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Watershed Development Programme: Panacea for Bundelkhand

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Watershed Development Programmes are a comprehensive approach to sustainable land and water resource management. These programmes aim to address issues related to water scarcity, soil erosion, and degradation, thereby promoting ecological balance and improving the livelihoods of communities dependent on these resources. ## The Urgency of an Integrated Management Watershed Program In today's rapidly changing world, the significance of accurate weather forecasts cannot be overstated. As such, it is now urgent to promote the elaboration of an integrated management watershed program that encompasses action plans for each sub watershed This program should have the objective of ensuring the quality of water and defining and regulating its uses for future sustainability.

The Role of Groundwater Resources

Groundwater resources play a crucial role in addressing water scarcity and ensuring water availability in times of drought. The availability and exploitation of water resources have become major challenges for many countries in recent decades In response to this emergency and the need for adaptation, groundwater resources with low vulnerability to drought have emerged as the best alternative. Assessment and integrated management of water resources form an integral part of the National Development Plan, with hydrologic and hydrogeologic watershed management being key components of this plan.

The Evolution of Watershed Development Programmes in India

The evolution of Watershed Development Programmes in India has been marked by a shift in focus and approach over the years. In the first-generation programme, the emphasis was on soil conservation and management. The second-generation programme prioritized water conservation, and in the third generation, a participatory approach for management and development of watershed activities became the focus (Gupta et al., 2019). ## The Need for an Integrated Approach The need for an integrated approach to watershed development and management is evident. Integrated Watershed Management Program is a prime example of this approach, as it combines various individual programs into a single, comprehensive initiative. This integration ensures better coordination and effectiveness in achieving the goals of watershed conservation and sustainable development. The Integrated Watershed Management Program in India has played a crucial role in the conservation of natural resources, with a specific focus on water. One of the key components of this program is the implementation of Managed Aquifer Recharge techniques, which have proven effective in augmenting groundwater recharge and building resilience to drought.

However, it is important to note that the implementation of watershed development programs has not been without challenges. One of the major limitations of these programs is the lack of understanding of aquifers and groundwater dynamics. Without an understanding of the aquifers, where groundwater resides, these interventions have severe limitations. The watershed development programs were implemented in a 'one-size-fits-all' manner without considering the hydrogeological conditions that often govern the location, nature, and impacts of a watershed management program on groundwater resources. This lack of understanding has been highlighted in periodic assessments conducted by the Central Ground Water Board over the years. To address these challenges and ensure the effectiveness of watershed development programs, a comprehensive understanding of aquifers is crucial. It is necessary to have a thorough understanding of aquifers, their characteristics, and their interaction with surface water in order to implement watershed development programs effectively.

This understanding will enable better site selection for interventions such as groundwater recharge structures, ensuring that they are implemented in areas where they will

have the greatest impact on groundwater recharge and overall watershed management. Integration of various programs into the Integrated Watershed Management Program has been a significant step towards effective watershed conservation and sustainable development in India.

Key Components of Watershed Development

It involves the conservation and management of soil, water, vegetation, and other natural resources in a holistic manner. The aim of watershed development programs is to take the watershed as the hydrological unit and implement suitable methods for soil and water protection, ensure sufficient water for agriculture and household use, and improve the overall livelihoods of the inhabitants. Watershed development programs typically involve multiple components and activities. These may include:

1. Identification and demarcation of the watershed area: This involves determining the boundaries of the watershed and understanding its hydrological characteristics.
2. Mapping and assessment of natural resources: This step involves understanding the various natural resources within the watershed, such as soil types, vegetation cover, and water availability patterns.
3. Implementation of soil and water conservation measures: This includes activities such as contour bunding, vegetative barriers, and check dams to prevent soil erosion, retain soil moisture, and recharge groundwater.
4. Implementation of water harvesting structures: This involves the construction of various structures such as ponds, tanks, and percolation pits to capture rainwater and recharge groundwater.
5. Promotion of sustainable agriculture practices: Watershed development programs often promote the adoption of sustainable farming methods, such as organic farming, agroforestry, and integrated pest management, to improve soil health, crop productivity, and overall farm sustainability.
6. Promotion of livelihood diversification activities: In order to enhance the overall livelihoods of the inhabitants, watershed development programs may focus on promoting income-generating activities such as skill development, entrepreneurship, and the

establishment of micro-enterprises. 7. Monitoring and evaluation: Regular monitoring and evaluation of the implemented activities is essential to assess their effectiveness and make any necessary adjustments.



Constructed Check Dam. Babina block of Jhansi district



Main Channel from Betwa river

Future Prospects of Watershed Development Programmes

Recent studies have shown that watershed development programs have the potential to be a panacea for various environmental and socio-economic challenges. These programs have been successful in addressing issues such as soil degradation, water scarcity, and rural poverty in many regions. For example, a review of 311 case studies of watershed programs in India conducted by the International Crops Research Institute for the Semi-Arid Tropics found that these programs resulted in a significant increase in crop yields, groundwater recharge, and overall livelihood improvements for the communities involved. The success of watershed development programs can be attributed to several key factors.

Firstly, the holistic approach of these programs, which take into account the entire watershed as a hydrological unit, allows for comprehensive planning and implementation of activities that address the various interconnected issues within the watershed. These programs focus not only on soil and water conservation but also on promoting sustainable agricultural practices, biodiversity conservation, and livelihood diversification activities. Secondly, community participation and ownership play a crucial role in the success of watershed development programs. By involving local farmers and community members from the beginning, these programs ensure that the implemented activities are relevant, feasible, and sustainable. Additionally, the participatory approach fosters a sense of ownership and commitment among the community, leading to better implementation and maintenance of the activities. Furthermore, watershed development programs also leverage the knowledge and expertise of various stakeholders, including government agencies, NGOs, and research institutions. This collaborative approach allows for a multidisciplinary understanding of the challenges and opportunities within the watershed, leading to more effective and tailored interventions.