

***WATERSHED DEVELOPMENT APPROACH FOR SUSTAINABLE AGRICULTURE  
MANAGEMENT AND CROP PRODUCTIVITY***

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**Abstract**

In India, most watershed projects are implemented with the twin targets of soil and water protection and enhancing the livelihoods of the provincial poor. Today watershed development has become the main intervention for characteristic asset management. A watershed or catchment is a territory from which all water drains to a common point, making it an appealing unit for specialized efforts to manage water and preserve soil for improving production. The watershed Area Development Approach is pursued in rainfed areas where availability of water is dependent on whimsical amount, intensity and distribution of rainfall. India accords high need to watershed based interventions as a procedure for improving livelihoods and sustainability in drought-prone areas. The ultimate objective of the watershed based management approach is to develop sustainable farming systems in rainfed areas for an enormous scope in the nation.

**Keywords:** watershed development, sustainable, agriculture, crop, productivity, etc.

**1. INTRODUCTION**

In India, most watershed projects are implemented with the twin targets of soil and water protection and enhancing the livelihoods of the provincial poor. Different kinds of treatment exercises carried out in a watershed include soil and moisture preservation measures in agricultural lands (form/field bunding and summer plowing), drainage line treatment measures (free boulder check dam, minor check dam, major check dam, and retaining dividers), water asset development/management (percolation pond, farm pond, and drip and sprinkler water system), crop demonstration, cultivation ranch and afforestation. The aim of watershed program is to guarantee the availability of drinking water, fuel wood and fodder to raise income and employment for farmers and landless workers through improvement of agricultural production and productivity. Today watershed development has become the main intervention for characteristic asset management. An aggregate of 45.58 million hectares of land has been treated through different watershed development programs in India with an investment of '17,037 crore. The normal expenditure per annum during the 10th arrangement is around '2300 crore.

Land is an important normal asset for meeting the country's requirement of food, fodder, fiber, timber and different agro-based industries. It needs to be used judiciously on a sustained premise without impairing its productive limit. For optimum production of vegetation of different kinds from the limited land the interaction between the land and water assets of a specific region can't be disputed. Such an interaction is best achieved on the watershed premise which is characteristic hydrologic units. The rainwater, offer touching the outside of the earth, under goes different processes, for example, run-off (RO), deep percolation (D) Evapo-transpiration (ET), metabolic water (M) and Dry soil water (DSW). The Dry soil water (DSW) which is stored in the soil is used for Evapo-happening and is replenished by the rainfall. Therefore, the amount of water in Evapo-happening is the lone amount which is needed by the plant for its growth and development. In this way the probability of rainfall depends upon the daily Evapo-happening and percolation misfortunes, which has been measured around 3-4 mm/every day in Eastern Indian. The rainfall periods are additionally decided based on this Evapo-happening and percolation misfortunes.

- **Watershed:** A watershed or catchment is a territory from which all water

drains to a common point, making it an appealing unit for specialized efforts to manage water and preserve soil for improving production. In water alarm areas, the goal is to catch water during rainy period for resulting use in the dry periods. This involves conserving soil moisture and supporting crop growth, encouraging water filtration to revive springs and harvesting surface runoff water in small ponds or tanks. A watershed is a hydrological unit that can fill in as a biophysical unit and as a financial and socio-political unit for planning and implementing asset management exercises. Watershed development has been recognized internationally as an important all encompassing approach to characteristic asset management, which looks to promote the idea of sustainable development. Watershed development involves the coordinated use and management of land, water, vegetation and other biophysical assets within the whole watershed with the target of ensuring minimal land degradation, erosion and likewise to manage and use the runoff for helpful purposes in order to improve the ground water revive.

## **2. WATERSHED DEVELOPMENT APPROACH IN RAINFED AREAS**

The watershed Area Development Approach is pursued in rain fed areas where availability of water is dependent on whimsical amount, intensity and distribution of rainfall. An element of danger pervades the production systems. Thus diversified and mixed farming systems are practiced which include agriculture, forestry, animal husbandry, fishery etc. This approach has been followed in India since mid sixties for sectoral projects aiming at control of siltation in supplies or mitigation of floods. Notwithstanding, after announcement of the new 20-point program in the year 1982, this approach was adopted as a public system for integrated and comprehensive development of rain fed areas. The integrated watershed development approach to improve farm productivity is a lot of pertinent in the current setting of the Indian

economy, considering its significant gainful impact on living standards and employment in the immense dry land region. As observed in the note and additionally evidenced by ongoing audits of the integrated watershed development project, there are certain issues which need critical consideration, for example, (a) The identification of areas with considerable development potential and according them main concern for inclusion under integrated watershed project should be initiated immediately. (b) It is no doubt ideal if watershed development is undertaken by the democratically elected neighborhood governments, with the specialized help from the government or non-governmental organization (NGOs), (c) The majority of recipients with their frail economic conditions can't afford to make investments for improving the land potential and harnessing of accessible water. (d) There are some obvious ill defined situations in planning, implementation and assessment of the projects and (e) The differences in the degree of achievement of watershed development projects in the nation could be traced, inter alia, to deficiencies in innovation, linkages between examination, expansion and farmer's training, enthusiasm for farmer's financial conditions, supply of inputs, seeds fertilizers and pesticides and stream of credit.

### **2.1 Benefits of watershed development**

In India around 70% (143.8 million hectares) of arable land is rainfed and depends on monsoon rains. Around 45 percent of these dry lands will continue to depend on normal precipitation even subsequent to realizing the full water system potential. Agriculture growth in these rainfed areas has been very low. The ultimate objective of the watershed based management approach is to develop sustainable farming systems in rainfed areas for an enormous scope in the nation. Keeping this approach in view the program of National Watershed Development project for Rainfed Areas (NWDPA) was launched by the Ministry of Agriculture in 1990-91 for its implementation during the eighth arrangement. Mainly three kinds of benefits by the individuals of the concerned zone can be achieved through the watershed development, for example,

➤ **Economic Benefits:**

- i. Additional crop production from the restored or realized land.
- ii. Additional crop production due to increased water system potential through water harvesting.
- iii. Additional milk production from improved live stock.
- iv. Production from trees, green crops grasses etc.

➤ **Protective/Ecological Benefits:**

- ✓ Land protection against erosion, for example, gullying, stream bank erosion etc.
- ✓ Protection of existing production level from I and subject to be lost because of soil erosion.
- ✓ Reduction in investment on structures/dam due to low degree of flood hazards. Prevention of crop damages due to erosion/floods droughts.

➤ **Employment Generation:**

- i. Casual employment generated during introduction of the treatment, for example, tree planting, development of structures etc.
- ii. Regular employment due to change in farming system i.e. by adoption of more work intensive crop undertakings.
- iii. Employment open doors for maintenance and follow up of the programme.

### **3. IMPACT OF WATERSHED DEVELOPMENT PROGRAMMES ON CROP PRODUCTIVITY**

India accords high need to watershed based interventions as a procedure for improving livelihoods and sustainability in drought-prone areas. This goes beyond merely protection exercises in terms of development of structures and emphasizes importance of human dimensions, strengthening neighborhood institutions, income generating innovations and markets to improve livelihoods. Most watershed projects are being implemented with the twin goals of characteristic asset preservation and enhancing the livelihoods of the country poor through enhancement of production levels. Different assessment studies carried out at different

watershed located in different agro-climatic conditions have indicated that watershed programs help to increase agricultural productivity besides conserving common assets. While there are no disputes about the helpful impact of watershed projects, one important issue that has not been answered by the scientists that how much part of this advantage (productivity being referred to here) is simply due to watershed innovation. On the off chance that watershed innovation is an improvement over control areas, at that point its belongings in terms of gain in productivity should have occurred in two phases. Initially, more yields are made accessible from the existing asset base under the new production innovation (for this situation watershed innovation). This is the productivity component, reflected in the move in the production work. Second, an adjustment component of innovative change is evident in the movement along the new production work. This movement along the new production work follows from the efforts of the firms to adjust to disequilibrium caused by the new degree of proficiency. It is advantageous, therefore, to decompose the absolute difference in yield into its causative factors of the differences in the degrees of input use and mechanical effectiveness.

### **4. WATERSHED DEVELOPMENT FOR SUSTAINABLE AGRICULTURE MANAGEMENT**

Proficient and sustainable utilization of normal assets is important for economic development, particularly in asset helpless nations. More so in the agriculture dominated economies like India where two-thirds of the cropped region is dependent on rainfall with no protective water system offices. These districts have for quite some time been the victims of disregard on the arrangement front. This disregard is mainly due to the convergence of public assets in the exceptional areas for meeting the nation's food requirements through water system development and green upheaval advancements, which are complementary. In any case, it has been realized of late that the optimum productivity levels in these (exceptional) locales are being reached and their potential in meeting future demand is limited. Moreover, further increases in

territory under water system are limited as well as costly. While the approach inclination, resulting in intensive agricultural practices, has paid off in terms of meeting the nation's food demands in the short run, it proved to be unsustainable, economically just as environmentally, in the since a long time ago run. This coupled with the limited extension for expanding water system (through traditional methods of damming the waterways) has prompted the strategy move towards dry land agriculture. Despite the fact that ongoing strategies failed to address the problems of irrigated agriculture through improving the allocative proficiency of significant inputs like water, concerted efforts are being made towards improving the conditions of the dry farming. Development of these locales, in terms of enhancing the crop yields, holds the way to future food security. Besides, these districts are increasingly being confronted with environmental problems, for example, soil erosion. Indeed, it is feared that the intensity of asset degradation is reaching irreversible levels in some of the areas. Promotion of appropriate advancements and development systems in these locales would bring about multiple benefits: (i) ensuring food security; (ii) enhancing the practicality of farming; and (iii) restoring ecological equilibrium.

#### **5. DECOMPOSITION OF PRODUCTIVITY GROWTH IN WATERSHEDS**

The protection, utilize and sustainable management of regular assets on watershed premise have been a high need for many nations in the course of recent decades. India additionally accorded high need to watershed based interventions as a methodology for improving livelihoods and sustainability in drought-prone areas. Most watershed projects are being implemented with the twin destinations of normal asset preservation and enhancing the livelihoods of the country poor through enhancement of production levels. A few studies conducted before showed that introduction of watershed advancements increased the cropping intensity, production levels and move the farming exercises from less work intensive (low income) to more work intensive (major league salary) crop,

alongside different benefits related to farm just as non-farm sector. The marked yield and productivity growth in the watersheds involves many interesting issues relating to growth. The amount of the growth in yield is due to watershed innovation alone and the amount of it tends to be attributed to other complementary inputs, for example, fertilizer, water system, high yielding varieties c, etc.

It is advantageous, therefore, to decompose the all out difference in yield into its causative factors viz., differences in the degrees of input use and innovative proficiency. Decomposition method was first used in Indian Agriculture to assess the impact of specialized change due to introduction of Mexican wheat in Punjab farms. Along these lines, the method was used by a few different specialists to assess the innovative hole in farm productivity. On the off chance that adoption of watershed based interventions presumed to be an improved innovation over control areas, at that point its belongings in terms of gain in productivity should have occurred in two phases. Initially, more yield is made accessible from the existing asset base under the new production innovation (for this situation watershed innovation). This is the effectiveness component, reflected in the move in the production work upwards and production parameters.

#### **6. CONCLUSION**

The ultimate objective of the watershed based management approach is to develop sustainable farming systems in rainfed areas for an enormous scope in the nation. India accords high need to watershed based interventions as a procedure for improving livelihoods and sustainability in drought-prone areas. The preservation, utilize and sustainable management of characteristic assets on watershed premise have been a high need for many nations in the course of recent decades. Watershed-based intervention in terms of different sorts of soil and water protection exercises contributed mostly to the variety and the cumulative commitment of differences in the degrees of input use to the productivity hole were irrelevant or even negative for the selected crops.

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