



Watershed Development-Present Status and Fisheries Perspectives in Indian Context

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Abstract

India encompasses a rich aquatic biodiversity, hosting vast arrays of freshwater, brackish water, and marine ecosystems. These unique landscapes harbor abundant fisheries resources, constituting primary protein sources and income channels for millions. Fisheries are an essential source of food security, livelihoods, employment generation, recreation, trade, and foreign exchange earnings worldwide. However, over exploitation, pollution, habitat destruction, climate change, invasive species, and other anthropogenic activities threaten fisheries resources' sustainability. Therefore, integrated approaches like watershed management can help restore and maintain aquatic ecosystem health, ensuring sustainable fish production while enhancing social welfare. This article explores the significance of watershed development in conserving fisheries resources and promoting their long-term viability. Watershed development plays a pivotal role in nurturing sustainable aquatic ecosystems and enhancing fisheries production in India. Amid intensified exploitative pressures coupled with changing climatic scenarios, watershed development emerges as an integral intervention toward sustainable fisheries conservation and management. Despite considerable progress made, certain constraints persist, necessitating targeted strategies for optimal outcomes. This article evaluates the current scenario, future possibilities, and viewpoints concerning watershed development vis-a-vis fisheries in India.

Keywords: Watershed Development; Fisheries; India; Status; Prospects; Perspective

Abbreviations

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Present Status

The Government of India initiated major watershed development schemes, including Pradhan Mantri Fasal Bima Yojana, Mahatma Gandhi National Rural Employment Guarantee Scheme, and National Mission for Sustaining

the Himalayan Ecosystem. Such undertakings prioritize participatory water management, soil conservation, and bioresource enhancement, complementing fisheries objectives. Encouragingly, many state governments launched dedicated policies advocating fisheries integration within watershed frameworks. Notably, the Ministry of Jal Shakti acknowledges fisheries as a key component of integrated watershed programmes, underscoring shared responsibilities among relevant line departments.

Simultaneously, encouraging developments unfold in selected Indian states where exemplary synergies emerge from merging fisheries within watershed development architectures. Specifically, Kerala, Odisha, and West Bengal stand out as frontrunners demonstrating close cooperation among their respective Departments of Fisheries, Animal Husbandry, and Water Resources (MoAFW&FD, 2020). As a result of this fruitful collaboration, these states achieve elevated productivity metrics surpassing average national benchmarks, indicating impressive gains realized through convergent approaches.

However, discrepancies exist in actual practice, often manifesting as insufficient financial allocations, fragmented institutional arrangements, technical know-how gaps, and inequitable benefit distribution. Addressing these shortcomings demands rigorous monitoring, evaluation, and iterative learning processes.

Understanding Watershed Development

A watershed refers to land areas draining into a common water body, typically rivers, lakes, or reservoirs. The concept of watershed development involves managing natural resources within these catchments holistically, integrating soil and water conservation measures, afforestation, agroforestry, biodiversity enhancement, and rural infrastructure development. By adopting this approach, communities work together to improve agricultural productivity, reduce runoff and sedimentation, recharge groundwater tables, protect soils against erosion, promote eco-tourism, and ensure overall ecological balance. In essence, watershed development aims to strike a delicate equilibrium between human needs and environmental preservation.

Relevance of Watershed Development to Fisheries Conservation

Habitat Restoration: According to a study published in the *Journal of Environmental Management*, implementing watershed restoration projects resulted in significant improvements in physical habitat characteristics and consequently enhanced fish abundance and diversity [1]. Similarly, another study conducted in India revealed that constructing check dams under watershed programs positively influenced fish population dynamics and provided additional income sources for local communities [2].

Water Quality Improvement: Research suggests that up to 76% of total suspended solids and approximately 90% of phosphorus loads enter aquatic systems due to nonpoint source pollution, primarily originating from agricultural lands. Implementing effective watershed management practices, including riparian buffers, terraces, grassed waterways, and controlled drainage systems, could

potentially decrease nutrient export rates by more than half [3].

Groundwater Recharge: Global groundwater storage declined by about 18% between 2000 and 2019, equivalent to losing nearly two Amazon Rainforests worth of water volume [4]. Artificial recharge methods used in watershed development, such as rooftop rainwater harvesting, farm ponds, and recharge shafts, showed promising results in increasing groundwater levels, reducing pumping costs, and supporting baseflow requirements for downstream ecosystems [5,6].

Climate Change Mitigation: Agriculture accounts for around 10-12% of global greenhouse gas emissions, making it crucial to incorporate adaptation and mitigation strategies in watershed development programs [7]. Afforestation, reforestation, and agroforestry practices implemented across several Indian watersheds demonstrated remarkable capacity in sequestering carbon dioxide, nitrous oxide, and methane, thus contributing to net zero emissions goals [8].

Epilogue

Integrated watershed development holds immense potential in fostering sustainable fisheries conservation efforts. By restoring vital habitats, improving water quality, enhancing groundwater availability, and building adaptive capacities, watershed management offers practical solutions to address multifaceted challenges confronting today's complex socio-ecological systems [9]. As we strive towards achieving responsible governance and equitable resource utilization, embracing comprehensive watershed development approaches becomes indispensable in safeguarding our planet's precious aquatic resources for future generations [10].

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