



## NEED OF WATERSHED PLANNING IN INDIA & ITS MANAGEMENT APPROACH

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### ABSTRACT

*Watershed is strongly connected to the planet of the school. Environmental degradation as well as destruction of watershed is 2 sides of the identical coin. Lately, there's a rising concern in the North East Region regarding the improved degradation of the earth especially due to anthropogenic factors. 70 % of the region being hilly, it's sensed that a lot of the deterioration is actually because of indiscriminate felling of trees as well as the unceasing practice of shifting cultivation normally recognized as jhum'. Hence the environmental difficulties that the region is confronting today are higher compared to every other time of the history. Thanks to improved human tasks towards the forest land as well as the utilization of its of natural resources, the all around health as well as wealth of the hilly individuals has been impacted. Watershed characterization has been studied in phrases of hydro geomorphology, rainfall distribution, soil depth, soil texture, slope, drainage density, underground water level as well as land use as well as land cover. In this article, we study the concept of watershed and its need in Indian Scenario.*

**Keywords:** Watershed, Management, Planning

### 1. INTRODUCTION

India is actually a house to approximately eighteen % of the world's human population as well as fifteen % of the live stock population though it's just 2 per cent of the world's geographical area and 0.5 per cent of the pasture lands. Approximately seventy % of the population depends on agriculture, and 2 thirds of the cropped place depends on rainfall with no shielding irrigation. The per capita accessibility of forests in India is actually approximately one per cent of the world average. Obviously, the land, natural vegetation resources and water of the nation are under huge pressure. Droughts, floods along with other climatologically extremes are popular phenomenon in a single or maybe the other areas of the nation. These extremes trigger extensive damage as well as setback to economic development of the nation. Drought takes place over a prolonged period of space and time, rendering it unpredictable and losses aren't quantifiable quickly. Within the last 125 years the nation has experienced twenty five drought yrs; 1916 was one of the most detrimental drought year when over 70% region was affected. Of the previous fifty years, the nation has experienced over fourteen droughts out of which 1987 drought was probably the worst, impacting almost one half of total geographical location of the nation. Arid as well as semi arid areas of India tend to be more susceptible to drought as opposed to the other climatic zones, the likelihood of drought being twenty % of the seasons. Usually the drought persists constantly for three to six years at



various intensities as was experienced throughout 1903-05, 1957-60, 1966-75, 1984-87 as well as 1998-2002 causing several unwanted effects on availability of water resources for drinking to human and livestock, crop as well as fodder creation. Throughout a few droughts a sizable population of the region migrates with the livestock of theirs to far off places with much better source accessibility.

Over the previous 3 years, India has addressed these issues head on and made significant investments of the region of watershed management with a mix of specialized innovations, participatory approaches as well as an enabling policy atmosphere. There's definitely proof of good impacts in phrases of improved soil as well as agricultural efficiency and water conservation in typical rainfall yrs in regions which were dismissed in the traditional green revolution based rural development. Nations in Sub saharan Africa, South East Asia as well as China look towards India to find out from these encounters and adopt this special natural resource based rural development model. Nevertheless, total benefits from watershed development haven't been equitably shared, both to the farming community and perhaps between various geographical adjustments. Despite substantial public investments (approximately \$700 million/annum) along with a government nongovernmental business consortium method for programme implementation, under ten % of the rain fed location of India needing quick land as well as water conservation methods has been closed.

## **2. CONCEPT OF WATERSHEDS**

The phrase watershed is actually referred in various ways such as for instance watershed, river basin, drainage basin, hydrologic basin, catchment region, catchment, river catchment etc. The typical terms are watershed; basins as well as catchment morphologically these terms convey exact same meaning. Basically, watershed is an actual device where water coming from all around the spot moves below gravity to a typical drainage channel.

Hydrologically watershed is actually an area that has just one outlet for emptying the surplus area flow / runoff. The phrase watershed has likewise been identified in a number of ways such as: Drainage divide above a specified point on a stream (or maybe) Sub-division of a drainage basin (or perhaps) all of the region of the land which drains to a private stream or perhaps lake and British hire it to a water divide between 2 drainage basins. The word watershed refers to Contiguous region emptying into a single water body or maybe a water program or maybe it's a topographical place having a typical drainage. This means the rainwater falling on a location coming inside a ridgeline may be harvested and can flow out of this particular region through single point. Some refer it as a catchment region or perhaps river basin. Watershed development next, refers to the conservation regeneration as well as the judicious use of all of the resources as land, plants, water, animals and man in the watershed region. Watershed management tries to bring about the very best in the planet between natural resources on one side and animals and man on the other. Watershed management is actually the integration of technologies within the natural boundary of the drainage region for maximum development of land, water, livestock and grow resources to satisfy the fundamental minimum requirements of the individuals in the watershed in a sustainable fashion.



It's being argued that the advantages of watershed programmes could be grouped into 2 viz., environmental associated and society connected. Environmental associated benefits has enhanced efficiency of the land, enhanced quality of the water, enhanced water table, protecting crazy living habitat as well as natural resources, controlling floods as well as sedimentation issues at downstream. Community associated advantages encompass direct involvement of community members in watershed tasks, providing opportunities to master the website link between natural resource management with development and enhancing community participation in guarding as well as restoring natural resources

The idea of watershed was created in India while in the third 5 Year Plan (1961-66) for soil as well as water conservation planning in the catchment region. It led to codification & delineation of watersheds of the nation. This particular process was entrusted to the Soil as well as Land Use Survey of India (SLUSI) by the Department of Cooperation and Agriculture, Ministry of Agriculture, Government of India. The delineation as well as codification of watersheds had been carried out at first for significant irrigation projects up to sub watershed amount with regard to the catchment region of the suggested dam website wherein the dimensions of the sub watershed ranged from 2000 5000 hectare. Subsequently, the delineation as well as codification has been expanded to the micro watershed fitness level.

In an attempt to systematically approach the Natural Resource Management in India, the Ministry of Agriculture, Government of India has created watershed atlas of India. The river basins of the nation are well structured on geographical foundation and according to that, 6 water resource regions are delineated. The All India Soil Survey and Land Use division have classified the nation in to basins, catchments, sub-Watersheds and catchments. The entire India has been grouped around to thirty five river basins, 112 catchments, and 500 sub catchments. As per the water resources atlas of India, a watershed covered a location of thousand to 5000 Sq.kms. Based on this the atlas delineated approximately 3237 watersheds of the nation covering a location of 3253.08 lakh Hectares.

Small watersheds are generally least heterogeneous as well as big watersheds are very heterogeneous. Put simply, spatial variability of watershed qualities increases with size.

As the watershed size increases, averaging as well as storage increases of hydrologic tasks increases as being a result. The outcome of averaging is usually to linearise the watershed behavior. On the average, small watersheds are definitely more nonlinear compared to big watersheds.

Watersheds can also be classified into several groups based on location that the watershed contains:

**Table 1: Classification of watershed**

Size (ha)	Classification
50,000-2,00,000	Watershed
10,000-50,000	Sub-watershed
1,000-10,000	Mili-watershed
100-1,000	Micro-watershed
10-100	Mini-watershed



## **2.1 Effects of watershed on the community**

Watershed management essentially entails harmonizing the usage of soil as well as water resources between downstream and upstream regions inside a watershed to the goals of natural resource conservation, improved agricultural efficiency and a much better standard of living for the inhabitants of its. Addressing as well as identifying the substantial externalities connected with watershed is vital for these goals to be accomplished in a sustainable fashion. A watershed boasts a wide ranging impact on the lives of the individuals in particular. Soils, water, vegetation are actually probably the most essential natural resources and watershed impacts every one of them. The sustained efficiency of food, fuel, fodder, fibre, timber and fruit may be guaranteed by effective and judicious management of soil, vegetation and water.

The soil erosion as well as sedimentation are important for watershed society.

- Accelerated erosion leads to loss of land as an all natural resource.
- It negatively impacts the efficiency as well as production on agricultural, forest lands as well as grasslands.
- Leads to higher production as well as transportation of sediments and silt to the reservoirs which lead to the decrease of advantages and living of the reservoir.
- Leads to siltation of streams plus rivers which result in floods.
- Leads to transforming economic assets into worthless land by development of ravines and gullies. Water quality, amount as well as routine are affected by watershed factors. Runoff
- leads to loss of water from watershed which may have been used by the community for drinking, industry, irrigation, domestic use, mining etc.
- leads to sheet, rill, ravenous erosion or perhaps gully of soil from watershed.
- leads to drop in groundwater table and also affects recharge adversely and results in damage to lifestyle and property.

Vegetation is an extremely essential element which impacts climatic, runoff, and erosion factors of the place. It offers food, fodder, fruit, energy, forage, small timber to the town. The type, quality and quantity of vegetative cover in watershed influences runoff, erosion as well as sediment generation, infiltration etc. For thick vegetation, intercepted moisture is actually considerable. Second, it shields as well as shades the soil, therefore lowers soil erosion and runoff. People's participation in watershed management programmes is actually a crucial program of government of India for creating watershed programmes profitable. Participation of regional beneficiary producers is actually necessary for planning, maintenance and implementation of watershed development projects as per everyday guidelines given by Ministry of Agriculture, Government of India.

## **3. NEED OF WATERSHED PLANNING IN INDIA**

Unplanned plundering, thoughtless pillage, ravenous devastation and ruinous selfish exploitation of natural resources degrade the lands, dwindled the availability of water resources and erased the greenery.



The gloomy predicament, coupled with the drought conditions enumerated earlier, have their interactive, negative influence on the environment. People on the one hand and governments on the other have only lip-reverence for preserving nature and the environment. Immediate hastening of efforts is required for preserving the meager dense greens, maintaining good lands, improving bad conditions, and restoring green foliage through scientific, integrated management. Watershed management concept, implemented on a war footing, will help the country in not only reversing the trends but also reviving the good environment through modern, but simple, technically appropriate, economical and feasible measures.

Watershed Planning is an aggregation of interrelated development proposals based on critical analysis and constant revision of targets in the light of a better understanding of these facts or of a substantial modification thereof and is essentially a question of hard thinking and unremitting intellectual vigilance. Planning for resource development and conservation aims at providing more economic benefit through efficient utilization of resources.

### **3.1 Significance of Watershed Planning**

The watershed boundaries are proper boundaries inside which powerful resource management as well as development may be planned scientifically. The substantial factors are:-

1. The watershed is a purposeful region started by actual physical relationships.
2. The watershed approach is actually rational for evaluating the biophysical linkages of upland and downstream tasks, as, within the watershed they're connected from the hydrologic cycle.
3. The watershed approach is actually holistic, which makes it possible for the Planners as well as supervisors to think about numerous facets of resource development.
4. Land use pursuits as well as upland disturbances frequently lead to a chain of environmental impacts that could be conveniently examined in the watershed context.
5. The watershed approach possesses a good economic logic. Most of the externals interested in alternate land management methods on a private farm are internalized once the watershed is handled as being a device.
6. The watershed offers a framework for analyzing the consequences of human interaction with the ecosystem. The environmental impacts in the watershed work as a feedback loop for changes in the social system.
7. The watershed approach may be incorporated with or perhaps be a part of a bigger programme such as forestry, soil conservation, rural and farming systems and community development.

## **4. WATERSHED MANAGEMENT APPROACH**

The watershed management is frequently being recognized as the perfect method for integrated natural resources management within rain fed places. Watershed management in arid lands is actually confronted with the complexities of developing as well as preserving food & fiber resources under extreme as well as adjustable climates. As sizzling hot arid zone of India is currently under huge man strain, the environmental interrelationships involving individuals, plants, animals as well as water have crucial implications for the job of watershed management of the formulation of policies which would lead to



sustained efficiency and development for the improvement of human welfare. Effect analysis of dry land technologies is actually crucial to find out a general effect of soil as well as water conservation methods used in the specific watershed. It can also help in appropriateness of the strategy used in carrying out the task activities as well as in order to estimate the medium as well as long-run social as well as economic advantages of the activities, effect and efficiencies of the task in the context of its stated goals. Watershed development projects are actually intended to harmonize the usage of pasture resources, forest, soil, and water of a means that conserves these resources while raising agricultural efficiency both by preserving moisture in the soil and raising irrigation via tank as well as aquifer based water harvesting. Watershed development projects have grown to be prevalent in rain fed parts recently. Rain fed agriculture in India is actually recognized by low productivity, degraded natural resources and poverty that is prevalent. The majority of the individuals living in rural areas rely on agriculture. Many folks eke the living of theirs on the natural resources & rain fed agriculture. It's however, been realized this just by way of a holistic development such as the watershed development programme, economic conditions of individuals that are such could be made better. Watershed management is actually the procedure of formulating as well as carrying out a course of action which seeks harness the possibility of natural, human and agricultural resources of the place. It is designed at providing resources which are desired by and appropriate to the community. Properly formulated watershed task based on a study of climate, soil, water& grow resources on a single hand and also the man, animal resources on the additional hand, provides ample scope for evolving sustained livelihood support system in these hinterlands.

Realizing the essential role as well as value of rain fed farming in Indian economy as well as restoration of socio-economic and ecological balance, the Government of India has resolved to place an end for the neglect of vast rain fed and dry land areas and has implemented the watershed approach for integrated and complete development of rain fed places. The approach is designed at scientific land use via development of integrated rain fed farming methods on the concepts of 'WATERSHED' management for each development block where there's much more than seventy per cent arable location below rain fed state.

Watershed basically is a land surface region emptying into the same outlet. The scale of the watershed might differ from a number of hectares to thousands of hectares based on the dimensions of the river or maybe stream passing through it and the location of the outlet. For providing conditions for maximum utilization of animal resources, plant, water, or land for saving the planet, it's essential to cure the land from the best to ridge or bottom to valley. Watershed management aims at reducing risks related with rain fed farming by the subsequent steps.

- i. Conserving soil and water resources through physical and/or cultural techniques
- ii. Emptying out extra water at a secure velocity end directing it for secure storage space for the utilization of its in season that is dried up
- iii. Stopping gully formation through vegetative and mechanical means & storage of water for recharging ground water





- iv. Utilizing land based on the capability of its & placing marginal land unsuitable much arable crop output to alternative land use
- v. Having a sustainable eco-system of harmony with the man land water-plant-animal complex of the watershed
- vi. Optimizing agricultural productivity every unit area, accessible water and time, and
- vii. To improve the quality of, life of the watershed dwellers via infrastructure development.

#### **4.1 Principles of watershed management**

Development of monitoring and farming of setting on watershed foundation continues to be a national strategy for and logical utilization of natural resources. Therefore, the degeneration of natural resources in an area could be contained. The entire resource is correctly created solely by following the watershed approach. In terms of resource evaluation, it discusses management and development of resources as soil, water, vegetation and all connected elements. It basically associated with natural resources conservation in the watershed including proper land use, protection of land against all types of degradation, maintaining soil fertility, water conservation, good management of ground and surface water, flood safety, sediment reduction, improving efficiency from all land uses, etc.. Effect of different watershed programmes could be considerably increased by developing new approaches and enabling policies different paradigm according to learnings more than previous thirty years for people centric alternative watershed management concerning convergence, collective action, consortium approach, capacity development to deal with economic, environment, efficiency, and equity concerns is urgently needed. Nevertheless, this could be utilized as entry point activity for enhancing livelihood for rural community.

#### **5. CONCLUSION**

Watershed is described as the drainage basin or perhaps catchment region of a specific stream or perhaps river. It's a handy device to figure out input output relationship of precipitation as well as the partitioning of its into different elements of water resources in a hydrological cycle. Additionally, it is similar to a drainage basin or maybe catchment as it drains water out of small streams to the same stream and in the task recharging the groundwater and irrigating the plantation which falls in this watershed. Watershed management is a detailed interrelated approach to natural and watershed resources management. It implies, the judicious use of all of the resources i.e. land, water, vegetation in a location for offering a solution to relieve drought, average floods, prevent soil erosion, boost water availability as well as improve food, fodder, gas on continual foundation. The development of watershed location with all socio-economic and natural facets for better planning, monitoring and delivery of the study area is actually justified.



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