Groundwater Use and Governance in India – Explained, pointwise

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Introduction

India has nearly 18% of the world's population and occupies about 2.4% of the world's geographical area. India consumes 4% of total water resources. A World Bank report has noted that India is the largest groundwater user. As India's economy and population grow, the groundwater use is expected to rise further. It has further strained the groundwater resources in India. Groundwater is the backbone of India's agriculture and drinking water security in rural and urban areas. Groundwater is pivotal to India's water security. Experts argue that there are several gaps in the groundwater governance in India which hampers the efforts related to conservation. Groundwater governance reforms and promoting judicious use of groundwater can address the depleting groundwater levels in India.

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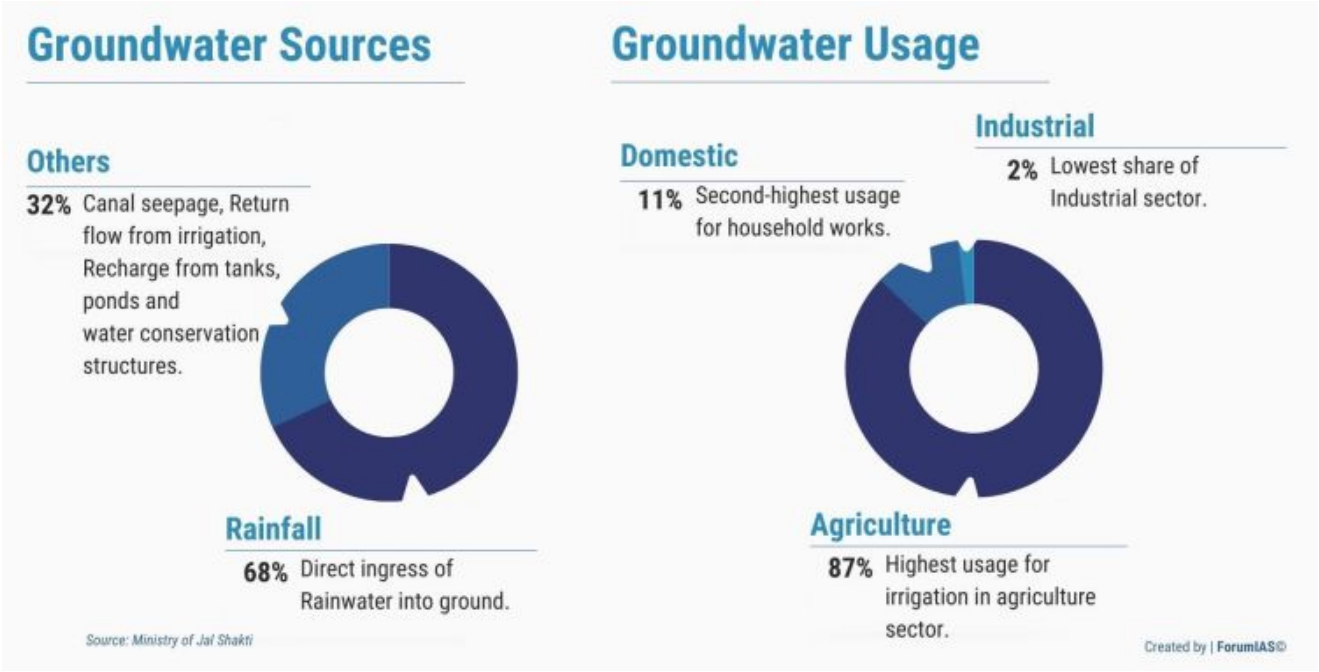
What is the current status of Groundwater Use in India?

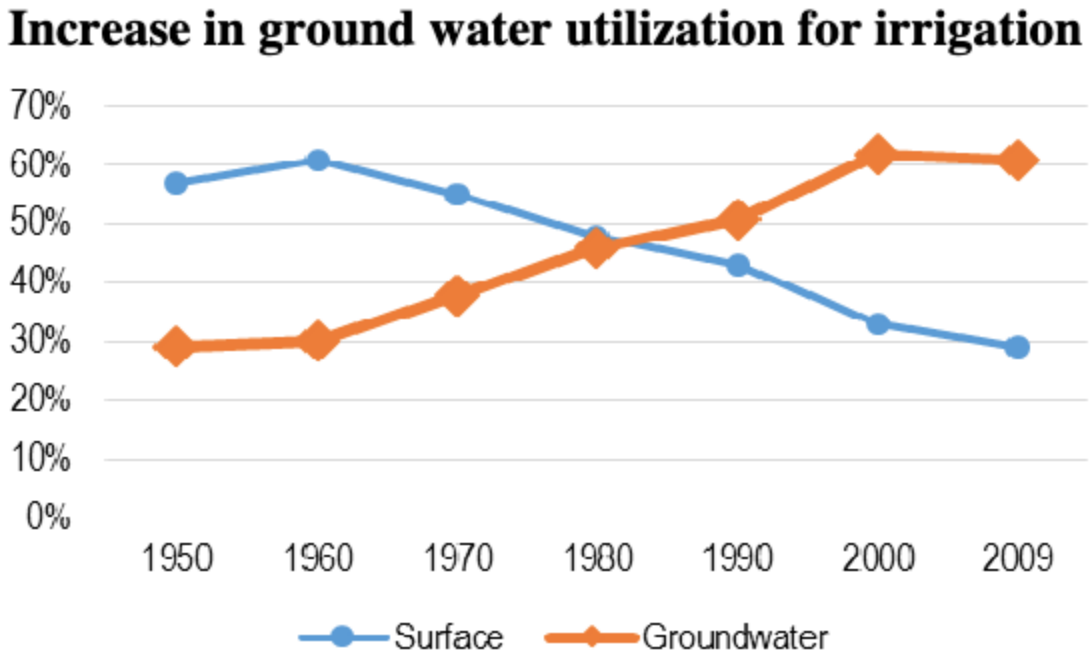
According to a Report by the **Ministry of *Jal Shakti*** (**Dynamic Ground Water Resource Assessment Report 2022**), the total annual groundwater recharge is 437.60 Billion Cubic Metres (BCM). The quantity of groundwater extracted stood at 239.16 BCM. The extraction has been the lowest since 2004, when the extraction was 231 BCM. The major user for groundwater is for irrigation (208.49 BCM), followed by domestic (27.05 BCM) and industrial use (3.64 BCM).



According to a **Report by the CAG** (2021), groundwater extraction in India increased from 58% to 63%, between 2004-17, exceeding the groundwater recharge rate.

The **Central Groundwater Board of India** estimates that about **17% of groundwater blocks are overexploited** (rate of extraction exceeds the rate of recharge of aquifer) while 5% and 14% blocks are at critical and semi-critical stages, respectively. The situation is particularly alarming in three major regions: North-western, Western, and Southern peninsular. According to the Groundwater Resource Assessment (2022), there has been a 3% reduction in the number of 'overexploited' groundwater units and a 4% increase in the number of 'safe' category units as compared to 2017. There was an improvement in groundwater conditions in 909 units.

According to **India water portal**, India uses 25% of all groundwater extracted globally, ahead of USA and China. ~70% of the water supply in Indian agriculture today is groundwater.



Sources: Agricultural Statistics at Glance 2014, Ministry of Agriculture; PRS.

Source: PRS

What are the challenges associated with Groundwater Use in India?

Rising Population: Rapid rise in population increases demand for water. Rise in urban population increases load of management of waste and polluted water. India is the largest user of groundwater accounting for ~25% of the total global withdrawal. Indian cities cater to about 48% of their water supply from groundwater. With rise in population, groundwater use is expected to rise further.

Unplanned urbanisation: Increase in the built-up and paved area eliminates infiltration of water into the ground. Absence of green cover reduces evapotranspiration. Increases in surface runoff causes urban flooding. Groundwater recharge is reduced. A study in theUnited States indicated that for every 1% increase in the impervious surface area, there is a 3.3% increase in the urban flood magnitude.

Transformation of the natural landscape, watershed and flow direction by urban sprawl often modifies the groundwater cycle and may result in a sharp decline or rise of groundwater levels, reduced well yields and deteriorating quality.

Agriculture Practices: Irrigation is increasingly shifting to tube-wells. Combined with faulty crop cycles due to farm subsidy and subsidy on electricity has resulted in over-use of groundwater, especially in the Northwest India. Regions with the most blocks with critical groundwater levels are in Punjab, Haryana, Delhi and western Uttar Pradesh.

Institutional, Management Framework Vacuum: **(a)** Various bodies are associated with regulation of groundwater resulting in **fragmented regulation** and **absence of an 'integrated and comprehensive' approach to regulation**; **(b)** There is **lack of legal provisions regulating extraction of groundwater** resulting in overexploitation. Groundwater rights are still determined by the archaic **Indian Easement Act, 1882**. These rights **tied to land ownership rights** exclude a large part of the society that has no land rights and gives landowners the **liberty to withdraw limitless water**. There is a large number of **unaccounted and unregulated private water wells**; **(c)** The various organisations that manage India's groundwater lack accountability and responsibility; **(d)** There is **lack of comprehensive data on groundwater** e.g., there is a lack of clarity on the **aquifer boundaries** (invisibility of groundwater). This makes it difficult to formulate clear guidelines for proper management of groundwater.

Major central level water institutions responsible for ground water management

Institution	Role
Central Water Commission	Initiating and coordinating schemes for the conservation and utilisation of water resources in the country in collaboration with state governments; and monitoring water quality
Central Ground Water Board	Developing and disseminating technology related to sustainable use of ground water; monitoring and implementing policies for the sustainable management of ground water resources; estimating ground water resources
Central Ground Water Authority	Constituted under Section 3(3) of the Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources; can resort to penal actions and issue necessary regulatory directives
Central Pollution Control Board	Implementation of the Water (Prevention and Control of Pollution) Act, 1974 which seeks to restore water quality

Sources: Ministry of Water Resources; Lok Sabha Question 2157, March 10, 2015; PRS.

Source: PRS

Groundwater Pollution: Infiltration and seepage from roads, industrial sites, waste dump sites, effluent drains with heavy metals and micro-pollutants are contaminating groundwater aquifers. Microbiological contamination occurs through the sewage system. Nitrate, arsenic, fluoride are some of the major elements responsible for groundwater pollution.

Climate Change: Climate shocks are exacerbating the groundwater crisis. Intermittent rainfall and prolonged droughts are reducing groundwater recharge resulting in falling water tables in many regions.

What steps have been taken to improve status of Groundwater Use in India?

Model Groundwater Bill: The Union Government has released Model Groundwater Bills in 1970, 1992, 1996, 2005, 2011 and 2016-17. Through the Bills, the Government has sought to foster a minimum level of control, among other things by recommending the **setting up of State groundwater authorities**. Various versions proposed **registration of existing groundwater structures** and a **permit-based system**, though actual restrictions would apply only to new wells, fitted with electrical pumps.

The Model Groundwater (Sustainable Management) Bill, 2017, addresses some of the major concerns in the existing regulatory framework and offers a holistic way forward. The major highlights include: **(a)** Strong environmental perspective in protection and prevention of damage to the aquifers; **(b)** Bottom-up institutional structure; **(c)** Drinking water as highest priority and the right to water, health, and environment; **(d)** Decentralization and subsidiarity principles; **(e)** Local bodies to form committees for groundwater management

Integration of Union Ministries: The Ministry of Jal Shakti was formed after the merger of the erstwhile Ministries of Water Resources, River Development and Ganga Rejuvenation along with Drinking Water and Sanitation. This has given impetus to the management of water resources with special focus on demand and supply management.

Initiatives: **(a)** ***Atal Bhujal Yojana*** (ABY) and the **National Project on Aquifer Management** (NAQUIM) have been launched with the goal of 'participatory groundwater management'. ABY looks to inculcate behavioural change made possible by incentivsation. NAQUIM envisages the mapping of sub-surface water bearing geological formations (aquifers) to help gather authentic data and enable informed decision-making; **(b)** ***Jal Jeevan*** **Mission**: It has been launched to provide safe drinking water to all rural households by 2024; **(c)** Through the **India-Groundwater Resource Estimation System** (IN-GRES) dynamic groundwater assessments will be done annually. A software, 'India-Groundwater Resource Estimation System (IN-GRES)', has also been developed; **(d)** Realising the importance of community participation, the ***Jal Shakti Abhiyan*** has been launched subsequently to transform *Jan Shakti* into *Jal Shakti* through asset creation, rainwater harvesting ('**Catch the Rain**' campaign) and extensive awareness campaign.

What steps can be taken to improve Groundwater Use and Governance in India?

First, **Mihir Shah Committee Recommendations** should be implemented: **(a)** The Central Water Commission (CWC) and the Central Ground Water Board (CGWB) should be **restructured and unified** to form a new **National Water Commission** (NWC). A unified body will help in the collective management of ground and surface water. The NWC will be responsible for water policy, data and governance in the country. It should be an adjunct office of the Ministry of Water Resources and **function with full autonomy**; **(b)** The NWC should have eight divisions: Irrigation Reform Division, River Rejuvenation Division, Aquifer Mapping and Participatory Ground Water Management Division, Water Security Division, Urban and Industrial Water Division, Water Quality Division, Water Data Management and Transparency Division, Knowledge Management and Capacity Building Division;
(c) Participatory Groundwater Management: Ground water needs to be recognised as a common pool resource and its continuous, unchecked extraction needs to be stopped. Corrective measures such as establishing required drilling depth, distance between wells, cropping pattern that does not require over-withdrawal of the resource should be adopted.

Second, For planning and management of groundwater, there is a need to focus on the **Integrated Water Resource Management** framework. It promotes the coordinated development and management of water, land and related resources.

Third, water-sensitive urban design and planning should be adopted. This can help maintain the water cycle by managing groundwater, surface water and rainwater for water demand and supply.

Fourth, there is need to adopt **Blue-Green Infrastructure** approach. Green (trees, parks, gardens, playgrounds and forests) and the blue (rivers, lakes, wetlands and water utilities) spaces can play a vital role in waterbody and aquifer rejuvenation.

Fifth, Public awareness and participation as well as trust-building between formal water sector institutions and communities will fill the void in groundwater management.

Sixth, Policies in the agriculture sector should be reviewed. The cropping pattern should be according to the local agro-ecology. Farm subsidies on electricity should be scrapped. These steps can help rationalize groundwater use in agriculture.

Conclusion

The situation of groundwater use in India has improved marginally as shown by the latest assessment. However, the pressure on groundwater resources is expected to rise further with rising population, urbanization and the uncertainties driven by Climate Change. Hence there is a need to adopt a more proactive approach to groundwater management in India. The governance framework related to water management in India must be reformed. Judicious and sustainable use of groundwater should be promoted through awareness campaigns and people participation (*Jan Bhagidari*).

Syllabus: GS I, Distribution of key natural resources across the world; GS III, Conservation.

Source: The Hindu, World Resources Institute, India Water Portal, Down to Earth, PRS