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India's Groundwater: A Valuable but Diminishing Resource

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Story Highlights

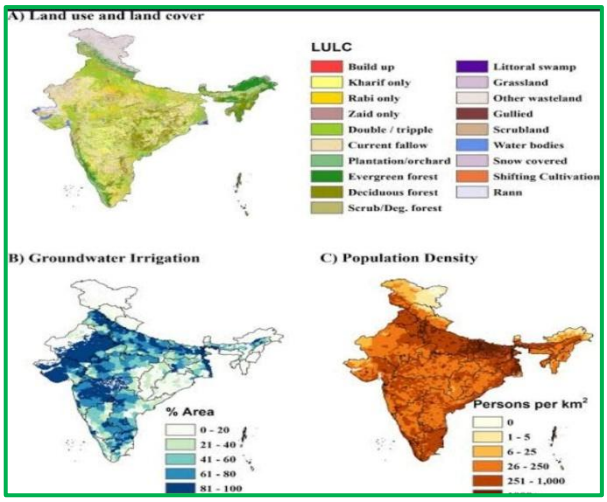
If current trends continue, in 20 years about 60% of all India's aquifers will be in a critical condition. India is the largest user of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year - over a quarter of the global total. More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater.Groundwater in India is a critical resource. However, an increasing number of aquifers are reaching unsustainable levels of exploitation. If current trends continue, in 20 years about 60% of all India's aquifers will be in a critical condition says a World Bank report, Deep Wells and Prudence. This will have serious implications for the sustainability of agriculture, long-term food security, livelihoods, and economic growth. It is estimated that over a quarter of the country's harvest will be at risk. There is an urgent need to change the status quo.

Key Issues

India is the largest user of groundwater in the world. It uses an estimated 230 cubic kilometers of groundwater per year - over a quarter of the global total. More than 60% of irrigated agriculture and 85% of drinking water supplies are dependent on groundwater. Urban residents increasingly rely on groundwater due to unreliable and inadequate municipal water supplies. Groundwater acts a critical buffer against the variability of monsoon rains. For example, a rainfall deficit in 1963-66 decreased India's food production by 20% but a similar drought in 1987-88 had very small impact on food production largely due to the widespread use of groundwater by that time. Farms irrigated with groundwater have twice the crop water productivity of those that rely on surface-water alone. This is largely because the resource allows farmers greater control over when to irrigate their fields and how much water to use each time. Despite the valuable nature of the resource, 29% of groundwater blocks are semi-critical, critical, or overexploited, and the situation is deteriorating rapidly (2004 nationwide assessment.) Moreover, aquifers are depleting in the most populated and economically productive areas. Climate change will further strain groundwater resources.

This will have serious implications for the sustainability of agriculture, long-term food security, livelihoods, and economic growth. It is estimated that over a quarter of the country's harvest will be at risk. A complex web of factors determines groundwater extraction: the size of landholdings, density of population, water-intensity of crops planted, water users' behavior, legislation and administration of groundwater, power subsidies for pumping irrigation water, and economic policies. India has both hard-rock and alluvial aquifers which differ considerably in their physical and socioeconomic profiles and require very different sets of solutions at both the macro and micro levels. As global experience offers few comparable models, home grown solutions are needed.

The World Bank report provides a menu of practical and non-controversial interventions which can be implemented in the current environment. Amongst its several suggestions, the report calls for community management of ground water wherein the user community is the primary custodian of the resource and is charged with implementing management measures.



The report showcases a model adopted in the drought-prone areas of the Indian state of Andhra Pradesh. The state has produced the first global example of large scale success in self-regulation of groundwater use. At the cost of US$2,200 per village per year, communities have shown the first large-scale example of self-regulation of groundwater. Farmers have doubled their income, while bringing their groundwater use close to sustainable levels. In many cases, farmers have voluntarily reduced their water use, while continuing to safeguard their crops.

An exceptional program of farmer education which has created `barefoot hydrogeologists' has made this change in water use possible. The approach is immediately replicable in other hard-rock areas (mostly in peninsular India) which account for two-third of groundwater settings in India. Other similar measures can be taken up immediately.