

Community-Driven Solutions for Sustainable Water Access: An Analysis of Jal Jeevan Mission in Rural India

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Abstract

The Jal Jeevan Mission, launched in 2019 under the National Rural Drinking Water Program, seeks to ensure tap water access to all rural households in India by 2024. Considering the crucial role of water in sustaining life and with a rapidly growing population, the program emphasizes sustainable water management through measures such as rainwater harvesting and conservation. By integrating modern technology and community participation, the initiative addresses challenges in maintaining a reliable water supply. Lessons from India's experience demonstrate the importance of cost-effective and sustainable water management, emphasizing community engagement and decentralized solutions.

Keywords: Jal Jeevan Mission; National Rural Drinking Water Program; Sustainable water management; Groundwater management.

INTRODUCTION

Water stands as one of the most fundamental requirements for sustaining life. The availability of drinkable water is critical for human growth (Gleick, 2014). India is home to 18% of the global human population and 15% of the global

livestock population (World Bank, 2022). With an increasing population and expanding economic activity, there is a surge in demand for water in a variety of sectors, including agriculture, industry, residential, recreation, infrastructure development, and so on, despite the fact that water resources are limited. As a result of limited supply and competing needs, drinking water management is a complicated subject (WWAP, 2019).

Water management methods and infrastructure before the independence of India were enough to serve a sparse population (Ghosh & Srinivasan, 2015). Local communities have a history of developing their own systems based on traditional knowledge and wisdom to meet the demands of the community under varying climatic conditions (Pandey *et al.*, 2011). Following independence, state governments established rural water supply programs to provide safe drinking water to the rural people. The Government of India launched

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the Accelerated Rural Water Supply Programme in 1972 as a part of the Minimum Needs Programme (GOI, 1972).

After the COVID-19 outbreak, people understood that "washing hands" was the best prevention, and it brought back the importance of safe and accessible water in our daily lives (WHO, 2023). Additionally, running tap water is crucial for personal hygiene and sanitation. The Prime Minister declared in August 2019 that the government intended to bring tap water to every family through the Jal Jeevan Mission, well before the pandemic. The initiative is to connect every rural family in the country to running water by 2024. It also makes source sustainability measures such as recharge and reuse through rainwater harvesting and water conservation (Kumar & Singh, 2017).

The initiation of the Jal Jeevan Mission took place on August 15, 2019. It is based on a community approach and intends to connect every rural family to the water system by 2024. The main difficulty is to secure the long-term viability of water supply systems (Biswas, 2012). The Jal Jeevan Mission has acknowledged this fundamental problem in water infrastructure projects and has emphasized that its goal is sustainability, so that water may continue to flow through pipelines and taps (GoI, 2019). This involves the use of modern technology in the planning and implementation of water delivery schemes, as well as the creation of new water sources (World Bank, 2022).

India consumes more than a quarter of all accessible groundwater globally, making it the largest user in the world. Groundwater has been critical in ensuring the country's food security. It is vital to include women in decision-making processes at all phases of planning, implementation, management, and so on (IWMI, 2022). Women across the country must actively participate in rural drinking water schemes in order to ensure long-term water security in villages (UNDP, 2022). In vision to this, Atal Bhujbal Yojana is one of those initiatives that exhibits community-led sustainable groundwater management at scale (GoI, 2020). The scheme's main goal is to improve groundwater resource management by combining multiple ongoing programs.

It's important to remember how the Indian experience has been beneficial in teaching the rest of the world how to redesign water management to make it more inexpensive and sustainable (Gleick, 2018). It is essential to conduct proper techno-economic appraisal and socio-economic analysis when planning and implementing water supply

schemes under the Jal Jeevan Mission. These initiatives put water in the hands of communities and are focused on decentralized recharge and reuse, making water everyone's business.

Strategies for Implementation of the Scheme

Under JJM, states and UTs are required to prepare a strategy for ensuring the availability of safe drinking water and to provide FHTC to every rural household because it may not be possible for the State Government or Department to manage the supply of water to every household, the Gram Panchayat and its subcommittee or local community play a crucial role in the planning, implementation, management, operation, and upkeep of the village's water supply. Besides, Panchayats have a protected order to oversee drinking water. In addition, the local community, Gram Panchayat, and its subcommittee such as VWSC, Paani Samiti, User Group must exist within the villages.

There is a felt need to have local area support, proprietorship and commitment in all choices relating to water supply frameworks. As a result, the strategy for achieving the goals of JJM will be a community-led partnership with states and UTs. Therefore, communities can make the most of this opportunity by ensuring that every rural household receives FHTC-provided water in sufficient quantities (minimum 55 lpcd) and on a regular basis as determined by the Gram Panchayat and/or its sub-committee, such as VWSC, Paani Samiti, User Group, etc. The state government and its departments are expected to effectively facilitate the process. The sector will be sustainable in the long run because of this strategy.

The proportion of piped water supplies with at least 40 lpcd, including connections for household taps and public stand posts, is around 46% of rural habitations, which provide services to approximately 54% of the rural population. Through a number of programmes, 81% of the nation's rural habitations had access to drinkable water as of April 1, 2019. According to the States, tap connections are present in 18% of rural houses. India has 20 agroecological zones with different levels of freshwater availability and yearly rainfall. Out of a total of 731 districts in 2017, 256 with 1,592 blocks were deemed to be water stressed. This calls for the use of water conservation measures, such as wise water management and supply planning techniques.

The following strategies are adopted to achieve the objective of JJM:

States and UTS should confirm and solidify the baseline data on home tap connections that was collected before March 2020, and the Department should submit this data on the Integrated Management Information System (IMIS) of the National Mission.

To guarantee the purity of the water and avoid overuse, FHTC can be planned to be provided to every household through three distribution locations (taps), namely the kitchen, bathroom, and toilet. Only one tap per family out of the three will get subsidies. The infrastructure for rural water delivery that has grown over time must be integrated, modernized, and updated in order to offer FHTCs. The completion of standpost based piped water delivery infrastructure and the retrofitting of current installations will take precedence. Low O&M usage, gravity and sun oriented power based water supply schemes should be explored and preferred in ancestral, sloping, and wooded areas. Investigation of springs in hills and mountains as a dependable supply of drinking water.

In both hot and cold deserts, novel strategies and the potential for technological intervention will be examined. In communities where groundwater is available in adequate quantities but of low quality, suitable in-situ treatment techniques might be researched. Three options for the most economical in-village water supply system will be provided to the Gram Panchayat and its subcommittee by the PHED/RWS Division after a thorough techno-financial and financial examination that includes local area using specialized apparatuses like PRA exercises, and so forth. Part-based sensors and iCloud are to be used to gather important data, such as the frequency of a sufficient supply of water in approved quality, in order to monitor administrative conveyance at the family level and take remedial action if necessary.

Concurrent monitoring would be an essential part of JJM. DDWS will create, operate, and oversee an IMIS with a real-time dashboard that records the financial and physical success of Gram Panchayat initiatives executed by VWSC, Paani Samiti, and User Groups. SWSM and DWSM. Building capacity for different stakeholders involved in program execution will continue at all levels. Reputable organizations with experience in the water sector will be consulted in order to successfully organize the community, and every effort will be made. It would be necessary for executing firms to complete in-town framework work in order to expedite the program's execution on such a large scale. To

this end, a unified e-offering component will be employed in order to locate the greatest offices and rates.

Steps taken to execute the scheme

SWSM will create many potential unit-type designs and cost estimates for all water supply scheme components, such as ESR, sumps, washing & bathing blocks, etc., based on population, profile, and soil conditions. Every facet of the program's execution in the village will be considered, including the participation of the Gramme Panchayat and/or its subcommittees, including the VWSC, Paani Samiti, User Group, etc.

For these items/components, SWSM will finalize item rate contracts and launch e-tenders to appoint multiple agencies under the Engineering Procurement and Construction (EPC) process. Possibly for two to three years. The maximum number of works to be awarded to the empanelled agencies will be determined by SWSM based on the State's annual target, the available funds, the number of projects where land acquisition is completed and turned over to the concerned party (i.e., land is readily available for infrastructure creation), and the agency's capacity to complete the works.

In order to ensure that one village has only one agency for all works, DWSM and PHED/RWS Department would choose the agency from the empanelled list for execution in conjunction with the Gram Panchayat and/or its subcommittee, such as VWSC/Paani Samiti/User Group, etc. After consulting with the Gramme Panchayat and/or its subcommittee, such as VWSC/Paani Samiti/User Group, etc., DWSM will award the job to the selected agency. As a result, DWSM, the Gramme Panchayat and/or its subcommittee, and the executing agency will enter into a tripartite contract.

Agency will begin the work after consulting with the Gram Panchayat and/or its subcommittee, such as the VWSC, Paani Samiti, User Group, etc. and DWSM. The executing agency will be given the support needed to handle any issues that may arise during the implementation and ensure that it is finished on schedule. A joint site inspection will be conducted by the following parties: the Gram Panchayat and/or its subcommittee, such as the VWSC/ Paani Samiti/User Group, etc.; the PHED/RWS Department; and a third-party inspection agency appointed by SWSM based on standards established by DDWS. In a separate "works register" made for this purpose in collaboration with the

Gram Panchayat and/or its sub-committee, such as VWSC, Paani Samiti, User Group, etc., the agreed upon discussion topics will be documented and signed. Accordingly, the PHED/RWS Department will enter the measurements in the Measurement Book (MB) and proceed with the payment procedure.

After the work is finished, the final bill will be paid in accordance with the aforementioned method, and the agency will be in charge of ensuring the water supply system runs smoothly throughout the defect liability term. The responsible agency will be accountable for the guarantee and/or warranty of the water supply scheme's equipment (machines, electrical items, etc.). However, the PHED/RWS Department is responsible for examining and verifying it.

LITERATURE REVIEW

A report from Government of India, Jal Jeevan Mission (JJM, 2023) emerges as a transformative initiative in addressing water scarcity and quality concerns in rural India. Its community centric approach prioritizes demand driven planning and source sustainability, laying the foundation for long-term viability. Also, the integration of technological advancements, such as Geographic Information System (GIS), real-time monitoring systems, and mobile applications, presents a promising avenue to enhance operational efficiency. These innovations not only streamline planning but also empower communities with real-time information, fostering a proactive approach to water resource management.

Singh *et al.*, (2019) stated that technological interventions, notably GIS, enable the creation of detailed water resource maps, facilitating informed decision-making in water infrastructure planning. Real-time monitoring systems contribute to adaptive management by providing up-to-date information on water usage and potential leaks. Mobile applications, if effectively leveraged, can bridge the communication gap between authorities and communities, disseminating information on water conservation practices and ensuring the efficient use of available water resources. Whereas, Sharma & Reddy (2021) described a critical component of the JJM's success lies in its financial sustainability. Public private partnerships offer the potential to infuse private sector expertise

and resources, supplementing public funds for robust infrastructure development. Concurrently, community based financing schemes install a sense of ownership and responsibility among local communities, ensuring the sustainability of water supply systems.

Chaudhuri *et al.*, (2018) elucidated that water conservation practices are pivotal to the mission's success. Encouraging rainwater harvesting, greywater recycling, and promoting efficient water usage are essential components of sustainable water management. By integrating these practices, the JJM not only addresses immediate water scarcity concerns but also contributes to long-term water security. While the literature largely applauds the JJM, it's imperative to acknowledge potential challenges. Success hinges on government commitment, active community participation, and adept utilization of technology and innovative financing mechanisms. Acknowledging these challenges provides a more holistic view of the mission's prospects. (Bhruwar., 2023)

Consequently, the Jal Jeevan Mission presents a holistic approach to tackling water challenges in rural India. By emphasizing community involvement, technological innovation, financial sustainability, and water conservation, the JJM holds promise in achieving Sustainable Development Goals. However, ongoing scrutiny, adaptation to challenges, and commitment from all stakeholders are crucial for its enduring success (Shekhawat *et al.*, 2021).

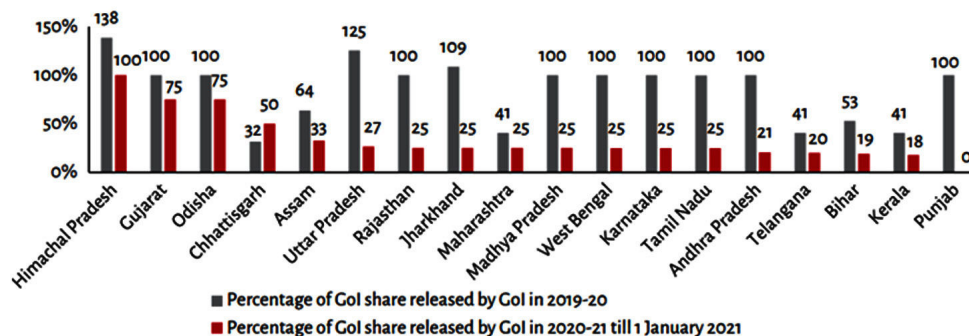
METHODOLOGY

The analytical and qualitative research methodology adopted for this paper is based on previously published literature that was gathered from a variety of sources including books, journals, reports and relevant websites. These sources were then analyzed to build a solid basis for this research.

Some of the objectives of this research are:

- To study the role of JJM in alleviating the water crisis in rural India.
- To assess the efficiency of the implementation process
- To present and study the overall GOI allocations
- To present the coverage and results of JJM

DATA ANALYSIS

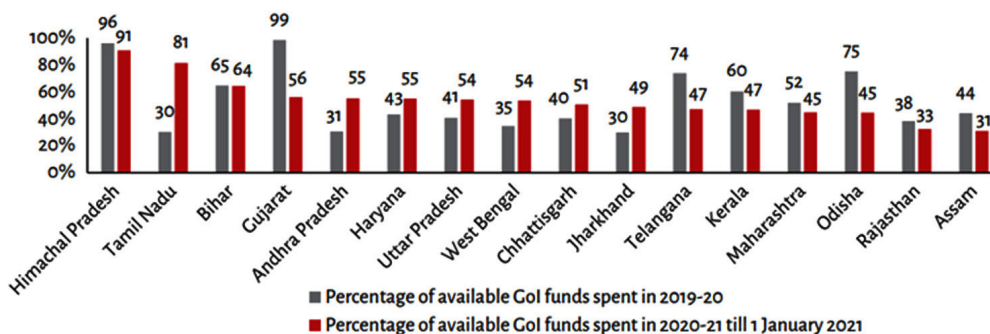


Source: JIM IMIS system, Financial Progress, Format D1 – State wise Allocation, Release and Expenditure. Available online at: https://ejalshakti.gov.in/IMISReports/Reports/Financial/rpt_RWS_StatewiseAllocationReleaseExpenditure_S.aspx?Rep=O&RP=Y. Last accessed on 1 January 2021.

Graph 1: Trends in releases

Graph 1 provides the percentage of shares released by the Government of India in various states of the country in two different time periods. It can be observed that 22 states and UTs had received less than half their GOI shares in 2020-21 till 1st January 2021. Punjab which had 100% of GOI shares

released in 2019-20 received 0% of funds in 2020-21, this is due to the COVID-19 pandemic which resulted in a slowdown of releases. Other states that suffered a similar fate included Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal.

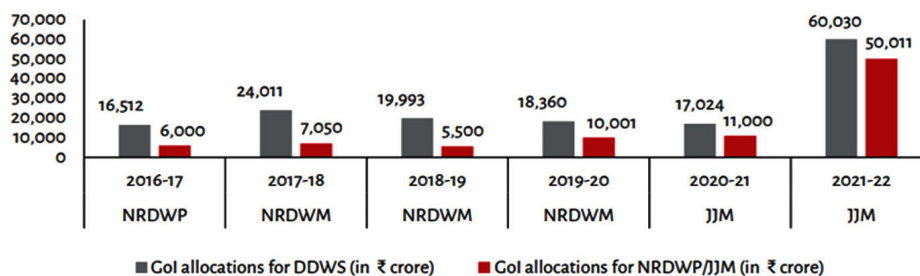


Source: JIM IMIS system, Financial Progress, Format D1 – State wise Allocation, Release and Expenditure. Available online at: https://ejalshakti.gov.in/IMISReports/Reports/Financial/rpt_RWS_StatewiseAllocationReleaseExpenditure_S.aspx?Rep=O&RP=Y. Last accessed on 1 January 2021.

Graph 2: Trends in expenditures

Graph 2 specifies the percentage of available GOI funds which was spent in two different time periods across the states of India. In 2020-21 till 1st January 2021, 16 states had spent less than 50% of their available GOI funds. Some of the states are Kerala (47 percent), Maharashtra (45 percent), Odisha (45

percent), and Rajasthan (33 percent). Out of all the GOI funds that were available, Assam had one of the lowest expenditures. In contrast, Tamil Nadu had used 81 percent and Himachal Pradesh had used 91% of the funds.



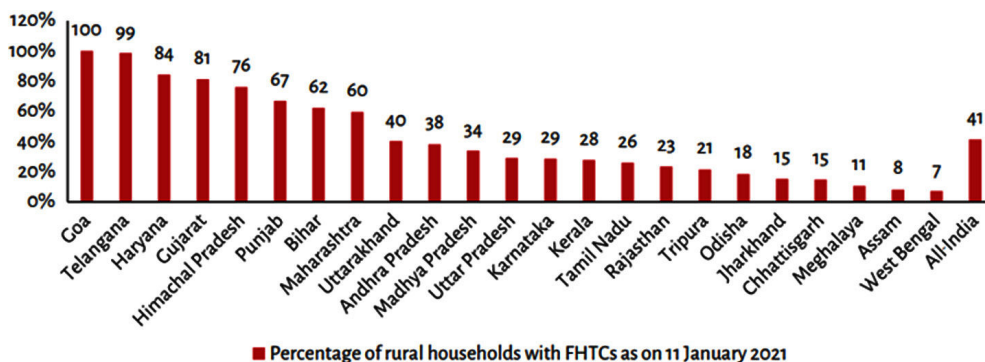
Source: Union Expenditure Budget, Volume 2, MJS for FY 2017-18 to FY 2021-22. Available online at: <https://www.indiabudget.gov.in>. Last accessed on 1 February 2021.

Note: Figures are in crores of Rupees and are Revised Estimates (REs), except for FY 2021-22 which are Budget Estimates (BEs). The figures do not include Extra Budgetary Resources.

Graph 3: Trends in overall GOI allocations

Graph 3 specifies the details of GOI allocations for various drinking water schemes for successive years starting from 2016-17 to 2021-22. This study can observe that GOI allocations for JJM have increased

more than fourfold in 2021-22. This comprises both those derived from Extra Budgetary Resources (EBR) and direct gross budgetary support or direct allocations for the program.

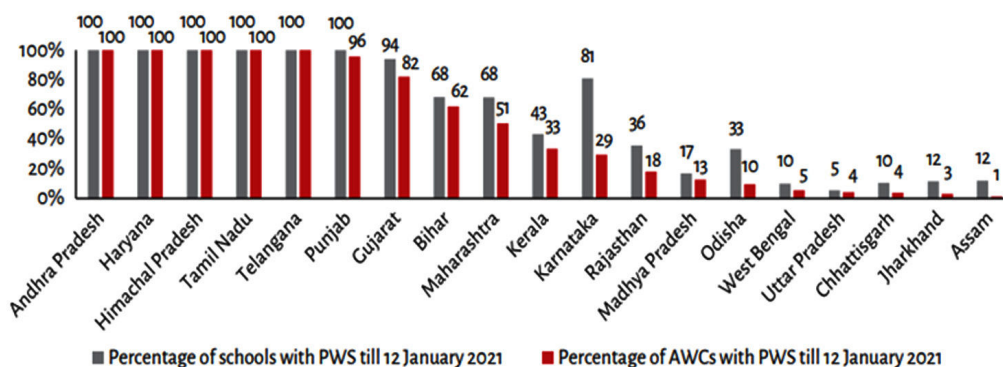


Source: JJM IMIS system, Format C30: Population having FHTCs. Available online at: https://ejalshakti.gov.in/IMISReports/Reports/Physical/rpt_RWS_StateWiseTapConnection.aspx?Rep=O&RP=Y. Last accessed on 11 January 2021.

Graph 4: Trends in coverage

Graph 4 provides information about the results of the JJM in the rural households of India. Goa and Telangana are the most successful states in terms of implementation of JJM. As on 11th January 2021, 41% of the Rural households had FHTCs. From 40 lpcd in the 11th Five Year Plan, JJM aims to offer

households 55 lpcd. Using the 40 lpcd criterion as of 1 April 2020, 11 states and UTs have coverage of more than 80%. Now just five states and UTs—Gujarat, Jharkhand, Madhya Pradesh, and Telangana—use the 55 lpcd standard.



Source: Tap water supply in schools and AWCs. Available online at: https://ejalshakti.gov.in/jjmreport/School/JJM_School_India.aspx. Last accessed on 12 January 2021.

Graph 5: Trends in targeted coverage

Graph 5 lays out information about the percentage of PWS (pipe water supply) to schools and AWCs till 12 January 2021. 12 States and UTs had PWS in less than 50% of schools while 19 States and UTs had PWS in less than 50% of AWCs. On October 2nd 2020, MJS started a mission mode campaign with the goal of supplying potable PWS to all rural schools and AWCs across the nation in only 100 days. Under this initiative, 9.14 lakh new PWS connections were made available to 4.3 lakh AWCs and 4.8 lakh rural schools. Every school

and AWC in the first six states- Andhra Pradesh, Goa, Haryana, Himachal Pradesh, Tamil Nadu and Telangana now have PWS. Assam, Jharkhand, Chhattisgarh, Uttar Pradesh, and West Bengal, on the other hand, had coverage for both schools and AWCs that was less than 15%.

Findings

The scheme had a total of 60,030 crore GOI allocations for the Department of Drinking Water

and Sanitation (DDWS) in FY 2021-22. In the FY 2021-22, GOI allocated 50,011 crore for JJM. Currently, JJM is responsible for 83% of the year's DDWS allocations. Allocations for FY 2020-21 was less than what the Cabinet had authorized. JJM received 11,500 crores in budget estimates (BEs) from the GoI. The entire budget, including funds from the Government of India and Extra Budgetary Resources (EBR), was 32% less than the sum of 34,753 crore that the Cabinet had allocated for the year, despite an additional funding of 12,000 crore.

By 2024, this initiative hopes to have installed Functional Household Tap Connections (FHTCs) in every rural household. A total of 6.4 crore or 41% of rural families had received FHTCs as of January 11, 2021. Goa is the first state in the nation to offer FHTCs to all of its rural households. The Jal Jeevan Mission aims to offer water through Functional family Tap Connections (FHTCs) to every rural family with a capacity of at least 55 liters per capita, per day (lpcd) by 2024. The National Rural Drinking Water Programme (NRDWP), which was first introduced in 2009, is the most recent effort to assure rural water supply that is incorporated within JJM. The Ministry of Jal Shakti's (MJS) Department of Drinking Water and Sanitation (DDWS) is in charge of carrying it out.

The COVID-19 outbreak made clear how critical access to clean water is in rural places. The DDWS issued a recommendation to states requiring them to provide safe, potable water to all homes, with priority given to water scarce areas and vulnerable populations, in accordance with a writ petition order from the Supreme Court dated 3 April 2020. States were recommended to prioritize FHTCs to prevent crowding at areas where people meet to get water, such as at public hand pumps, wells, and public stand posts, since they are two of the most efficient ways to slow the spread of the disease. In order to allow water supply infrastructure activities to continue during the COVID-19 induced lockdown period, the GOI also updated the Disaster Management Act's regulations.

SUMMARY

The research article focuses on India's Jal Jeevan Mission (JJM) and its efforts to provide rural households with Functional Household Tap Connections (FHTCs) by 2024. With a significant portion of India's population and livestock, there's an increasing demand for water across various sectors. The COVID-19 pandemic underscored the importance of accessible water, emphasizing

the need for sustainable water management. JJM, launched in 2019, seeks to ensure tap water access to rural families and emphasizes community involvement. The study highlights the challenges in implementing the scheme, including slow release of funds, underutilization of available funds, and uneven progress across states. It also reveals GOI allocations for JJM have increased significantly, and many households now have FHTCs. However, there's a gap between the targeted 55 liters per capita per day (lpcd) and the current 40 lpcd standard. The research finds that JJM aims to provide safe and sufficient water to all rural households and addresses the critical role of water in public health. It also discusses the impact of the COVID-19 pandemic and regulatory updates to continue water supply infrastructure activities. The study emphasizes the need for effective resource allocation, data accuracy, equitable access, infrastructure optimization, technology adoption, and community involvement to ensure the success of JJM.

CONCLUSION

Over the last four years, the Jal Jeevan Mission has made significant strides in improving the lives of millions of people. However, with the ambitious objective of delivering tap water connections to every rural family by 2024, a significant gap remains to be bridged within the timeframe. To really assess the Jal Jeevan Mission's performance, it is critical to secure the sustainability of safe and clean tap water beyond 2024. This involves the construction of a comprehensive water governance system that is adaptive to local conditions and sensitive to climate change problems. The mission's scope should go beyond simply delivering tap water and include the broader concept of water security, which is associated with the Sustainable Development Goal 6 of the United Nations.

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