Community-led Water Management

Water lies at the heart of India's journey towards sustainable and inclusive green growth. As pressures from climate change, rising demand, and ageing infrastructure intensify, conventional top-down approaches to water management are proving insufficient. Community-led water governance, rooted in local institutions such as Panchayati Raj Institutions and Water Users Associations, offers a more resilient and equitable alternative. By integrating traditional knowledge with modern practices, and linking water with energy, livelihoods, and ecosystem sustainability, such approaches can enhance efficiency, reduce resource stress, and ensure long-term water security. Strengthening these local systems is essential for building a climate-resilient and resource-efficient future.

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Green growth is about developing the economy while carefully managing natural resources, with water playing a vital role at the local level. Strong local institutions such as Panchayati Raj Institutions (PRIs), along with active community participation, make water management more efficient, equitable, and resilient. By linking water with climate action, energy use, and inclusive governance, long-term sustainability and reliable resource security can be ensured.

Green growth refers to promoting economic development while ensuring that natural resources continue to provide the materials and environmental services essential for human well-being. Key natural

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resources, such as water, are best managed at the grassroots level. A village-level community comprising all stakeholders including government authorities, primary beneficiaries, and those with competing demands forms an ideal unit for effective water management.

In India, there are approximately six lakh inhabited villages, accommodating around 95 to 100 crore people. With the empowerment of Panchayati Raj Institutions through the 73rd Amendment of the Constitution, villages have become effective administrative units. As a result, the voices of villagers have had a positive impact on governance. Furthermore, subjects such as minor irrigation, water management, watershed development, and drinking water are included in the Eleventh Schedule of the Constitution, which outlines the responsibilities of PRIs.

Essential Elements of Green Growth

According to the Organisation for Economic Co-operation and Development (OECD), an international forum of 38 member countries committed to democracy and market economies in which India is a key partner a green growth strategy focuses on aligning economic and environmental policies so that they reinforce each other. It recognises the full value of natural resources as essential to production and growth. It also emphasises cost-effective methods to reduce environmental pressures, enabling a transition towards new growth patterns that avoid exceeding critical environmental limits at local, regional, and global levels.

This concept is also endorsed by the United Nations. The green growth pathway includes increased productivity through the optimal use of resources; innovative approaches to addressing environmental challenges; stimulation of demand for green technologies and practices; appropriate pricing of pollution; and the reduction of resource bottlenecks and imbalances in natural systems. It is also linked to the Nationally Determined Contribution (NDC 3.0). Integration of the water sector within NDC 3.0 focuses on sustainable resource management, resilient infrastructure, and low-carbon WASH (Water, Sanitation, and Hygiene) systems to address rising water scarcity and climate-related risks.

Support from Finance Commissions

The Thirteenth Finance Commission (2010-15) observed that international experience demonstrates that green growth promotes inclusivity. It further noted that environmental degradation reduces the quality of life for all citizens, with particularly severe impacts on poor and vulnerable groups, who are most affected by limited access to clean water, air, and sanitation.

It is, therefore, important to incentivise fiscal policies that promote energy conservation, renewable energy, soil conservation, afforestation, and improved access to clean water at all levels of government. Subsequent Finance Commissions have also extended strong support for water conservation and efforts to ensure water security in rural areas.

The Fifteenth Finance Commission (2021-26) earmarked 60 per cent of total grants allocated to Panchayati Raj Institutions for national priorities such as drinking water supply, rainwater harvesting, and sanitation. The Sixteenth Finance Commission (2026-31), recognising the importance of improving citizens' quality of life and reaffirming commitment to achieving Sustainable Development Goal 6 (Clean Water and Sanitation), has also recommended that 50 per cent of the basic component allocated to local bodies be directed towards 'Sanitation and Solid Waste Management' and/or 'Water Management'.

Water at the Centre

Water resource management plays a vital role in achieving green growth from multiple perspectives. It encompasses the use of water for agriculture, industry (including cooling), drinking, sanitation, energy generation, and recreation. It also requires attention to watershed services, not merely water supply and sanitation. Inadequate investment in infrastructure, regulation, monitoring, and information systems can restrict access to quality water services and hinder economic growth. When managed effectively, however, water resources can support growth while placing minimal strain on natural systems.

Ageing water infrastructure has emerged as a significant concern. For instance, there are 5,264 completed dams in the country, with an additional 437 under construction. Of these, 3,701 dams, approximately 73 per cent of completed dams, were constructed before 1990. Among the 65 dams of national importance, 31 are at least 45 years old. Analysis conducted by the Central Water Commission under the Ministry of Jal Shakti indicates that around 0.73 per cent of reservoir storage capacity is lost annually due to silt accumulation, resulting in a cumulative loss of nearly 30 per cent.

The impact of siltation is not limited to large reservoirs; ponds and tanks also suffer capacity loss due to the accumulation of clay and silt. This issue can be effectively addressed through proper watershed management in reservoir catchment areas, along with regular desilting of ponds and tanks, activities in which rural communities can play a significant role.

A major cause of reservoir sedimentation is uncontrolled soil erosion in catchment areas. Micro-level watershed interventions offer an ideal solution and can be more effectively planned, implemented, and maintained by local communities. Measures such as afforestation and reforestation of catchment areas, planting vegetative barriers, contour bunding of farmlands, construction of temporary structures like gully plugs across drainage lines, and the selection of crops that minimise soil erosion can significantly reduce runoff and sediment inflow.

Regular rejuvenation of ponds and tanks through the removal of deposited silt and clay is another effective strategy for sustaining water storage in rural areas. The excavated material, being rich in nutrients, can be used as manure for agricultural fields. This approach has been successfully implemented under the *Mission Amrit Sarovar*, where approximately 70,000 ponds have been rejuvenated, and it holds strong potential for further scaling. According to the Water Body Census conducted by the Ministry of Jal Shakti, India has around 14.43 lakh ponds.

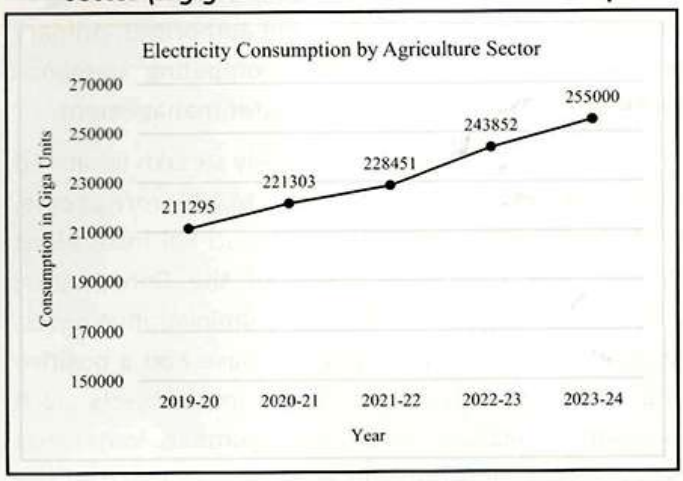
Water-Energy Nexus

Subsidised electricity has played a crucial role in increasing groundwater abstraction. However, reducing these subsidies presents challenges, particularly in the context of food security. Data from the Central Ground Water Board indicates that 14.18 per cent of groundwater assessment units fall into either the 'over-exploited' category (where extraction exceeds annual recharge) or the 'critical' category (where extraction is between 90 and 100 per cent of recharge).

Electricity consumption in the agricultural sector is also rising steadily. Between 2019-20 and 2023-24, consumption increased by 20.68 per cent.

Community involvement can help curb this trend by promoting more sustainable practices, including the judicious use of groundwater and the solarisation of irrigation pumps. Savings from reduced power

Figure 1: Electricity consumption by the agricultural sector (1 gigaunit-hour = 10^6 kilowatt-hours)



source: Energy Statistics India 2025, Ministry of Statistics and Programme Implementation

subsidies without imposing additional financial burdens on farmers can be redirected towards more productive uses.

Schemes such as PM-KUSUM support the solarisation of pumps for individual farmers, as well as the establishment of solar plants of up to 2 MW capacity by Farmer Producer Organisations (FPOs) and Water Users Associations (WUAs). Farmers can also monetise surplus solar power by selling it to distribution companies (DISCOMs), thereby creating an additional source of income.

Minor Irrigation Schemes

Schemes catering to irrigation requirements for areas up to 2,000 hectares are classified as Minor Irrigation (MI) Schemes. According to the Sixth Minor Irrigation Census (reference year 2017-18; data from the Seventh Census for the entire country is yet to be released), there are 23.14 million MI schemes across India, with an irrigation potential of 75.64 million hectares nearly half of the country's total irrigation potential.

Notably and somewhat alarmingly 94.7 per cent of these schemes (21.93 million out of 23.14 million) are groundwater-based. There has also been a significant increase in the number of deep and medium tubewells. Given their relatively small scale, MI schemes are particularly well-suited for community-based management. There is considerable scope for improving irrigation efficiency by reducing conveyance losses and adopting more efficient irrigation methods.

Water Users Associations (WUAs) can be established for every 40 to 50 hectares, supported by an advisory committee at the project level comprising representatives from WUAs, government officials, and elected representatives. Such an institutional framework can promote harmony in water conservation by fostering a sense of ownership and enabling democratic decision-making. The water and energy conserved through these measures are valuable assets in building a greener future.

Managing Conflicting Demands

Water resources are shared among multiple stakeholders with often competing demands. For instance, a reservoir may serve rural farmers, supply raw water for urban drinking needs, and support industrial use. The release of water for irrigation during summer may benefit farmers but raise concerns among urban populations dependent on drinking water supply.

During drought years, both agricultural and domestic users may oppose allocations for industrial purposes, even though industries provide livelihoods for a significant number of workers. Curtailing industrial water supply, in turn, can disrupt local economic stability. In such situations, community-level management can play a crucial role in building consensus, as opposed to relying solely on top-down administrative decisions.

Another important aspect that community-driven approaches can better address is the protection of riparian rights of downstream communities and the maintenance of environmental flows in rivers both of which are essential for sustainable and green growth. There have been instances where upstream dam construction has led to the near-complete drying of rivers downstream, causing irreversible damage to biodiversity.

Sustainable Operation and Maintenance

A major challenge faced by almost all water infrastructure systems is deferred maintenance. Achieving self-sufficiency in operation and maintenance (O&M) can significantly improve the performance and extend the useful life of such systems. However, inadequate maintenance funding often results in frequent breakdowns and, in some cases, the eventual abandonment of schemes.

Introducing a system of reasonable and affordable user charges sufficient to meet O&M expenses—can be effectively implemented through the collective responsibility of beneficiary communities. Such community-led arrangements may also be supported by government grants. Several states have already introduced enabling legislation in this regard. For example, the Kerala Irrigation and Water Conservation Act, 2003 authorises Water Users Associations (WUAs) to levy and collect fees, and entrusts them with the responsibility of maintaining and managing designated parts of the water distribution system.

Traditional knowledge possessed by local communities can also play a valuable role in managing infrastructure and carrying out maintenance in a cost-effective manner. Their involvement can help reduce overhead expenses, such as the cost of land for storing construction materials, creating access routes to infrastructure, and hiring external labour.

Way Forward

Going forward, community-led water management needs to be institutionalised and streamlined through sustained capacity building. Training and awareness programmes on the planning, implementation, and management of water infrastructure and government schemes should be provided to community members to ensure that their participation is both productive and meaningful.

Women, as primary users, managers, and stewards of water at the household level, should be adequately represented in leadership roles within water user communities. Ensuring their participation in decision-making processes is essential for inclusive and effective governance.

Furthermore, community collectives must be financially empowered to undertake regular operation and maintenance of water utility systems. This will enhance the performance and longevity of infrastructure, thereby improving regional water security and contributing to energy savings.

In addition, the efficient use of water in agriculture and industry will enhance productivity while ensuring optimal utilisation of resources. Such measures will align development activities with green growth principles by ensuring sustainable resource availability and equitable access for all. ❑