

Lessons from India: sustainable solutions in a water crisis

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Global water resources are becoming increasingly depleted, threatened by pollution, over-consumption, and climate change. Semi-arid regions are particularly vulnerable to climate variability, thereby requiring sustainable management strategies to ensure adequate mitigation and adaptation for water scarcity¹⁻³. For centuries, inhabitants in semiarid and arid regions developed specialized techniques to combat water scarcity, enabling them to survive in harsh climates. Ancient knowledge such as water harvesting was, however, forgotten during the era of colonialism. Rediscovering ancient techniques is a valuable means for sustaining water security in a time of global water crisis.

Water harvesting has a deep history in India as a means to cope with vulnerability to droughts and for securing water supply after the monsoon season. The benefits of ancient water harvesting methods can be exemplified through a case study of a semi-arid region in the Gangeshwar watershed in rural Rajasthan, India. Through high taxation, the British colonists effectively destroyed indigenous water management systems and deteriorated local governance, leaving many Indians poor and landless³. Generations later, remnants of British influence still exist in rural areas, as impoverished people lack bare necessities. The revival of water harvesting in India has been a slow process with improvements yet to be made. Along with initiatives from the national government, international donor foundations and NGOs have been reintroducing traditional methods.

The Gangeshwar Watershed contains a population of 974 over an area of 76 km². Groundwater is the major source of water supply, since high rates of evapotranspiration and low rates of precipitation (~150 mm/year) induce river flow only in the rainy season, leaving rivers and streams dry for a large portion of the year. Ultimately limited by storage, the construction of water harvesting structures increases the percolation of rainwater into the ground and prevents soil erosion by inundating the land surface and slowing down surface runoff. In 2004 and 2007, Wells for India (a UK-based charity), along with assistance from Sahyog Sansthan (a local NGO) have funded the installation of these ancient structures within the Gangeshwar Watershed, demonstrating evidence of the benefits: the greening of local arid landscapes, rising water tables, and the opportunity to grow three crops a year versus two.

The combination of ancient and modern influences, such as the expansion of the electric pump, however, represents a new threat to rural India. Together with the National Institute of Hydrology in India and Wells for India, researchers from the University of Oxford are carrying out the first geochemical studies in the Gangeshwar Watershed to verify whether rates of groundwater recharge are increased by the installation of water harvesting structures. Scientific monitoring is crucial to promote sustainable water use through education and awareness. Ensuring basic water needs will not only enable rural villagers to secure ample food and water supplies, but also sustain their livelihoods and alleviate them from poverty.

References

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