil erosion and improve water resources, especially groundwater in the rainfed regions. It facilitates higher land productivity through improved moisture and water availability for agriculture. It means improving the management of a watershed or a catchment area by building contour bunds, water harvesting structures (check-dams), field bunds (raised edges), etc.

Area Development Programmes

- (1) DPAP- Drought Prone Areas Programme (1973-74)
- (2) DDP -Desert Development Programme(1977-78)
- (3) IWDP- Integrated Watershed Development Programme (1989-90)
- (4) IWMP - Integrated Watershed Management Programme (2008)

The DPAP, DDP and IWDP were combined together and they were included under IWMP.

Impact Assessment

The problem of it includes the following aspects:

- ✓ Developing a frame work to identify what impact to asses, where to look for these impacts and selecting appropriate indicators to assess the impacts and
- ✓ Developing a frame work to incorporate the indicators together and assessing the overall impact of the project.

Major Challenges Includes

(1) Choice of methodologies	(4) Quantifying benefits in upstream and downstream
(2) Selection of indicators	(5) Extent of natural and artificial recharge
(3) Choice of discount	

Sourch- (Palanisami and Suresh Kumar, 2006).

The watershed development technologies benefit not only the participating farm households, but also non-participating and other rural household in the watershed village. The economic surplus method has been used in the present context to study the impact of watershed programmes using data from sample watersheds applying the following three approaches:

- (1) Before and After (2) With and Without (3) Combination of Both

Methodologies

- (1) Conventional Benefit Cost Analysis (2) Econometric Models (Economic Surplus Model) (3) Bio-econometric Modelling (4) Meta Analysis

Econometric Approach

Economic Surplus Approach

Economic surplus method is widely followed for evaluating the impact of technology on the economic welfare of households (Moore *et al.*, 2000; Wander *et al.*, 2004; Maredia *et al.*, 2000; Swinton, 2002). The economic surplus is utilized together with the research costs to calculate NPV, IRR and BCR (Maredia *et al.*, 2000). It measures the aggregated social benefits of a research project. It is possible to estimate the return to investments by consumer and producer surplus through a technological change originated by research. It is the most commonly used method for assessing the impact of agricultural research investment, particularly those related to crop improvements.

The watershed development intervention affects agricultural producers in two ways:

- (i) Lower marginal costs (according to the theory, the supply curve corresponds to the curve of marginal costs as of the minimum value of the curve of average variable costs), and
- (ii) Lower market price (P_0 reduced to P_1). Thus, the producer’s surplus is defined as the Area $P_1b_1l_1$ - Area $P_0a_0l_0$.

Application of Economic Surplus Method to Watershed Evaluation

They play a dual role of safeguarding the interest of the producers as well as consumers, as in several locations, the drought-proofing aspects of the watershed programs are easily felt (Palanisami and Suresh Kumar, 2007). In the case of producers, they can change the crop pattern due to increased water levels in their wells, moisture conservation in the soil, increase water use for the fodder production. In the case of consumers, the increased crop production in the watershed results in availability of produce at lower prices. There is also a change in the cost of production of the commodities in the watershed and also an increase in technology adoption due to watershed programmes. Consumption levels also get increased among the consumers.

Conclusion

The watershed development programmes have resulted in positive change in the land use pattern in most of the regions. More waste land was converted for productive use by the farmers. This has resulted in increase in net sown area in majority of the states. Further, better

land use pattern has helped to increase agricultural intensification and thus enhance agricultural production. There was a net raise in the irrigation sources due to increase in the groundwater recharge through water harvesting structures. The long term improvements in the environment including availability of fuel wood, fodder, timber, drinking water, quality of life etc., done by the a forestation during the project period would further improved the rates of returns to such investments. Equity, in sharing the benefits is a vital consideration for effective community participation. The value of CDI increases with the decrease in concentration and rises with the number of crops/ activities and the watershed treatment activities help in diversification in crop and farm activities.

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