Jal Jeevan Samvad

Har Ghar Jal
Jal Jeevan Mission

Building Partnership
Changing Lives

April | 43rd Edition | Year 2024

Special Feature

Data and Digital Governance

Contents

43rd Edition
April 2024

National Jal Jeevan Mission
New Delhi - 110 003
e - mail: njjm-ddws@gov.in

Prime Minister on Jal Jeevan Mission

Narendra Modi
Prime Minister

The speed and scale of our work reflects our eagerness to take the nation to new heights. Our model of saturation shows our commitment to open the doors of prosperity for every family.

- PM Shri Narendra Modi
in an interview to the Times of India on 29th April 2024

Har Ghar Jal
Jal Jeevan Mission

Note from the desk of

Additional Secretary & Mission Director...

New Delhi
30th April, 2024

In a world increasingly guided by technology, India's commitment to inclusive growth and transformation is palpably evident in its proactive initiatives across sectors. The Jal Jeevan Mission (JJM) epitomises this approach, especially in its use of data and digital technologies to ensure safe and adequate water supply to every rural household.

Since its inception, JJM has been data-centric, not merely adopting digital technologies as ancillary tools but integrating them as central elements of strategy and execution. Our efforts are rooted in a comprehensive digital framework aimed at achieving transparency, accountability, and efficiency. We leverage real-time monitoring systems, data analytics, and IoT solutions to oversee and manage water quality and distribution, ensuring that our commitment to each household is met with unwavering precision.

One of the groundbreaking advancements under JJM is the establishment of digital water quality testing and monitoring labs. Equipped with the latest IoT technologies, these labs empower us to swiftly identify and rectify potential issues, ensuring public health and preserving our precious water resources for future generations. This proactive surveillance system exemplifies our commitment to safeguarding our communities through technological vigilance.

Moreover, our dedication to digital governance extends beyond infrastructure management. The integrated data management system implemented by JJM ensures that crucial data is not only stored and analysed efficiently but also made accessible to the public. This open-access approach promotes a collaborative environment where every stakeholder becomes an integral part of our water sustainability mission. It is through this transparency that we build trust and encourage active community participation.

The strides we have made in digital governance have positioned India as a frontrunner in the global arena of technological integration in the water sector. These efforts are a reflection of our broader national agenda aimed at rapid transformation and sustainable development through the prism of data and digital technology.

Our special feature for April, 'Data and Digital Governance,' highlights several pioneering initiatives under the JJM umbrella. We have seen remarkable contributions from our teams and development partners in this front. In the pages ahead, readers will gain detailed insights into how JJM has skilfully harnessed technology to drive impact, transformation, responsiveness, and transparency. They will discover the innovative approaches and digital tools that have been pivotal in revolutionising water management, ensuring that every initiative not only meets current needs but also sets the foundation for sustainable practices in the future.

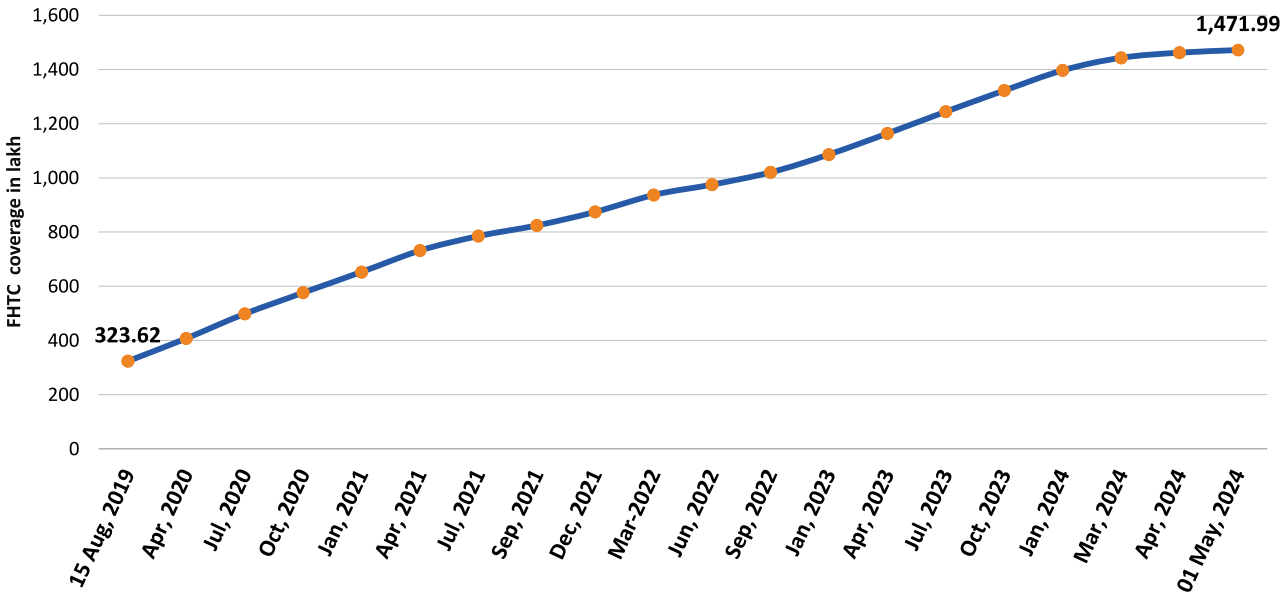
As we continue to expand and refine our digital infrastructure, Jal Jeevan Mission remains agile, ready to adapt and evolve in response to new challenges and opportunities. Our ongoing initiatives and future plans are not just about meeting the water needs of today but setting a global benchmark in data-driven governance.

Let us recommit ourselves to the vision of Jal Jeevan Mission. With every drop of water we safeguard, with every digital tool we deploy, we are not just managing resources; we are nurturing the future of our nation. Together, let's continue to champion the digital revolution, ensuring that the benefits reach every corner of rural India. Every drop counts, and every effort in this direction is a step towards a thriving, empowered India.

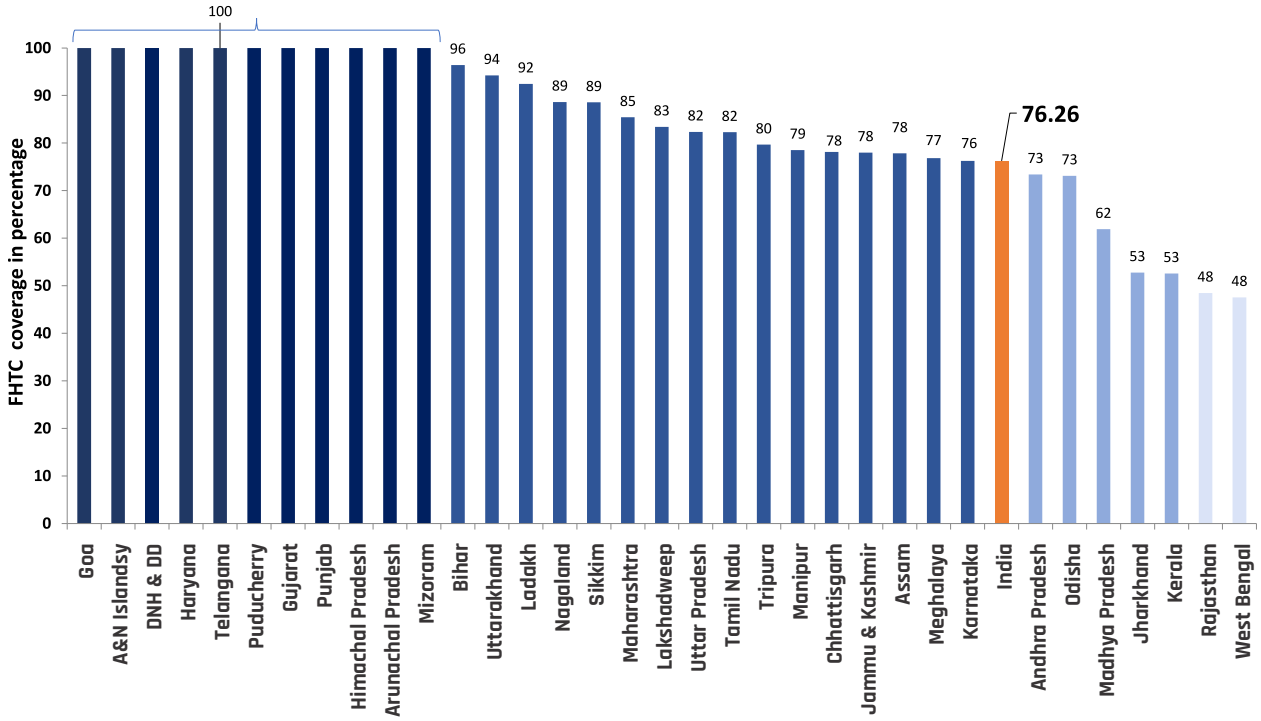
[Dr. Chandra Bhushan Kumar]

Har Ghar Jal
Jal Jeevan Mission

Progressive coverage - Functional Household Tap Connection (FHTC) (as on 30.04.2024)



Comparative FHTC coverage status of States/ UTs (as on 30.04.2024)



Har Ghar Jal
Jal Jeevan Mission

As on 30th April, 2024

Source: JJM-IMIS

India | Status of tap water supply in rural homes

Total number of households (HHs)	Households with tap water connections as on 15th Aug 2019	Households with tap water connections as on date
19,30,32,989	**3,23,62,838** (16.77%)	+45,165 **14,71,99,047** (76.26%)

Households provided with tap water connection since launch of the Mission

11,48,36,209 (71.47%)

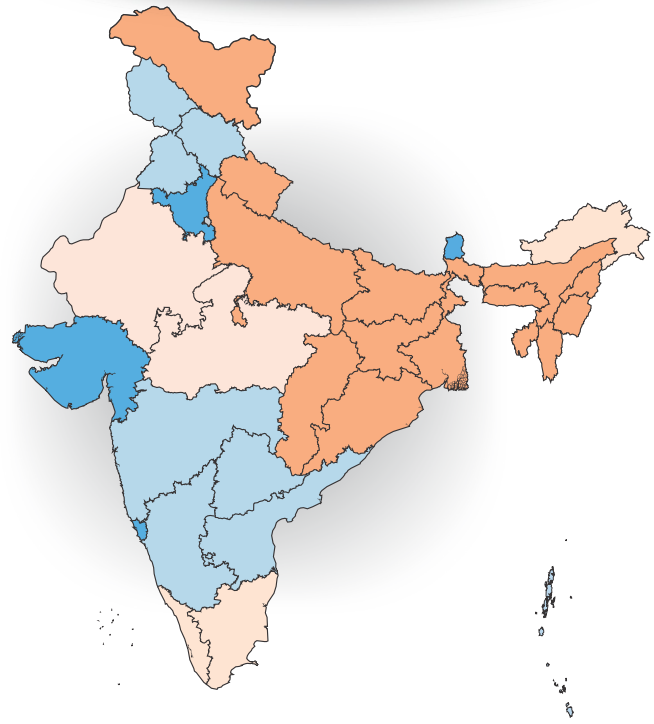
Har Ghar Jal [100% HHs with tap water connections]

100% FHTC States/ UTs

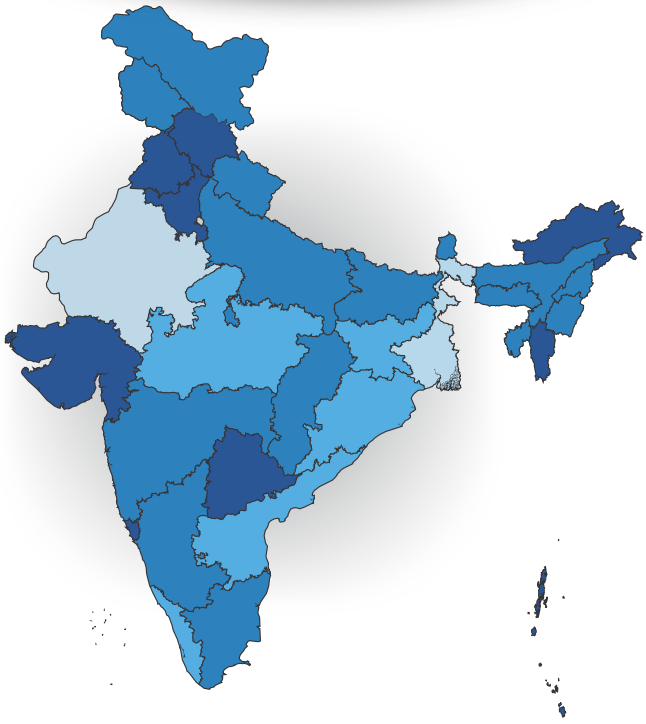
Goa, A & N Islands, Puducheerry, D&NH and D&D, Haryana, Punjab, Telangana, Gujarat

100% FHTC Districts	100% FHTC Blocks	100% FHTC Panchayats	100% FHTC Villages
191	1,841	1,03,381	2,17,226

As on 15th August, 2019



As on 30th April, 2024



0 to <10% | 10% to <25% | 25% to <50% | 50% to <75% | 75% to <100% | 100%

Leveraging IoT and Digital Portable Testing Kits for Assured Service Delivery under Jal Jeevan Mission

- **Pradeep Singh**, Director NJJM & **Divya Chauhan**, NJJM

Abstract

The Jal Jeevan Mission (JJM) is a transformative initiative aiming not just to provide tap water connection to every rural household but also to leverage IoT and digital portable water testing kits, which can significantly enhance service delivery. The mission strives to achieve its ambitious goal of providing piped water supply, and the integration of cutting-edge technologies has become imperative to optimize service delivery and ensure sustainable water management. Smart solutions for monitoring water pollution are getting more and more significant these days with innovation in sensors, communication, and Internet of Things (IoT) technology. In this regard, the necessity of deploying the Internet of Things (IoT) and digital portable devices in Jal Jeevan Mission cannot be overstated. These technologies enable proactive management of water supply systems through real-time monitoring, data-driven decision-making, and improved efficiency. By embracing these innovative solutions, India can make substantial progress in ensuring safe and accessible drinking water for all its citizens, thus contributing to improved public health and socio-economic development.

Keywords: National Jal Jeevan Mission, IoT, digital devices, service delivery, safe water.

1. Introduction

Har Ghar Jal through Functional Household tap connections is the core objective of the Jal Jeevan Mission (JJM), which envisions every rural household having a drinking water supply by 2024 in an adequate quantity of prescribed quality on a regular and long-term basis at affordable service delivery charges, leading to an improvement in the living standards of rural communities. The aim is to provide safe and adequate drinking water to all rural households at the household level. The 'functionality' of household connection, as the real goal of the Mission, is defined as providing drinking water in adequate quantity i.e., minimum 55 LPCD and of prescribed quality i.e., BIS 10500:2012 standard on a regular basis over the long-term/full design period of the scheme [1].

1.1. Obstruction in service delivery and a way out -

Though providing piped water supply in remote areas is a complex and challenging task due to various issues and constraints, some of the key issues in providing piped water supply in remote areas are as follows:

i. Infrastructure and Distance:

Remote areas often lack the necessary infrastructure for piped water supply, including pipelines, reservoirs, and pumping stations. Establishing this infrastructure in remote and rugged terrain can be costly and technically demanding.

Moreover, the distance between the water source and the remote area can be significant, requiring extensive pipeline networks and pumping systems.

ii. Water Source Availability:

Identifying a reliable and sustainable water source in remote areas can be a significant challenge. The availability of freshwater sources such as rivers, lakes, or groundwater might be limited or not easily accessible. Conducting hydrological surveys and assessments to determine suitable water sources is crucial but can be challenging in remote areas.

iii. Quality and Contamination:

Ensuring that the quality of the water supply is essential to protect public health. However, remote areas may face additional challenges in maintaining water quality due to the lack of proper treatment facilities and monitoring systems. Contamination risks from natural sources, agricultural runoff, or human activities may be higher, requiring robust filtration and treatment processes.

iv. Power Supply:

Providing a reliable and uninterrupted power supply for pumping stations and treatment facilities can be problematic in remote areas. These areas may have limited or unreliable access to electricity, making it necessary to explore alternative power sources such as solar, wind, or mini-hydropower systems. However, installing and maintaining such systems can add to the project's complexity and cost.

v. Operation and Maintenance:

Remote areas often face challenges in terms of skilled manpower and technical expertise for operating and maintaining piped water supply systems. The lack of trained personnel and resources for regular maintenance can lead to system breakdowns and service disruptions, jeopardizing the sustainability of the water supply.

Addressing these issues requires a comprehensive approach that considers technical, social, and economic aspects. It involves collaboration between Research institutes, technology providers, government agencies, local communities, NGOs, and other stakeholders to develop sustainable solutions tailored to the specific challenges of each area. Certainly, there are some potential technological solutions using the IoT (Internet of Things), such IoT-based solutions that utilizes wireless sensor networks and satellite connectivity to overcome infrastructure limitations and enable remote monitoring and control of water supply systems [2]. Identifying and managing water sources in

remote areas can be challenging. IoT sensors and devices can be deployed to monitor water levels, quality, and usage in real-time. This enables efficient water resource management, early detection of issues, and timely decision-making [3]. Ensuring a safe and clean water supply is essential. IoT-based water quality monitoring systems can continuously monitor parameters such as pH, turbidity, and chlorine levels. Real-time data collection and analysis facilitate early detection of contamination and enable timely actions to maintain water quality standards [4]. Remote areas often face energy constraints. IoT can assist in optimizing energy usage in water supply systems by incorporating smart grid technologies. This includes real-time monitoring of energy consumption, demand response mechanisms, and integration of renewable energy sources for power generation [5].

Above mentioned studies provide insights into how IoT can address challenges related to piped water supply in remote areas by leveraging remote monitoring, water management, water quality monitoring, and energy efficiency. The National Jal Jeevan Mission has made a path-breaking change from the conventional paradigm to focus on service delivery. With this change in orientation, it is incumbent upon the water supply operators to regularly measure and monitor the quantity and quality parameters of drinking water. This would help in ensuring service delivery to the households on the one hand and, on the other hand, facilitate the reduction of physical and commercial losses in water distribution systems and improve the recovery of water charges as well.

To ensure functionality, it is proposed to set up 'sensor-based monitoring system' that collects data from field locations of the rural water supply systems and transmits it through a network to a central server that analyzes the data to monitor and manage functionality both at the operational level and at different administrative levels in the States, and at the national level. IoT technology can revolutionize the monitoring and management of water supply systems. By deploying IoT sensors and devices, it becomes possible to gather real-time data on water quality, quantity, and distribution. These sensors can be installed at various points in the water supply network, including source points, treatment plants, storage tanks, and distribution pipelines. The IoT sensors continuously monitor parameters such as pH levels, turbidity, chlorine levels, and temperature. The collected data transmit wirelessly to a central monitoring system, which provides a comprehensive view of the water supply infrastructure. This real-time monitoring allows for the early detection of issues such as leaks, contamination, or inadequate water supply, enabling prompt action to be taken.

Apart from basic physical parameters, the digital portable water testing kits offer a convenient and efficient solution for on-site chemical parameter water quality testing. These kits are equipped with sensors and technologies that can quickly analyze water samples and provide accurate results. They are user-friendly, allowing even non-experts to conduct water tests easily. By incorporating IoT capabilities, these kits can transmit test results wirelessly to a central database or monitoring system. This integration enables instant data analysis, automated reporting, and proactive decision-making. Water quality data can be monitored at a granular level, ensuring compliance with the prescribed standards, and identifying areas that require immediate attention.

The objective of sensor-based monitoring is not only to monitor Key Performance Indicators but also to ensure quick response, minimum service delivery outages, minimum water loss, optimize efficiency, and monitor quantity and quality on the sustainable basis.

The additional advantage of this data would be to analyze the demand pattern of the user groups over time and use this information for demand management at the aggregate level, minimize non-revenue water, and ensure proper management and effective operation and maintenance of water supply systems in the villages. The mission objective is to shift the focus from physical infrastructure and highlight the importance of developing a utility mindset to focus on service delivery. This shift can be achieved by designing "sustainable O&M of the systems, undertaking water budgets and audits at regular intervals, cost recovery, reducing the energy charges by adopting conjunctive use of water as well as use of conventional and non-conventional energy, specifically solar, measuring the water withdrawal and accounting for the same, addressing the grievances proactively, etc.

1.2. Benefits of IoT in Service Delivery under Jal Jeevan Mission:

The adoption of IoT and digital portable water testing kits brings several benefits to service delivery under Jal Jeevan Mission:

i. Real-time Monitoring and Data Insights:

The implementation of IoT devices enables real-time monitoring of water supply systems, leading to improved operational efficiency and timely issue detection. According to a study by Farmanullah et al. (2022), IoT-based water supply management

systems enhance monitoring capabilities and provides insights into water demand, distribution, and leakage detection. Real-time data collection allows for prompt action, ensuring efficient service delivery [6].

IoT-enabled sensors provide continuous monitoring of water quality and infrastructure, enabling prompt identification of issues and faster resolution. The utilization of IoT devices enables real-time monitoring of water supply systems, allowing for continuous data collection on parameters such as water quality, pressure, and distribution. This real-time monitoring facilitates early detection of issues such as leaks, contamination, or inadequate water supply, enabling prompt action to be taken. A study by Spoorthi et al. (2022) highlights the benefits of IoT-based water quality monitoring systems in ensuring timely identification of water quality problems and improving the overall performance of water supply networks [7].

ii. Enhanced Efficiency & Resource Optimization:

IoT technology helps optimize water supply systems, reduce water waste, and streamline maintenance efforts. According to a study by Sarraf et al., (2020), IoT-based smart water management systems enable efficient water resource allocation, leakage detection, and real-time water pressure monitoring. These advancements enhance overall system efficiency and resource optimization [8].

IoT technology enables efficient water resource management through data-driven insights. Real-time data on water demand and usage patterns, combined with advanced analytics, can facilitate the optimized allocation and distribution of water resources. By minimizing water waste and streamlining maintenance efforts, IoT-based systems improves overall system efficiency. A report by the Confederation of Indian Industry (CII) emphasizes the role of IoT in optimizing water distribution and reducing losses in water supply systems [9].

iii. Early Detection of Water Quality Issues:

Digital portable water testing kits integrated with IoT capabilities facilitate on-site water quality testing, enabling early detection of contaminants and ensuring safe drinking water. In their research, Małgorzata et al., (2023) highlight the importance of IoT-enabled portable water quality monitoring systems for rapid on-field assessment and timely interventions to mitigate risks associated with waterborne diseases [10]. Digital portable water testing kits, equipped with IoT capabilities, offer a convenient and efficient solution for on-site water quality testing. These devices enable quick analysis of water samples, providing accurate and real-time results. By integrating IoT capabilities, these kits can transmit test results wirelessly to a central monitoring system, enabling instant data analysis and proactive decision-making. The Government of India's Jal Jeevan Mission guidelines highlight the importance of digital portable water testing kits in ensuring water quality compliance [1].

iv. Transparent and Inclusive Service Delivery:

The integration of IoT and digital devices promotes transparency and inclusivity in Jal Jeevan Mission. A research study by Syrmos et al., (2023) emphasizes that IoT-enabled smart water grids facilitate real-time information sharing, enabling equitable water distribution among rural communities. This transparency fosters trust, ensuring that all households receive safe drinking water services [11].

The incorporation of IoT and digital devices promotes transparency and inclusivity in service delivery under Jal Jeevan Mission. Real-time data sharing with stakeholders and the public enhances accountability and trust in the government's efforts to provide clean water. The use of IoT devices also ensures equitable water services, reaching remote and marginalized areas. A research study by Narendran et al. emphasizes the role of IoT-based systems in improving transparency, efficiency, and equity in water management [12].

v. Data-Driven Decision Making:

The availability of real-time data and analytics empowers officials to make informed decisions, allocate resources efficiently, and prioritize maintenance and repairs. The data generated by IoT devices and digital portable devices assists in evidence-based decision-making and policy formulation. Research conducted by Kaur et al. (2021) highlights that IoT-based water quality monitoring systems provide accurate and real-time data, supporting informed decision-making for resource allocation, infrastructure development, and water quality management [13].

2. Recent developments under Jal Jeevan Mission:

The Department in collaboration with M/o Electronics and Information Technology (MEITY) conducted ICT Grand Challenge under which IoT pilots were deployed under water supply schemes at various locations in 14 States of the country.

In recent years, several IoT-based smart rural water management pilots have been conducted across India by non-profits, academia, and government departments. There are several success stories of using IoT to

improve water service delivery in different states like Andhra Pradesh, Rajasthan, Odisha, Gujarat, Uttarakhand, and Maharashtra. Further, state rural water supply departments from Gujarat, Arunachal Pradesh, and Bihar have already initiated such IoT deployments in several blocks/districts; through the measurement and monitoring of water supply in villages through sensor based IoT solutions.

So far, IoT based pilots have been implemented in 123 villages and the real time data is available in the public domain on the JJM dashboard. Guidance has been issued to states for the upscaling of IoT based systems.

The 10,000 villages in Gujarat, entire Goa, 1,044 sites in two districts, Panipat & Karnal in Haryana, 897 villages in Punjab, 9,000 schemes & all 2,000 MVS schemes Maharashtra, and entire Bihar have planned for upscaling the IoT based systems.

3. Way Forward:

The integration of IoT and digital portable devices in Jal Jeevan Mission is essential to overcome the challenges associated with rural water supply. These technologies provide real-time monitoring, automation, and data-driven decision-making capabilities, facilitating efficient service delivery, water quality management, and infrastructure maintenance. By leveraging IoT and digital portable devices, Jal Jeevan Mission can significantly improve access to clean and safe drinking water in rural areas, thus improving public health, enhancing socio-economic development, and realizing the vision of a water-secure nation.

Reference:

1. Operational Guidelines for the Implementation of Jal Jeevan Mission Har Ghar Jal, Government of India, Ministry of Jal Shakti, Department of Drinking Water and Sanitation, National Jal Jeevan Mission, 2019.

2. N. S. Kamaruidzaman and S. N. Rahmat, " Water Monitoring System Embedded with Internet of Things (IoT) Device: A Review, IOP Conf. Ser. Earth Environ. Sci. 498 012068, 2020.

3. S. S. Ahmed, R. Bali, H. Khan, H. I. Mohamed, S. K. Sharma, "Improved water resource management framework for water sustainability and security," Environmental Research, 201, pp. 111527, 2021.

4. S. Geetha, and S. Gouthami, "Internet of things enabled real time water quality monitoring system," Smart Water, pp. 1-19, 2017.

5. S. Behera, N. B. D. Choudhury, "A system-atic review of energy management system based on various adaptive controllers with optimization algorithm on a smart microgrid, *International Transactions on Electrical Energy Systems,* 13132, 31, 12, 2021.

6. J. Farmanullah, N. M. Allah, S. Saeed, S. Z. Iqbal, and R. Ahmed. "IoT-Based Solutions to Monitor Water Level, Leakage, and Motor Control for Smart Water Tanks" *Water* 14, pp. 309, 2022.

7. L. E. Spoorthi, N. Kashyap, B. Rajatha, M. H. Priyanka, K Bhargavi, "A Review on Smart Water Quality Monitoring System" IJRASET, 10(6), 2676-2680, 2022.

8. R. Sarraf S. Ojha D. Biraris Kishor B Bhangale, "IoT based smart quality water management system, International Journal of Advance Scientific Research and Engineering Trends, pp. 12-16, 2020.

9. Confederation of Indian Industry (CII). (2019). The IoT (Internet of Things) in Water Management. Retrievedfrom *https://www.cii.in/PolicyAdvocacyDetails.aspx?enc=toLEBmnd8WsTqQhzK5IyGRkuDSkIi6Hzf3GJG9WBNW6W2WvaAb2Daqdo5b94/CX0sn.*

10. M. Małgorzata, A. Kisiel, D. C.-Lech, I. Durlik, and T. Miller, "IoT in Water Quality Monitoring-Are We Really Here?" *Sensors* 23, pp 960, 2023.

11. E. Syrmos, V. Sidiropoulos, D. Bechtsis, F. Stergiopoulos, E. Aivazidou, D. Vrakas, P. Vezinias, I. Vlahavas, "An Intelligent Modular Water Monitoring IoT System for Real-Time Quantitative and Qualitative Measurements". *Sustainability, 15*, 2127, 2023.

12. S. Narendran, P. Pradeep and M. V. Ramesh, "An Internet of Things (IoT) based sustainable water management," IEEE Global Humanitarian Technology Conference (GHTC), San Jose, CA, USA, pp. 1-6, 2017.

13. M. Kaur, P. D. Kaur S. K. Sood, "Energy Efficient IoT Based Cloud Framework for Early Flood Prediction, DOI.org/ 10.21203/rs.3.rs-162134/ v1, 2021.

Algorithm Governance for Water management:

OurWater Bot an Example of Citizen Engagement

- **Sunderrajan Krishnan,** INREM Foundation

Rajni is a nurse in Jhabua, MP. She types onto her WhatsApp Bot called OurWater *"क्या खेती से मेरा पानी प्रभावित हो सकता है और स्वास्थ्य समस्याएं पैदा हो सकती हैं?" (can farming affect my water and cause health problems).* To know her answer, keep reading this article ...

Since the launch of GPT-4 in March 2024, the world has rapidly changed. From automated call centres to digital nannies, AI is fast being applied to every conceivable use case imaginable. Exponential change seems not to be in our own hands now, but in the nooks and corners of chips and bytes.

Guiding all of these are 'algorithms' that determine what happens to our digital experience and guide our journey there. Earlier eras of digital algorithms could still be visualized onto flowcharts or a connecting logic. In the newer age of LLMs and AI-enabled conversational mediums, these algorithms are extraordinarily complex, and that too indeterministic i.e. they do not behave the same each time.

Rajni received the following response to her question (response in Hindi here translated back into English): "Yes, farming can potentially affect your water quality, leading to health issues. Use of pesticide, fertilizer, and waste from livestock in agriculture can seep into groundwater and contaminate drinking water sources. This may lead to numerous health issues, such as gastrointestinal illness, reproductive problems, and neurological disorders. Regular water quality testing is important to ensure safety."

She is actually both amazed and shocked by this. Being a responsible nurse, she relays this information to mothers and patients around her and that starts a real world conversation. Here we have a great example of digital algorithms and real-world dialogues that could lead to unexpected outcomes.

How does something like "OurWater" work? On one hand, it builds over existing Digital Public Infrastructure (DPI) such as Bhashini for language translation and Jugalbandi for anchoring LLMs such as GPT-4 to a specific knowledge base. In simple words, what these DPIs help us is to take a reliable source of information (here, training material for JJM programme), use the power of digital human language from the LLMs and facilitate communication through Rajni's language, Hindi. Further, all of this happens through an open source solution for WhatsApp bots called Glific.

Sounds magical, doesn't it?

However, the flipside of magic is wizardry. And the darker side of algorithms, is the potential for rapid diffusion of sometimes unintentional and possibly disruptive elements to occupy centre stage. If we ignore what is now referred to as "Algorithm governance", we run the risk of exposing ourselves to large scale system disruption.

Let us take this specific case of OurWater. Here we have 4 systems interacting to produce the response for Rajni. GPT-4, Jugalbandi, Bhashini and Glific, all come with their own sets of algorithmic structures. Each algorithm comes with its own set of assumptions, uncertainties and also possibilities. However, when we combine them together, none of the specific building blocks here can determine how the response would really materialize.

Here is where it becomes important to look at governing algorithms when applying them to large scale experiments such as JJM programme here. While a solution such as OurWater can help a nurse such as Rajni access information that she desires in her own language, and transmit it to her local audience, it also carries the risk of potential misinformation that could arise due to the nature of the algorithms being combined here.

Stepping back from this specific example, a programme such as JJM today would be experiencing algorithms at scale. A single example of OurWater has shown us 4 different such algorithms at play. When we look at a wide scale of innovations and experiments that are now in progress across urgent requirements such as building capacities, improving

access to information or addressing grievances, we would surely uncover increasing number of cases where traditional flow-chart based algorithms are interacting with modern DPIs that are large black box systems, even if open source (since the input-output relationship with algorithms such as LLMs are indeterministic).

We are still at a very early stage of exponential development of LLMs and related DPIs in the area of water management and JJM. By being conscious of the need for digital governance of algorithms, we can start making progress in striking a balance between improving accessibility and generating more trust and transparency.

Some broad principles may be applied here:

- Any new solution that brings together complex algorithms should be rigorously prototyped and tested with independent audits
- Human labellers can be employed to pre-test these solutions with standardized methods
- Scaling up needs to be a gradual process, instead of making it open in one go - given that low probability-high risk responses are the norm with such algorithms
- Implementation of these solutions need constant reviews and process of random sampling checks so that we ensure there is a constant vigilance and risk of disinformation is reduced

Meanwhile, Rajni in Jhabua and a few hundred other nurses are part of this closely monitored prototyping process. Each time they use OurWater, it throws up immense possibility, as well as makes us increasingly aware of the need for algorithm governance.

JJM BRAIN: Comprehensive Digital Architecture for Transparent Rural Water Supply in Assam

- **Kailash Kartik,** Mission Director, Jal Jeevan Mission, Government of Assam

With the advent of the fourth industrial revolution, digital technologies are changing the approach towards governance systems. UNDP in its 2023 report titled, **"A Shared Vision for Technology and Governance"** highlights that digitalisation of government services can increase efficiency and broaden inclusion. In this context, let us understand the origin of the term governance.

Embracing Digital Governance for Effective and Inclusive Public Service Delivery

The term governance was first introduced by Harland Cleveland in 1972 who was a political scientist and public administrator working with the US government. He observed that what people want is, "less government and more governance".

Later in the eighties and early nineties, the term got a further impetus when international organizations such as the World Bank mandated the presence of Governance systems in countries as a precondition for receiving aid.

Modern technologies ushered in the era of digital governance to enhance the efficiency, transparency, and accessibility of government services. By embracing digital solutions such as cloud computing, big data analytics, and mobile applications, governments can streamline processes, reduce bureaucracy, and foster greater citizen engagement.

The Jal Jeevan Mission Assam, aimed at providing clean drinking water to all households in the state, has indeed taken center stage in addressing one of the most fundamental needs of the population. The emergence of a ground breaking software solution called **Jal Jeevan Mission - BRAIN (Bridging Revenue for Asset Infrastructure Network)** marks a significant step forward in realizing the mission's objectives.

JJM BRAIN has appeared to be a pivotal tool in the implementation and management of the mission's initiatives. Its significance lies in its ability to efficiently manage water resources, infrastructure, and revenue generation. This software solution likely integrates advanced technologies such as data analytics, artificial intelligence, and geographic information systems (GIS) to streamline operations and decision-making processes. How such architecture can work, follows as below:

Data Integration and Monitoring:

- Establish a centralized digital platform to integrate data from various sources such as sensors, meters, GIS (Geographical Information System), and SCADA (Supervisory Control and Data Acquisition) systems.

- Utilise IoT (Internet of Things) devices and smart meters to monitor water usage, flow rates, pressure levels, and quality parameters in real-time.
- Implement remote monitoring systems to continuously assess the condition of water infrastructure such as pipes, pumps, and reservoirs.

Analytics and Decision Support

- Employ advanced analytics, including machine learning algorithms, to analyse the vast amount of data collected. This can help in detecting patterns, identifying anomalies, and predicting water demand fluctuations.
- Develop decision support tools that provide actionable insights to water managers and policymakers for optimising operations, maintenance schedules, and resource allocation.

Transparency and Stakeholder Engagement

- Foster transparency by making relevant water supply data accessible to stakeholders such as government agencies, utility companies, researchers, and the public through user-friendly interfaces and open data initiatives.
- Implement public awareness campaigns and community engagement programs to educate citizens about water conservation practices, encourage responsible water usage, and solicit feedback on water service quality.

Asset Management and Maintenance

- Utilise predictive maintenance algorithms to forecast equipment failures and prioritise maintenance activities based on risk assessment and asset criticality.
- Implement asset management systems to track the lifecycle of water infrastructure assets, including installation, maintenance history, and decommissioning, to optimise asset performance and longevity.

Resilience and Risk Mitigation

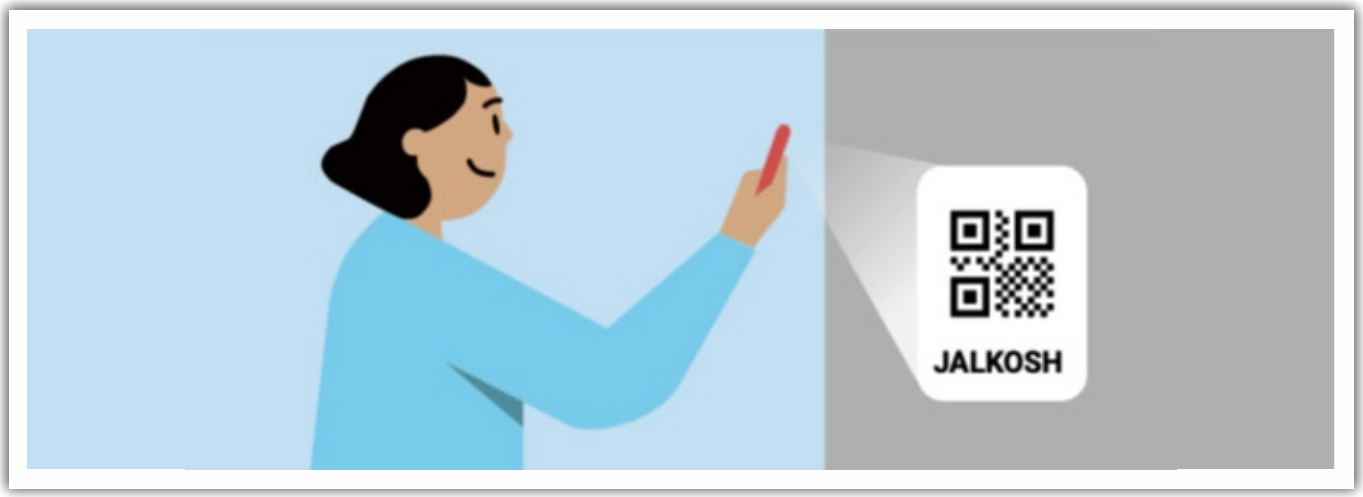
- Develop contingency plans and resilience strategies to address potential risks such as water scarcity, extreme weather events, infrastructure failures, and cybersecurity threats.
- Incorporate redundancy measures, alternative water sources, and emergency response protocols to ensure continuity of water supply during crises.

Policy and Regulatory Compliance

- Align BRAIN initiatives with existing water management policies, regulations, and standards to ensure compliance and accountability.
- Advocate for policy reforms and regulatory frameworks that support the adoption of digital technologies and promote sustainable water management practices.

Jal Kosh: The Citizen Centric System

Jal Jeevan Mission, Assam has integrated a Public Grievance Redressal System and JJM Contractor Task Management System using unique 'Jal Kosh' QR codes for each water supply scheme. These QR codes contain static scheme details and dynamic updates like water quality assessments. Contractors and citizens can scan the codes to submit responses, report issues, and log grievances, fostering transparency



and improving JJM's efficiency in managing tasks and data.

The key components of the of QR Code Intervention section are:

1. Static Information Inclusion: QR codes contain administrative details, technical specifications, and stakeholder information pertaining to each water supply scheme. This ensures that citizens have access to foundational data about the projects.

2. Dynamic Information Incorporation: The QR codes dynamically update with real-time information, especially concerning water quality parameters. This feature allows citizens to stay informed about the quality of water supplied, promoting health and well-being.

3. Citizen Accessibility: By simply scanning the QR code, citizens gain immediate access to a wealth of information. This user-friendly approach ensures that even those with limited technical proficiency can benefit from the initiative.

4. Grievance Mechanism: The QR codes serve as a conduit for citizens to voice concerns. Whether related to scheme functionality, service delivery, or water quality issues, citizens can easily lodge grievances by scanning the code. This empowers citizens to actively participate in the improvement of services.

Wider Penetration in Remote Areas

1. **Inclusive Technology:** QR codes, being a low-cost and straightforward technology, are easily deployable in remote areas where internet connectivity might be a challenge. This inclusivity ensures that citizens in even the remotest locations can access crucial information.

2. **Parallel with Water Supply Schemes:** Just as small vendors leverage QR codes for business transactions, JJM Assam's initiative brings a similar level of accessibility to citizens regarding water supply schemes.

3. **Community Empowerment:** In remote areas, the QR codes act as a catalyst for community involvement. Citizens become active participants in monitoring and improving water supply services, fostering a sense of ownership and responsibility.

Role of AI in Digital Governance

Data Analytics and Decision Support: AI can process and analyse vast amounts of data from various sources, including citizen feedback, service delivery metrics, and sensor data. This data-driven approach can provide valuable insights to policymakers and enable more informed decision-making for efficient governance.

Predictive and Prescriptive Modelling: AI models can be trained to predict future trends, identify potential issues, and suggest preventive or corrective actions. For example, AI could be used to forecast water demand, predict infrastructure maintenance needs, or optimize resource allocation based on usage patterns.

Personalised Service Delivery: AI-powered chatbots and virtual assistants can interact with citizens, understand their queries, and provide personalized information or guidance. This can enhance the citizen experience and improve the accessibility of government services.

JJM Assam's QR code-based IT intervention stands as an example of leveraging technology for the benefit of citizens. By enhancing data accessibility at the doorstep of every citizen, the initiative not only promotes transparency and accountability but also empowers communities, even in the remotest areas.

As this initiative continues to unfold, it has the potential to set a benchmark for similar interventions in the water supply sector and beyond. Moreover, the integration of emerging technologies like Artificial Intelligence (AI) can further augment digital governance efforts by enabling data-driven decision-making, personalised service delivery, and enhanced citizen engagement.

The success of digital governance initiatives hinges on a collaborative approach involving government agencies, technology providers, and active citizen participation. By embracing innovation and leveraging technological advancements, India can pave the way for transparent, efficient, and inclusive governance, fostering a more empowered and engaged citizenry.

Building Capacities of Mid-Management Cadre on Jal Jeevan Mission through Innovative Approaches in Rajasthan

Rushabh Hemani, WASH Specialist; **Nanakkumar Santdasani,** WASH Officer;
Prasoon Mankad, Water Safety and Security Consultant UNICEF State Office for Rajasthan

Background

Jal Jeevan Mission in its operational guidelines has consistently emphasised capacity building of stakeholders involved in its implementation. It is important that all stakeholders work in sync with each other and implement a process-based approach, which would facilitate achieving mission objectives on a sustainable basis. There has been a felt need to capacitate mid-management cadre for effective implementation of Jal Jeevan Mission on ground.

National Jal Jeevan Mission, during its visit to Rajasthan in May 2023, while focusing on capacity building interventions suggested to the state needs development a training calendar based on emerging training needs.

Further, while interacting with functionaries of mission, during workshops and various training programmes it was felt that there is requirement of building the capacity of mid-management cadre from the department which include the field engineers, support agencies and others associated with the implementation of the programme. To address the issue, PHED with technical support of UNICEF developed -

(i) A comprehensive training needs assessment to identify the emerging needs and

(ii) Organised learning clinics for capacity building using the platform of WASH digital academy.

The work carried out in Rajasthan is discussed in detail here:

i. Training Needs Assessment

Comprehensive theme-based subjects were identified and shortlisted for conducting a cloud survey of training needs assessment. A cloud-based format was developed and circulated to mid-management cadre of JJM in Rajasthan. The mid-management cadre included field staff of Public Health Engineering Department (PHED), District Project Management Unit (DPMU), District Support Unit (DSU), Implementation Support Agencies (ISA) and staff of water quality testing laboratory.

The survey covered following thematic areas: (1) infrastructure design (2) administrative processes (3) project finance (4) contract management (5) operations and maintenance of water supply schemes (6) climate change and environmental sustainability (7) water quality and monitoring surveillance (8) community engagement processes. It also covered training preferences, viz. online, offline, hybrid, residential, etc.

Of the total 71 training topics spread across eight core thematic, 16 priority topics emerged in responses wherein more than 60 per cent respondents identified these topics to be included in the training calendar. These emerging topics primarily included community management of operations and maintenance, water quality monitoring and surveillance, financial planning through Gram Panchayat Development Plan (GPDP) and 15th Finance Commission (15th FC), fixing of water tariff through Village Water and Sanitation Committees (VWSC), effective contract management, process protocol for handover and takeover of Har Ghar Jal certified villages.

As a follow-up to the training needs assessment, PHED has begun developing a detailed training calendar. In the meantime, UNICEF extended its technical support on capacity building on two critical areas, viz. Community managed operation and maintenance of in-village water supply schemes and water quality monitoring and surveillance using WASH digital academy platform introduced by Department of Drinking Water and Sanitation, Ministry of Jal Shakti, Government of India.

ii. Capacity building intervention using WASH Digital Academy platform

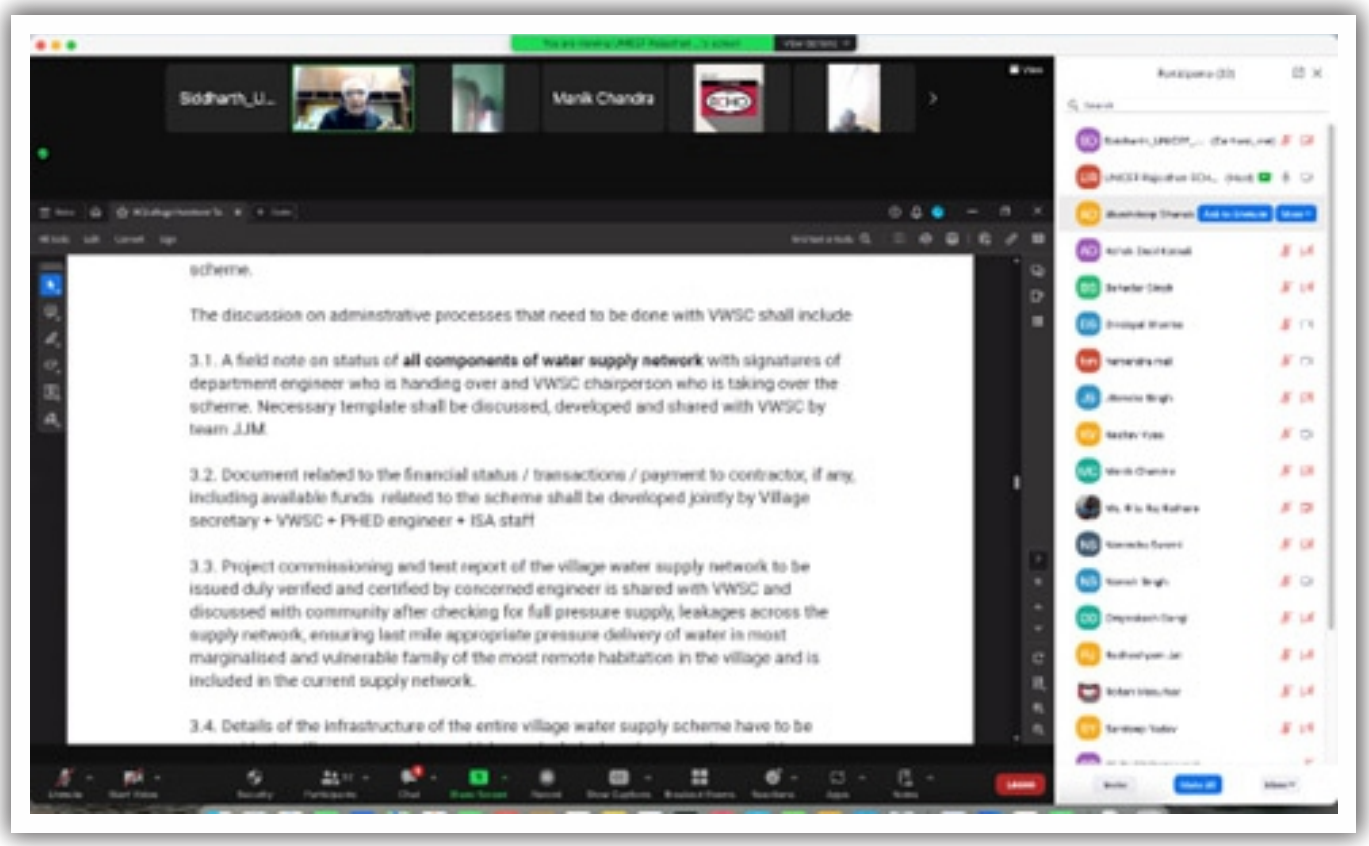
With declaration of Har Ghar Jal villages steadily increasing in Rajasthan, it is important that in alignment with mission guidelines,

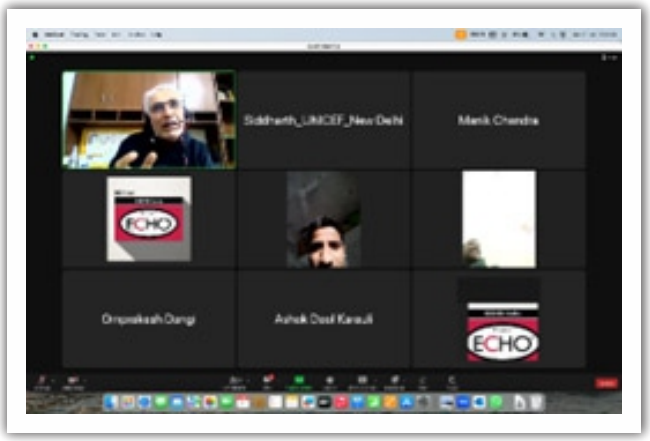
community needs to take over complete management of in-village water supply system including fixing and collection of tariff and day-to-day operations. In this context, a cloud-based village readiness assessment tool was developed with technical assistance from UNICEF. This tool assessed pre-requisites for VWSC to take over operation and maintenance of in-village water supply schemes through community engagement processes.

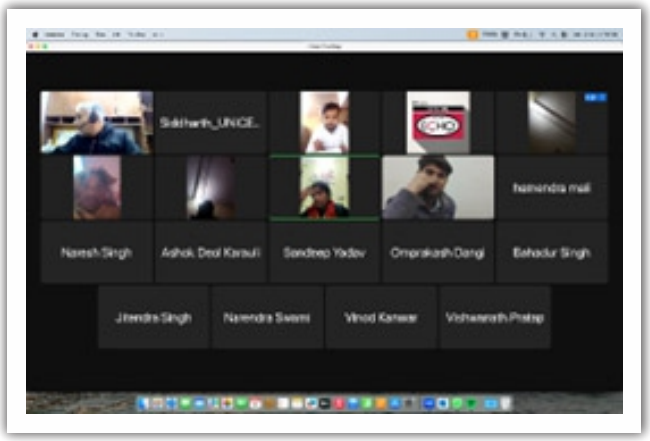
As a first step, DPMU and ISAs of three districts of Rajasthan, viz. Jaipur, Karauli and Pratapgarh were oriented on various aspects of how to use the village readiness assessment tool through WASH digital academy platform for initiating handover takeover of in-village water supply schemes in Har Ghar Jal certified villages. This initiative was well received by the target group, as it aligned to some of the areas identified for capacity building in the TNA carried out by PHED in 2023, which helped them in identifying potential villages for initiating identified interventions.

Way Forward

As a way forward, learnings from these important initiatives by PHED are planned to be integrated through development of a training calendar and scale up community-led operation and maintenance of in-village water supply schemes in Rajasthan during 2024-25.







Embracing Digital Solutions for Enhanced Rural Drinking Water Management:

A Deep Dive into an Innovative Approach in Muzaffarpur, Bihar

This article delves into the intricacies of a pilot on the use of digital solutions by Anurakshaks, pivotal to O&M of piped water supply schemes in Bihar

- **Abhijeet Kumar and Abid Reza,** Aga Khan Rural Support Programme (India) (RWPF); **Madhavi Purohit,** Arghyam (RWPF)

Introduction

In an effort to enhance sustainable drinking water management in rural areas, the Government of Bihar initiated the Mukhymantri Grameen Peyjal Nishchay Yojana (MGPNY). A key feature of this initiative is the engagement of community representatives, known as Anurakshaks, in the operation and maintenance (O&M) of Piped Water Supply (PWS) systems. This strategy reflects the state's dedication to secure sustainable water supply by fostering community involvement alongside professional management.

Digital Tools in PWS Management

The pilot project in Muzaffarpur, a collaborative effort by AKRSP(I), Arghyam, and Water For People, seeks to reinforce the sustainability of water schemes. By integrating digital tools into capacity building, financial management and community engagement processes, the project aims to ensure the PWS operates effectively and efficiently.

Knowhow at the fingertips

The PDA app has been instrumental in providing Anurakshaks with on-demand access to training content on their phones. This digital solution enables them to quickly refer to essential information, facilitating better management of daily operations, water quality testing, and community engagement. The Anurakshaks could download and share the content with others as and when required, which can be a handy tool while engaging with community members or while motivating different stakeholders.

At the same time the project managers could view the training status of all Anurakshaks across the district. With a clear view of trainings attended and trainings missed by each individual, the capacity building team can organise batches for bridging the gaps and ensure that training requirements of every stakeholder is met.

Enhancing Financial Management

The mGramSeva application (adopted by the JJM as *NalJalSeva*), developed by the eGov foundation, is a user-friendly application that streamlines income and expenditure tracking for PWS service providers and offers digital billing, reminders, and confirmations/receipts to consumers. Initially deployed in Punjab, the portal was customised to suit the PWS context in Bihar under the MGPNY pilot program and is transforming how records on income and expenditure are being managed at the WIMC level, bringing transparency and efficiency to the forefront. Preparation for using the portal required every household had a connection and was eligible to pay the user fee. Once the payment was made the same had to be entered into the system which led to creation of a verified Household Connection

Anurakshaks. A rapid survey on the access to smartphones and access to internet was carried out. 90% Anurakshaks had smartphones, and were comfortable with its basic usage. The transition to each of the digital tools, one at a time, was supported by a robust training program for Anurakshaks. The training and subsequent continuous support, pivotal in this digital transition, was not just about the tool features and navigation but also about building confidence and fostering a culture of innovation and efficiency among the Anurakshak.

Register (HCR) for each ward. It provides a precise number of households which were connected to the system.

Streamlining Task Management

The Avni platform addresses the challenge of managing the extensive administrative tasks associated with Public Water Supply (PWS) operations. By digitalizing these tasks – Ward Implementation Management Committee (WIMC) meetings, Jal Chaupals, maintaining daily water supply log book and water tank cleaning activities, Avni not only reduces the reliance on paper records but also ensures that the information is secure, accessible and up to date. This tool, can work without internet and give periodic reminders to the Anurakshak when tasks are due. The tool has been pivotal in providing stakeholders with real-time insights, thereby enhancing decision-making and operational efficiency.

Training to equip Anurakshaks for a digital era

Initial apprehensions before introducing digital tools was the accessibility of smartphones to

Impact on the Ground

The deployment of digital tools has significantly improved the efficiency of operations, community engagement, and trust in the water management process. Anurakshaks report that the use of these tools has streamlined their work, reducing the time and effort required for routine tasks. The community has welcomed the increased transparency and convenience offered by digital billing, reflecting a positive shift in perceptions of the water supply management. For project managers, digital tools have been a boon, offering insights into PWS performance and enabling swift action on operational challenges. These changes mark a significant shift in the social dynamics of the communities, with technology acting as a catalyst for improved processes and community participation.

Conclusion and Future Prospects

The integration of digital tools in the management of rural water supply in Muzaffarpur offers a practical model for using technology to improve public services. Trusted data generation at the point of action and making the collected information useful to all levels of stakeholders has the potential to act as a key enabler in improving the sustainability of rural water supply schemes at scale.

This initiative demonstrates how strategic combination of government policy, technological innovation, and community participation can lead to more efficient, transparent, and accountable service delivery. The experiences and outcomes of this project provide valuable insights for similar initiatives, paving the way for the digital transformation of rural water supply schemes across India and beyond.

Voices from the field

Sonu Kumar is 30-year-old youth working as Anurakshak for PWS in his ward since last 5yrs. While he engages in agricultural activities and works as electrician, he has been actively involved as Anurakshak in creating awareness among the community on water issues and diligently carries out his roles and responsibilities towards ensuring regular water supply in his ward.

"Bill katane se pahle, bill generate karte hain jis se sabko sms chala jaata. hai. SMS milne par kuchh log khud hamaare paas aate hain payment karne, Hamain unke ghar jaana nahin padta".

"बिल काटने से पहले हम बिल जेनरेट करते हैं, जिससे सभी घरों को SMS चला जाता है. SMS मिलने पर कुछ लोग खुद हमारे पास आते हैं पेमेंट करने. हमें उनके घर जाना भी नहीं पड़ता।"

- Sonu Kumar, Anurakshak, from Bishanapur Bakhari village working in Ward No. 08 of Muzzaffarpur district, Bihar.

Avinash Kumar is a 40 year old very energetic and highly motivated resident of the ward 12 of Majhauliya GP. On personal front, he engages in farming, and has also worked at LPG refilling station. As a social activist Avinash is passionate about women empowerment, childcare and education. He has been working as Anurakshak of PWS since 2017 and been instrumental in ensuring optimal functioning of the scheme.

"Ab humein payment lene ke liye register leke nahi jaana padta. Sirf mobile leke jaate hain, jisme suvidha hai aur hum garv bhi mehsoos karte hain"

"अब हमें पेमेंट लेने के लिए रजिस्टर लेके नहीं जाना पड़ता। सिर्फ मोबाइल लेके जाते हैं, जिसमे सुविधा भी है और हम गर्व भी महसूस करते हैं."

– Avinaash Kumar, Anurakshak, Majhauliya, Ward No 12 from Majhauliya village in Muzaffarpur district of Bihar.

"Jhar-Jal" – Digital Transformation led e-Governance Initiative Revolutionising Water Supply and Sanitation Services in Jharkhand

- **Rahul Sinha,** DWSD Jharkhand; **Biplab Shankar Dey,** SPM, Piramal Foundation

Drinking Water and Sanitation Department (DWSD) of Jharkhand has taken an impactful step by using digital technology to modernize water supply and sanitation services in the state. Through the efforts under an initiative named **"JharJal e-Portal"** project, the way of monitoring and managing water and sanitation related services has improved the way of providing citizen centric services with transparency and efficiency. Every section of society has been appreciating this initiative of the department since its launch in early 2022.

The main objective of this initiative is to create a transparent and efficient public service delivery system using the latest technologies. Using a robust technology platform consisting of ASP.NET, SQL Server, Android and GIS, the project is ensuring streamlined and real-time data management.

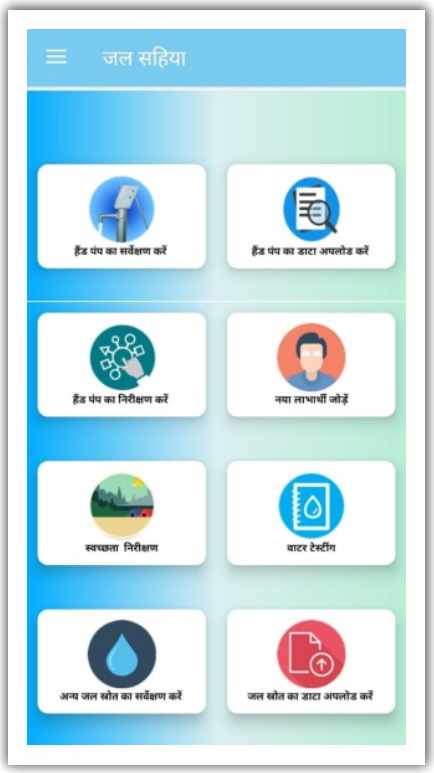
An important feature of the project is timely disposal of citizen complaints. Earlier, filing complaints manually required a lot of time and effort. However, with the advent of Jhar-Jal portal citizens have the opportunity to lodge complaints and get prompt resolution through paperless, labor-free mobile phone sitting at home.

The project also ensures water quality. Real-time monitoring and GIS mapping of water sources ensures quick identification and resolution of problems related access to water and

sanitation. This initiative facilitates communities with safe and clean water, which strengthens their social and mental well-being.

Additionally, the project includes Remote Monitoring System (RMS) using Internet of Things (IoT) technology to monitor mini water supply schemes (single village schemes) based on solar energy. This is a commendable effort through which senior management gets information regarding water supply, thereby securing regular update on status of operation and maintenance of these schemes. Based on the information received, necessary guidelines are also being given to the concerned divisions to ensure prescribed quantity, quality and regularity in water supply.

Before the implementation of this initiative, water supply and sanitation services in Jharkhand state faced problems like very slow complaint resolution and limited access to information at the divisional level. But with the advent of JharJal e-portal, the monitoring and resolution of complaints has increased from 20% to an astonishing 91%. This proves the progress and effectiveness of the real-time information system.



Furthermore, the Jalsahiyas (a key woman member-cum-treasurer of VWSC working as Last Mile Cadre for promoting WASH interventions, one each in every village of Jharkhand) are using Jhar-Jal Mobile App to conduct various survey related works viz. functionality assessment of handpumps, source sanitary inspection etc. besides submitting records of their monthly calendar activities regularly. This enables timely follow-up of various support activities in the villages besides timely processing the payments of monthly incentive based Jalsahiya honorarium. The state government has recently taken a decision and sanctioned a budget of Rs. 39 Crore to provide Smartphones/ Tablets to all approx. 29,500 Jalsahiyas with the aim to capacitate and empower them for their role and responsibilities.

Due to this initiative of the department, especially women and people from backward sections of the society are getting most benefitted by the use of these digital services. Streamlined processes, improved

transparency and timely resolution of complaints have created self-confidence and trust in rural communities. Apart from this, engineers and administrative officers are getting assistance in monitoring, decision making and ensuring overall service delivery through this mechanism.

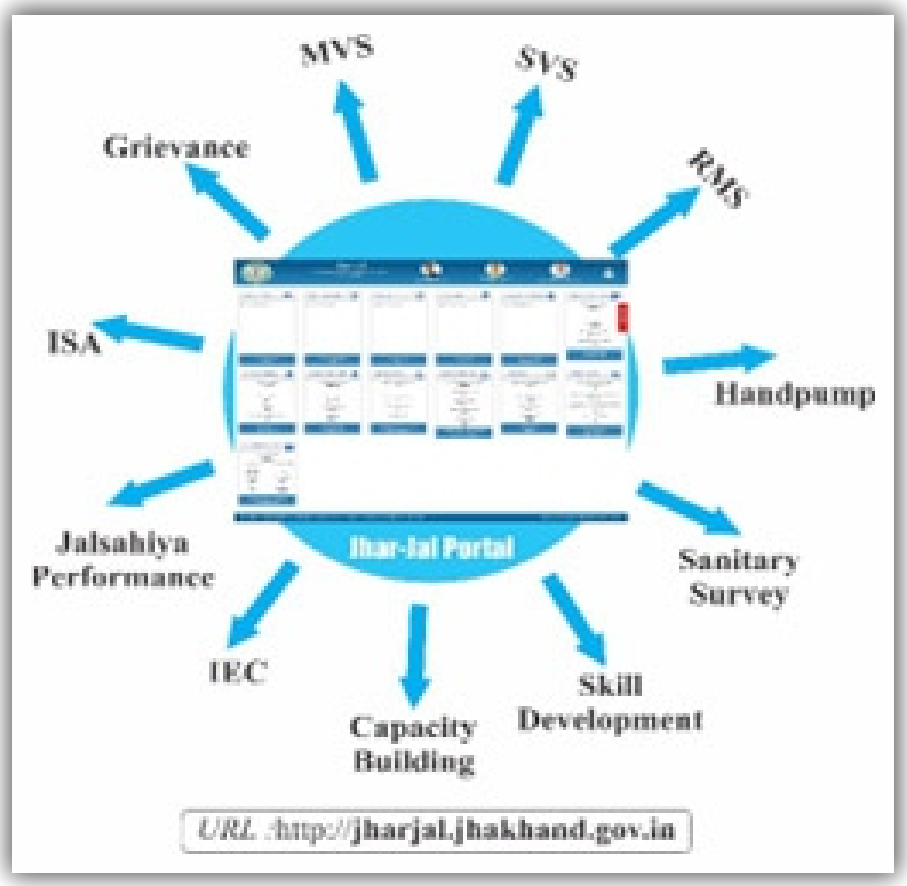
The success of JharJal e-portal project is a unique testament in the field of digital transformation and e-governance. It showcases the immense potential hidden in cutting edge technologies and reflects the commitment to sustain efficient and transparent public water supply cum sanitation services to the rural citizens of Jharkhand.

This initiative of Jharkhand is paving the way of bright future for success of national flagship program Jal Jeevan Mission in favor of rural citizens of the state. Other states will also be inspired by this initiative.

Status of key features so far:

1. **Means of Verification (MoV):** URL: *http://jharjal.jharkhand.gov.in;* Developed by: Jharkhand Space Application Centre (JSAC); Deployed at: State Data Center, JAP-IT, Ranchi. And Grievance Redressal Cell (Call Centre) at PMU, DWSD Ranchi.

2. **Objectively Verifiable Indicators (OVI):** Changes in progress and performance recorded on Jha-Jal e-portal vs. that reported on JJM and SBM-G IMIS. Monitoring and evaluation of specific parameters (all activities and information at local level) could not be done through JJM and SBM-G IMIS.



3. **Scopes to be promoted by DWSD Jharkhand under its JharJal intiative:** following modules are to be either incorporated or emphasized upon soon -

i. Water supply monitoring through sensor-based RMS controller (for approx. 1 lakh SVS schemes)

ii. Monitoring module through IoT dashboard (for approx. 700 MVS schemes including old and new)

iii. Grievance registration and redressal through AI tool (Whatsapp bot) – for all water and sanitation related complaints.

iv. Handpump survey through Mobile App and monitoring through GIS portal (for approx. 4 lakh ground water sources)

v. Baseline survey and IEC activities done by ISAs and monitoring through JharJal portal (for all approx. 29500 villages)

vi. Sanitary inspection of water sources and its monitoring through JharJal platform.

Reinforce Rural Lives through Sustainable Water Quality Management under Jal Jeevan Mission

- **Divya Chauhan and Laxmi Baluni**, NJJM

Water is a fundamental resource which is essential for sustaining life. Ensuring its quality is crucial for the well-being of communities. In India, Jal Jeevan Mission (JJM) has emerged as a transformative initiative aimed at providing safe and potable water to all rural households. One of the key components of this mission is the implementation of a robust water quality management system. This article explores the significance of water quality management under JJM and its impact on the lives of people across the country.

Background:

Before the implementation of JJM, water quality testing and monitoring efforts in India were limited, especially in rural areas. Many communities lacked access to regular water quality testing services, resulting in a lack of awareness regarding the safety of their drinking water. In certain regions, water quality testing was sporadic and irregular, leading to delayed identification of contamination issues and other water quality problems. Access to water quality data was often limited to government authorities and stakeholders, resulting in reduced public awareness and participation in addressing water quality concerns.

The JJM aimed to address these limitations by expanding water quality testing and monitoring to cover a larger number of locations and communities. The mission emphasized regular monitoring to ensure that drinking water sources meet the prescribed quality standards as per BIS 10500, enabling early detection of contamination and timely intervention. Technological advancements, such as real-time monitoring systems and automated sensor technologies have been encouraged by JJM to improve water quality testing methods.

Water Quality Management Information System (WQMIS) portal, managed by Department of Drinking Water and Sanitation, Ministry of Jal Shakti and Designed, Developed and Hosted by National Informatics Centre (NIC) has a significant advancement in ensuring safe drinking water for rural households in States and Union Territories (Uts). It serves as a comprehensive platform for sample collection from source as well as delivery point, water quality testing, reporting, remedial action, monitoring, and surveillance of drinking water sources.

1. WQMIS key features:

The portal offers several key features that contribute to its effectiveness and impact:

- **Water Quality Information:** The WQMIS portal provides detailed information on the quality of water supplied to rural households. This transparency creates confidence among consumers, assuring them that the water they consume is safe.
- **Reports in Different Formats:** WQMIS offers a variety of report formats to analyse water quality data. These reports can be viewed based on different parameters such as State-wise, Lab-wise, Village-wise, Quality affected areas, and the measures taken to address water quality issues in WQMIS report/analysis portal. Such diverse reporting options enable authorities and stakeholders to gain insights into the status of water quality and implement targeted measures for improvement.
- **Public Domain Access:** The information available on the WQMIS portal is accessible to the public. This transparency promotes accountability and encourages active participation from stakeholders in monitoring and ensuring adherence to water quality standards. The report of the water sample of villages can be accessed on Citizen Corner platform. To access water test report and provide the feedback, rural communities can visit the official Citizen Corner website at *https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx.*
- **Lab Locator and Water Quality Test Booking:** The portal includes a feature that allows users to

locate nearby laboratories, facilitating easy access to water quality testing services. Additionally, public can book water quality tests at nominal charges, promoting proactive monitoring of water sources.

- **Remedial action:** WQMIS portal plays important role to take strategic decision for remedial action on contaminated samples, selection of appropriate water treatment technologies, outreach strategy for public awareness related to water quality issues etc.

2. Benefits and Impact:

The enhanced version of the Water Quality Management Information System (WQMIS) portal brings several notable advantages, contributing to improved water quality management in multiple ways. The following aspects highlight the benefits of the upgraded portal:

- **Empowerment of Rural Communities:** The mission empowers rural communities by involving them in the decision-making processes related to water management. This participatory approach fosters a sense of community ownership and responsibility, promoting sustainable practices for the long-term. As of now about 23,55,832 women have been trained for water samples testing using Field Testing Kit (FTK). Rural communities can also check in village assigned FTK users on "Know FTK Users" tab on WQMIS portal.
- **Enhanced Awareness:** By making water quality information readily available to the public and various stakeholders, the WQMIS portal promotes greater awareness about the quality of drinking water. This increased awareness empowers individuals and communities to make informed decisions regarding their water consumption and take necessary precautions if any water quality issues arise.
- **Informed Decision-Making:** The availability of accurate and up-to-date water quality data on the WQMIS portal enables stakeholders, including government authorities and water management agencies, to make informed decisions. With a comprehensive understanding of the water quality situation, decision-makers can implement targeted measures to address specific issues and allocate resources effectively.
- **Cost Savings:** The WQMIS portal can contribute to cost savings in water quality management. By streamlining data collection, reporting, and analysis processes, the portal reduces the time, effort, and resources required for manual data management. This optimization allows for more efficient utilization of funds and resources, leading to cost savings in the long run.
- **Data Accuracy:** The use of a centralized platform like the WQMIS portal ensures the accuracy and reliability of water quality data. With standardized data collection protocols and real-time monitoring systems, the portal minimizes errors and discrepancies in data reporting. This accuracy helps in identifying and addressing water quality issues promptly, thereby safeguarding public health.
- **Streamlined Reporting:** The WQMIS portal offers streamlined reporting capabilities, enabling easy access to water quality reports in various formats. This simplifies the dissemination of information to different stakeholders, such as government officials, researchers, and community organizations. Streamlined reporting facilitates efficient communication and collaboration, fostering a coordinated approach to water quality management.
- **Better Service Delivery:** The improved WQMIS portal enhances service delivery in the domain of water quality management. With features like lab

locators and water quality test bookings, the portal ensures easy access to testing services for users. This proactive approach to service delivery enables prompt detection of water quality issues and timely interventions, leading to improved overall water quality and better public health outcomes. By fostering collaboration and data-driven approaches, the portal contributes to ensuring safe and clean drinking water for communities, ultimately benefiting public health and well-being.

3. Digital Transformation-

The utilization of digital technologies in the Water Quality Management Information System (WQMIS) brings about significant benefits and contributes to the digital transformation of governance, particularly in the realm of water quality management.

Here are some perspectives on how WQMIS facilitates digital transformation:

- **Digitization of Data:** WQMIS enables the digital storage and management of water quality data, eliminating the need for manual record-keeping. This digitization process enhances accessibility, searchability, and organization of information, making it easier for authorities to retrieve and utilize data effectively.
- **Real-Time Monitoring:** The integration of real-time monitoring systems within WQMIS allows for continuous data collection and transmission. This functionality provides authorities with instant updates on water quality parameters, enabling them to respond promptly to any deviations or contamination incidents. Real-time monitoring enhances the efficiency and effectiveness of water quality management efforts.
- **Collaboration and Integration:** WQMIS serves as a digital platform that facilitates seamless collaboration among various agencies and stakeholders involved in water quality management. The system promotes data sharing, coordination, and communication, fostering an integrated approach to governance. This collaborative aspect enhances the effectiveness of water quality management initiatives.
- **Evidence-Based Decision-Making:** The availability of reliable and up-to-date water quality data through WQMIS empowers policymakers to make evidence-based decisions. Accurate information obtained from the system enables policymakers to formulate strategies, design interventions, and allocate resources in a more informed manner, leading to effective governance outcomes.
- **Spatial Analysis with GIS:** WQMIS incorporates Geographic Information System (GIS) technology to map water quality data spatially. This spatial analysis helps identify geographical patterns, hotspot areas with specific water quality challenges, and prioritize interventions based on location-specific needs. GIS integration enhances the precision and efficiency of governance efforts.

4. Outcome:

The Jal Jeevan Mission's water quality management system represents a holistic and integrated approach to addressing the challenges of water contamination in rural India. By combining technological innovations, community engagement, and sustainable practices, the mission strives to ensure that every household has access to safe and clean drinking water. As the mission progresses, its impact on public health, community development, and environmental sustainability is poised to create a legacy for generations to come.

Digital Public Infrastructure (DPI) :
The Digital Pulse of India's Jal Jeevan Mission Revolutionising Water Access

- **Navneet Kumar, Anand Pandey and Kushbu,** NJJM

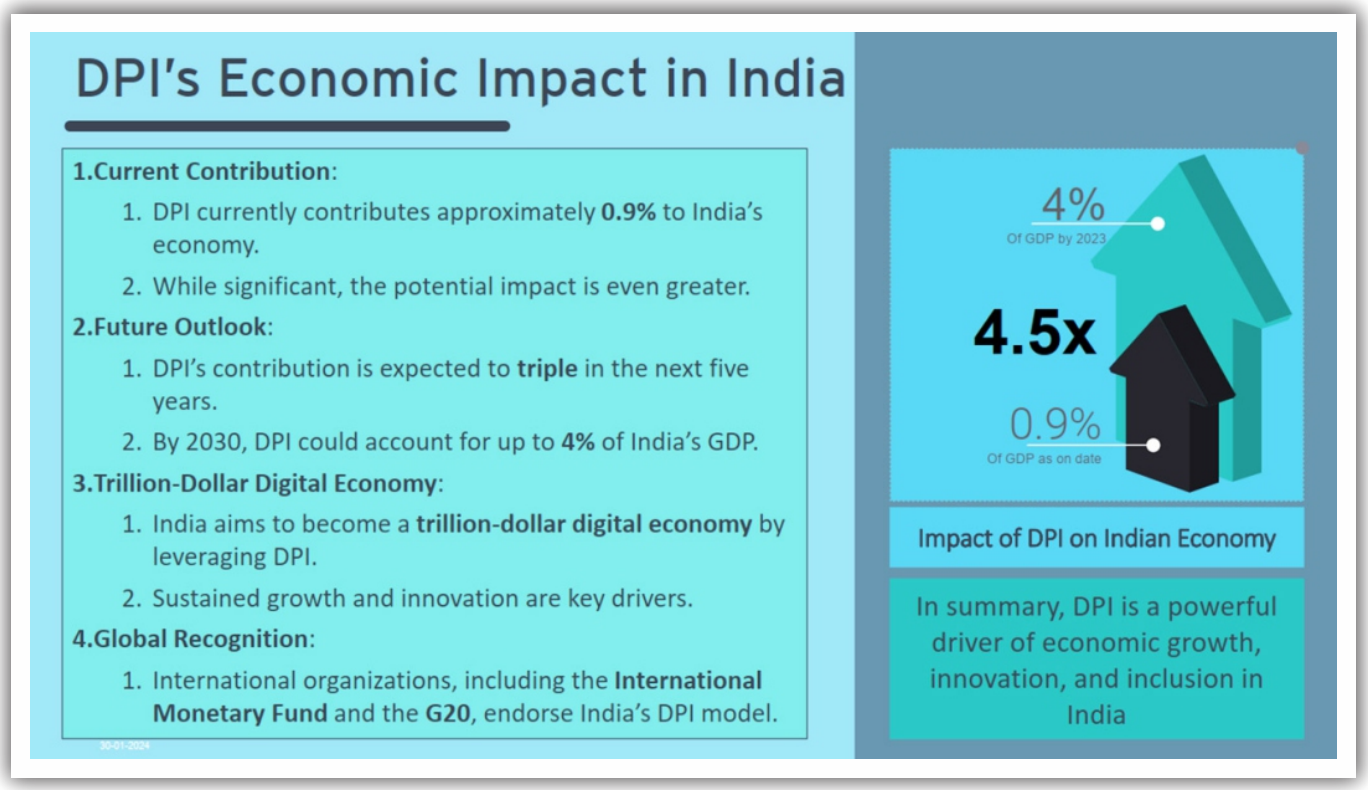
In India, a nation of over a billion people, confronting the challenge of equitable water distribution is not just an environmental concern but a testament to the country's dedication to public welfare. Against this backdrop, the Jal Jeevan Mission (JJM), an initiative spearheaded by the Department of Drinking Water & Sanitation under the Ministry of Jal Shakti, stands as a monumental effort to ensure that clean drinking water reaches every rural home. What amplifies the mission's ambition is its intricately woven Digital Public Infrastructure (DPI), a sophisticated amalgamation of technology and public service, charting a course for a future where digital governance is the norm, not the exception.

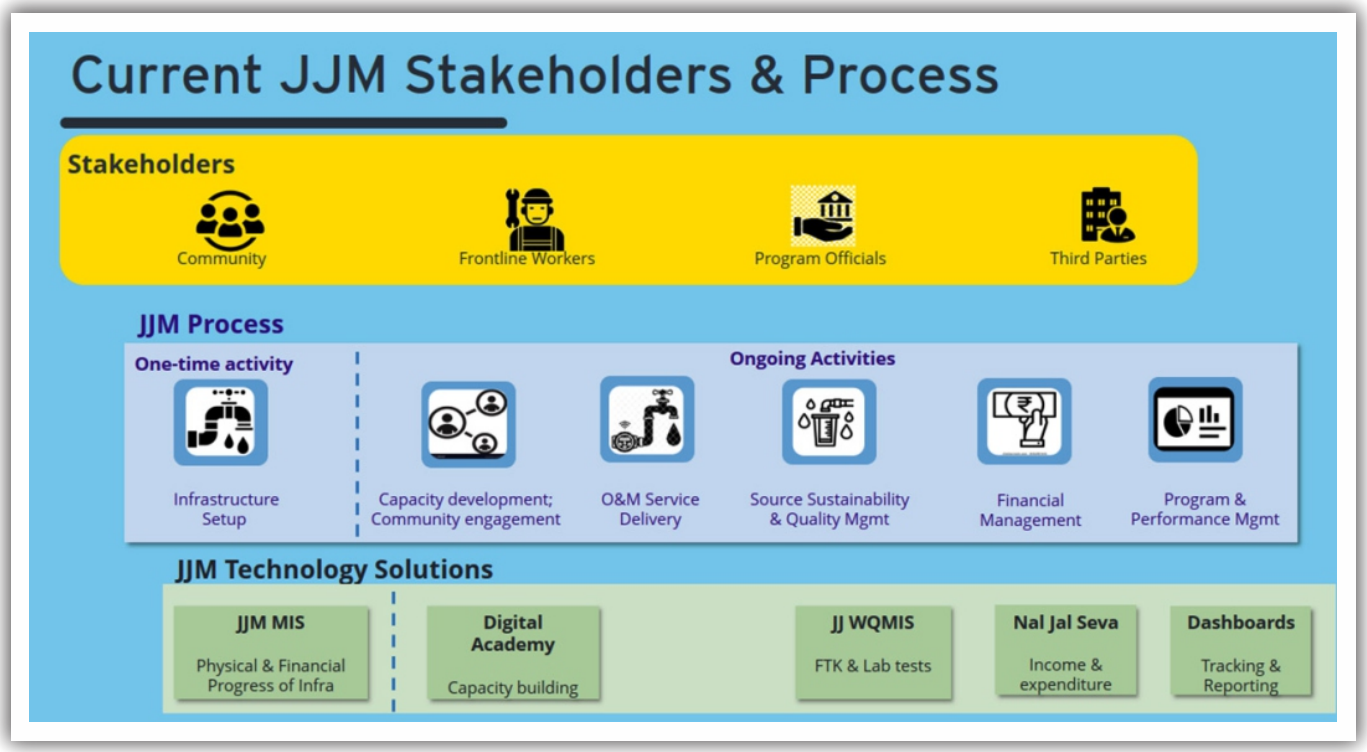
The Essence of India's Digital Public Infrastructure

At the core of the DPI's success are the foundational elements comprising Aadhaar for biometric identification, DigiYatra for a streamlined air travel experience, DigiLocker for secure document management, and the Unified Payments Interface (UPI) for efficient financial transactions. Collectively, these infrastructures symbolize the transition to an advanced digital state, emphasizing social and financial inclusion, security, and convenience.

The Cornerstones of India's Digital Framework

This digital lineage has not only eased bureaucratic complexities but has embraced a people-centric approach where services are but a touch away. These initiatives reduce the daily struggle of paperwork, eliminate long queues, and pinpoint targeted welfare disbursement, underscoring the inclusive growth the country strives for. Economically, DPI charts a trajectory that could thrust India's GDP contribution from 0.9% to an envisioned 4% by 2030. This quantum leap embodies the potential to evolve India into a behemoth trillion-dollar digital economy, evoking





endorsements from global entities such as the IMF and benefitting from the spotlight at G20 discussions.

Unleashing the Power of DPI in JJM

Jal Jeevan Mission harnesses the DPI to drive home the premium on data-led governance, objective tracking of Functional Household Tap Connections (FHTCs), and water quality management. Digital platforms like the JJM - IMIS, JJM Dashboard, and JJM WQMIS are the pulsating hubs where data translates into action, be it in the monitoring of schemes, overseeing the water testing, or enabling communities to take active roles in governance.

DPI in Action Within JJM

- **Advanced Monitoring and Governance through DPI:** JJM's digital platforms, spearheaded by the JJM - IMIS and inclusive of the JJM Dashboard and WQMIS, serve as the instruments through which data is transformed into actionable governance.
- **Streamlining Operations with Digital Innovations:** The DPI ensures operational efficiency by digitizing data collection and enabling real-time transparency in service delivery.
- **Empowering Communities with Data Accessibility:** Through JJM's DPI outreach, communities are encouraged to participate actively in monitoring water quality, fostering a vigilant governance ecosystem.
- **Navigating the Challenge Spectrum:** The road to DPI integration is peppered with obstacles such as data security concerns, infrastructural needs, and the inertia against change. However, opportunities in scalability and technological synergy await, with JJM poised to adopt global cybersecurity best practices.

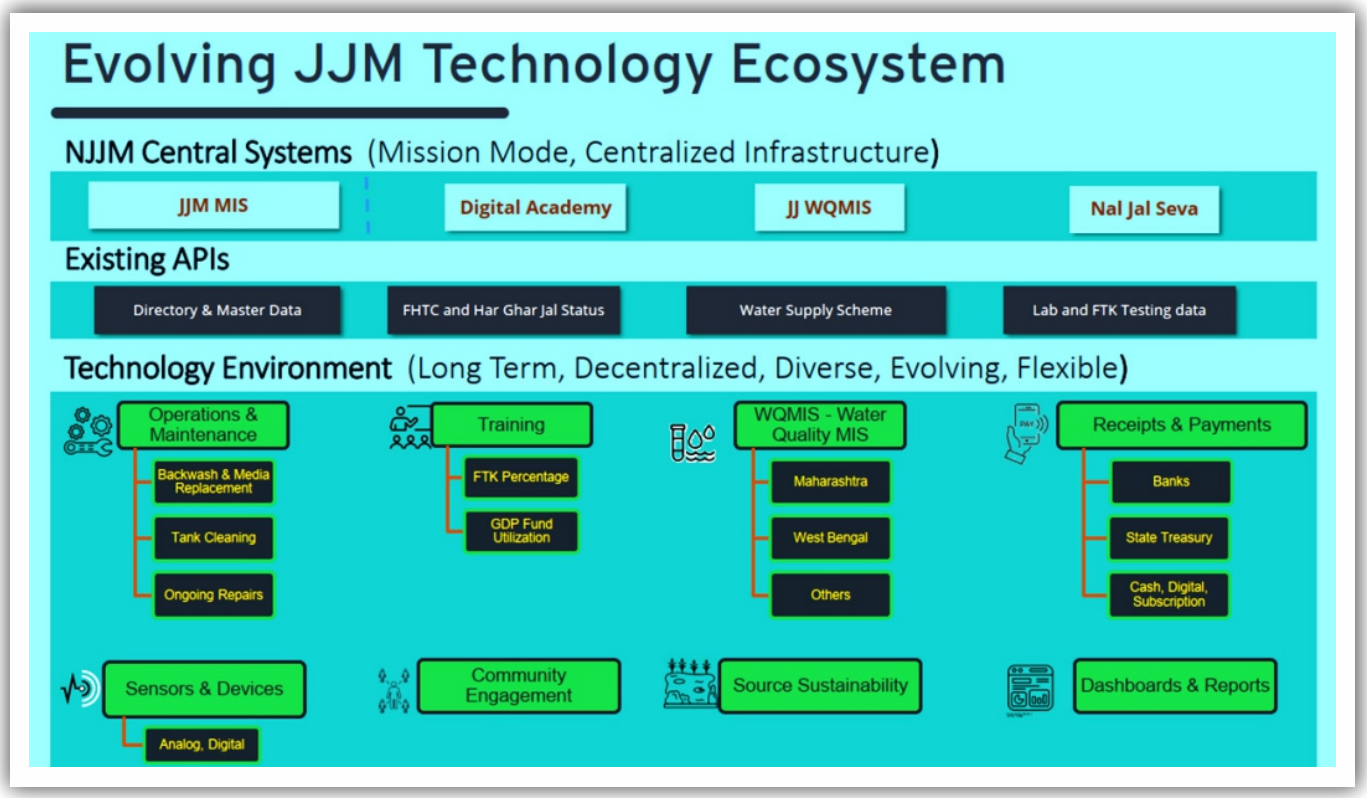
DPI: JJM's Technology Blueprint and Future

JJM's DPI strategy involves enhancing current digital initiatives, capacity building for local management, and nurturing community-level participation. The JJM MIS, Digital Academy, JJM WQMIS, and Nal Jal Seva are part of this transformative roadmap designed to ameliorate infrastructure setup, financial management, and service deliverability.

DPI translates into multifaceted efficiency within JJM. Not only does it streamline the complex web of information collection, but it also encourages transparency, improving stakeholders' ability to access and interpret mission progress, and embodies inclusivity in service delivery, ensuring no community is left behind. The availability of daily data fortifies the mission's ability to proactively manage resources, plan services effectively, and swiftly address emergent issues, a vital component in a country prone to natural variances in water availability.

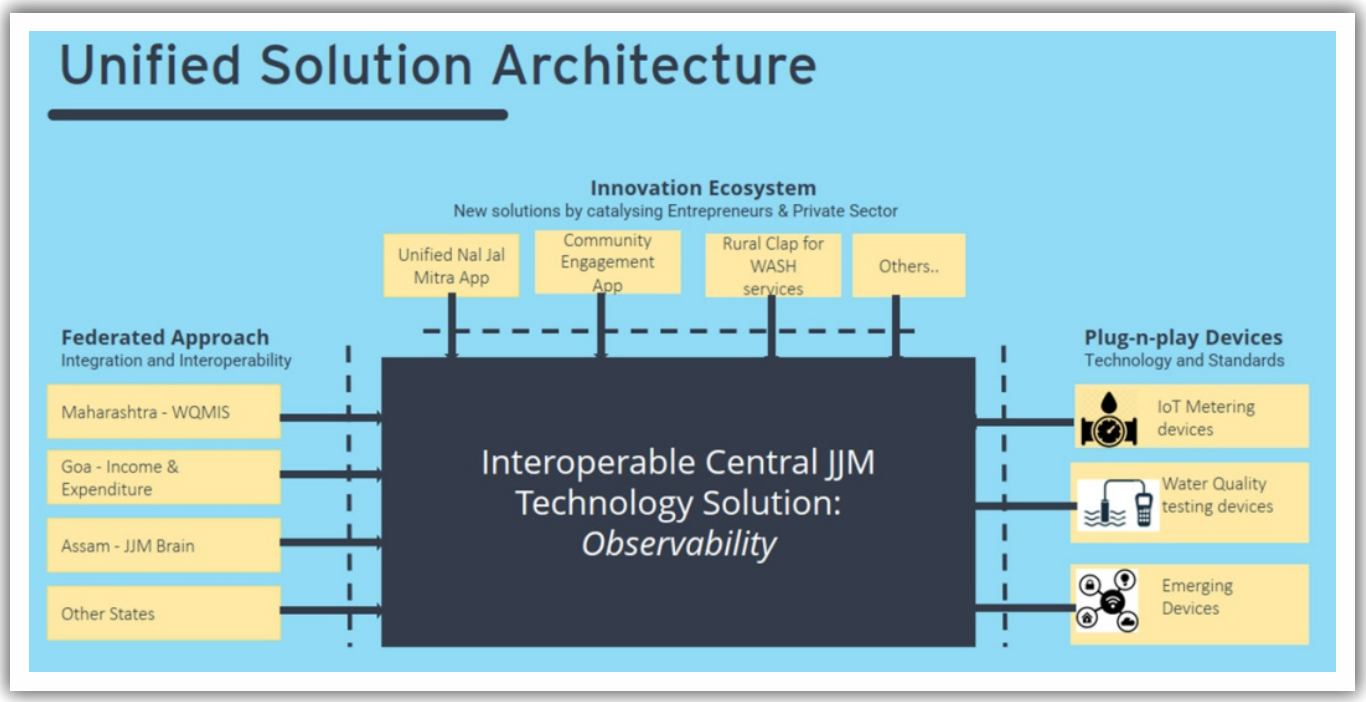
JJM's DPI Strategy: A Model for Sustainable Innovation

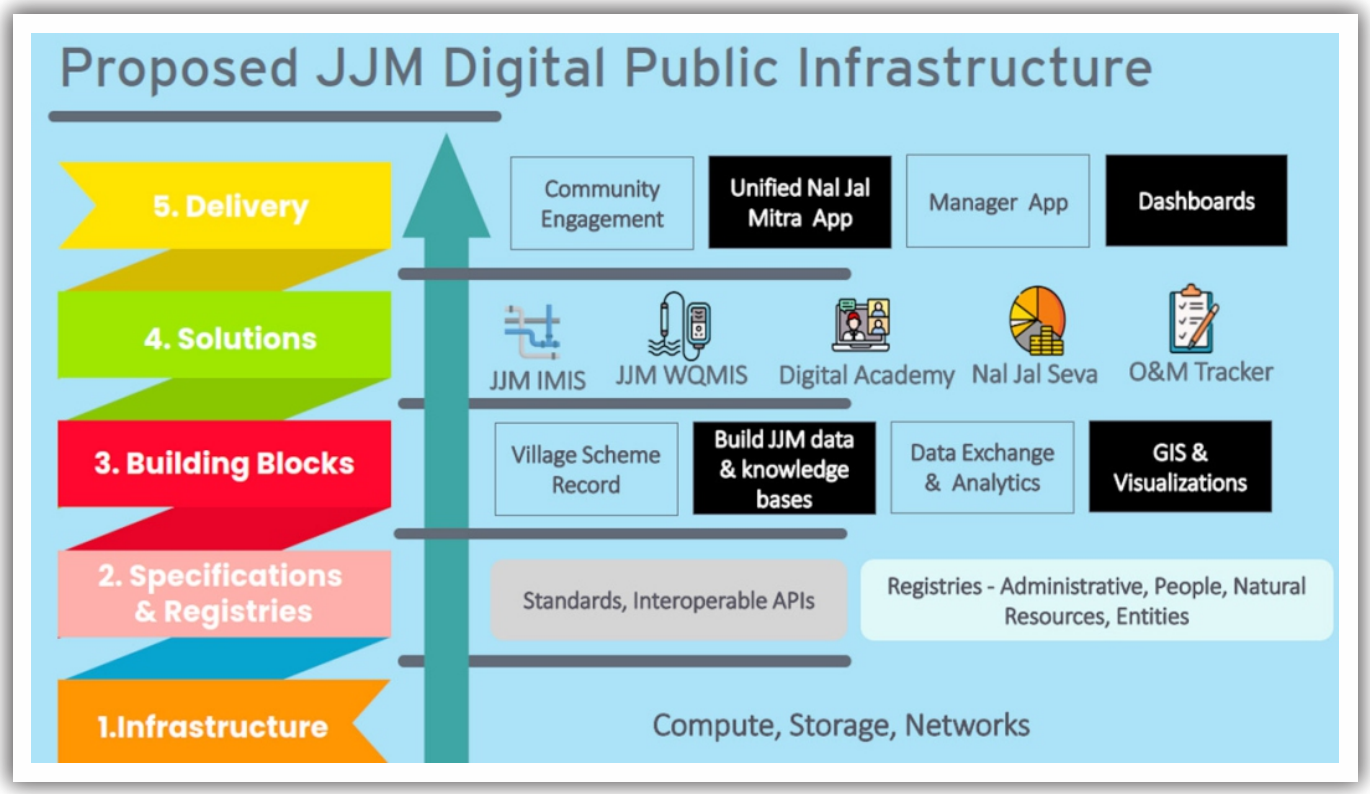
- Unifying Technology for Maintenance and Analytics: Operational



technology, analytics, and visualization tools are key components in JJM's DPI approach, aiming to revolutionize maintenance practices and data comprehension.

- A Framework Enriched for Data Exchange and Analysis: A structured DPI framework within JJM offers comprehensive data exchange and analytics facilities, driving better efficiency and ensuring inclusive services.
- Projecting JJM's Global Influence with DPI: JJM stands as an instructional model for the confluence of water resource management and digitization, potentially guiding global public infrastructure initiatives.
- The DPI Advantage: Scalability, Impact, and Legacy: The DPI's true advantage lies in its flexible nature, the magnitude of its





impact on governance, and its potential to create a lasting legacy.

Digital Integration: Crafting a Public-Private Synergy

To ensure seamless deployment and compliance, the meticulously defined collaboration between governments, private partners, device ecosystems, and civil society organizations is critical. Together, they reinforce the digital fabric that constitutes JJM's DPI strategy.

Challenges and Opportunities in the Path of DPI

The incorporation of DPI is not devoid of challenges; data security looms as a titan needing vigilant management, gaps in infrastructure demand bridging, and resistance to technological change needs addressing. Yet, recognizing these hurdles paves the way for scalability, robust technology integration, and the establishment of global cybersecurity practices that serve to armour the data corridors against breaches and threats.

A Future Roadmap for DPI and JJM

The technology ecosystem of JJM, with the DPI at its core, is on a trajectory of continuous transformation. Plans involve harnessing operational technology for maintenance, employing analytics for better resource management, and curating user-friendly visualization tools to distill complex data into actionable intelligence. Such advancements are poised to solidify JJM's effectiveness and responsiveness.

Incorporated within JJM's blueprint is a visionary DPI framework that features robust infrastructure, tailored specifications, and a palette of solutions emphasizing enriched data exchange and analytics. From boosting efficiency to ensuring quality and inclusivity, DPI provides tangible improvements across the spectrum – for rural homeowners, stakeholders, frontline employees, and the overarching governmental ecosystem.

The Ripple Effect of Synthesized DPI in JJM

The DPI model employed within JJM is more than a digital backbone – it is an ecosystem that thrives on scalability and sustainability. Looking ahead, the mission's roadmap casts light on expansion, fostering innovative solutions, leveraging collaborations across sectors, evaluating the impact, and mounting multi-tiered awareness campaigns to bring every stakeholder to the table.

A well-defined network of roles and responsibilities ensures that states, JJM partnerships, solution providers, and sensor ecosystems work in concert to guarantee deployment, compliance, maintenance, and the iterative refinement of DPI solutions. This level of organization reflects a commitment to not only incept but to nurture and grow the digital mechanisms that underpin the mission.

Harnessing DPI for a Global Model

As JJM forges ahead, the DPI-based model becomes instructive for the world, delineating a pathway for federating water resource management and public infrastructure seamlessly into the digital era. India's narrative, with the JJM at its forefront, is a compelling case study for the symbiosis of technology and humanitarian goals, showcasing remarkable governance strides, sparking economic propulsion, and elevating quality of life.

Indeed, JJM's enduring digital initiatives are shaping a blueprint for similar missions worldwide, establishing a befitting exemplar of how infrastructure can harness the power of technology for societal upliftment. With DPI as the standard bearer of this transformation, the Jal Jeevan Mission is not only bringing water to the doorsteps of millions but also embodying the spirit of a forward-thinking, inclusive India.

JJM's DPI-structured approach is not only fulfilling the vision of water for every rural home in India but is also etching the outlines for a digitally empowered world, where technology and welfare harmonize to craft sustainable and equitable solutions for one of humanity's most fundamental necessities – water.

Ensuring Every Drop Counts:
Jal Jeevan Mission's Data Accountability in the Global Arena

- Rana R K Singh and Absar A. Khan, NJJM

Background

As nations strive to achieve Sustainable Development Goals (SDGs), India's Jal Jeevan Mission (JJM) rises as a beacon of data accountability. JJM launched by the Government of India in 2019, aims to provide safe and adequate drinking water to all households in rural India through Functional Household Tap Connection (FHTC). The mission has been lauded for its commitment to public accountability, with the government voluntarily making itself accountable to people at the grassroots. This mission leans heavily on meticulous data-driven strategies that reflect a steadfast commitment to international standards and accountability. This article explores the data accountability of Jal Jeevan Mission in a global context, with reference to the Joint Monitoring Programme (JMP) Report by UNICEF.

The Joint Monitoring Programme Report by UNICEF

The WHO/ UNICEF Joint Monitoring Programme (JMP) for Water Supply, Sanitation and Hygiene has been reporting on progress in drinking water, sanitation, and hygiene (WASH) since 1990. The 2023 JMP update report, highlights stark inequalities in access to WASH, with a heavy burden falling on women and girls. As per JMP report, the accessibility of safely manged and basic water supply has improved globally since 2015.

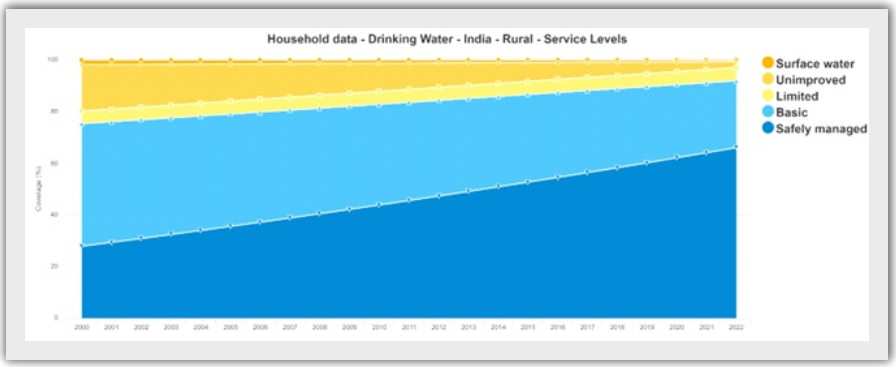
Source - Washdata.org

Aligning with the Joint Monitoring Programme Report by UNICEF

UNICEF's JMP Report serves as a global standard for assessing progress in the water supply and sanitation sector. It provides a comprehensive analysis of trends and an accountability framework for global water initiatives. In the context of Jal Jeevan Mission, the JMP report serves as a benchmark for assessing progress. The mission's goal aligns with the JMP's objective of achieving universal access to safe drinking water.

The JJM has made significant strides, with the potential to avert almost 400,000 diarrhoeal disease deaths if it provides safely managed drinking water to all of India.

JJM engages in regular data collection and dissemination practices that allow for the continuous monitoring of water service levels across millions of households. This level of granular data accessibility ensures that the program can be objectively evaluated against key indicators such as the proportion of the population using safely managed drinking water services—a core parameter in JMP's remit.



Source - Washdata.org

JJM: A Data-Centric Endeavor

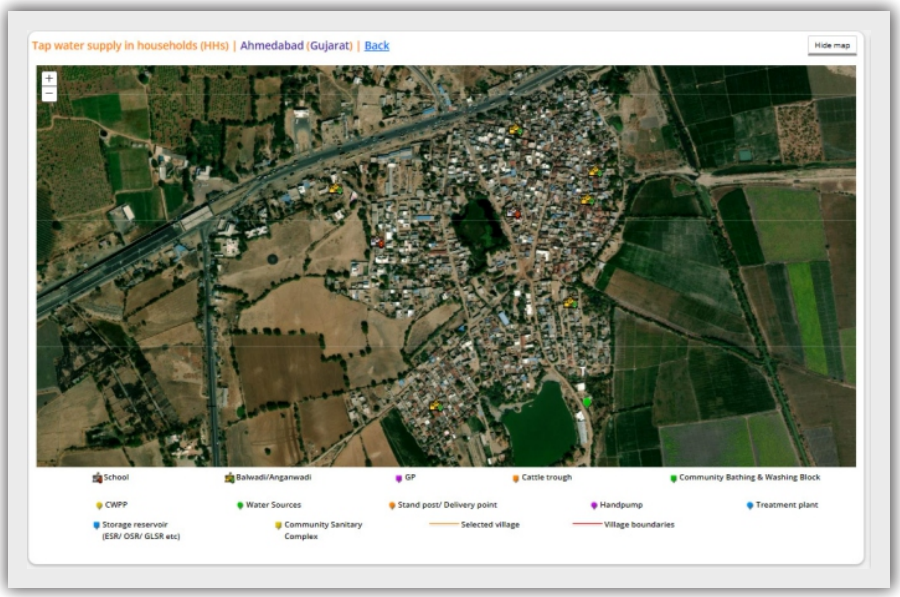
JJM transforms raw data into tangible results, building a resilient water supply network for millions of Indian residents. JJM, with its meticulous data acquisition through platforms like JJM Dashboard *(https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx)* and JJM WQMIS (Water Quality Management Information System) *(https://ejalshakti.gov.in/WQMIS)*, echoes the international aspirations of the JMP by providing transparent and actionable data. We can navigate real time minute details related to institutional arrangement, planning, implementation and O&M of rural water supply up to village level.

Adherence to Global Standards

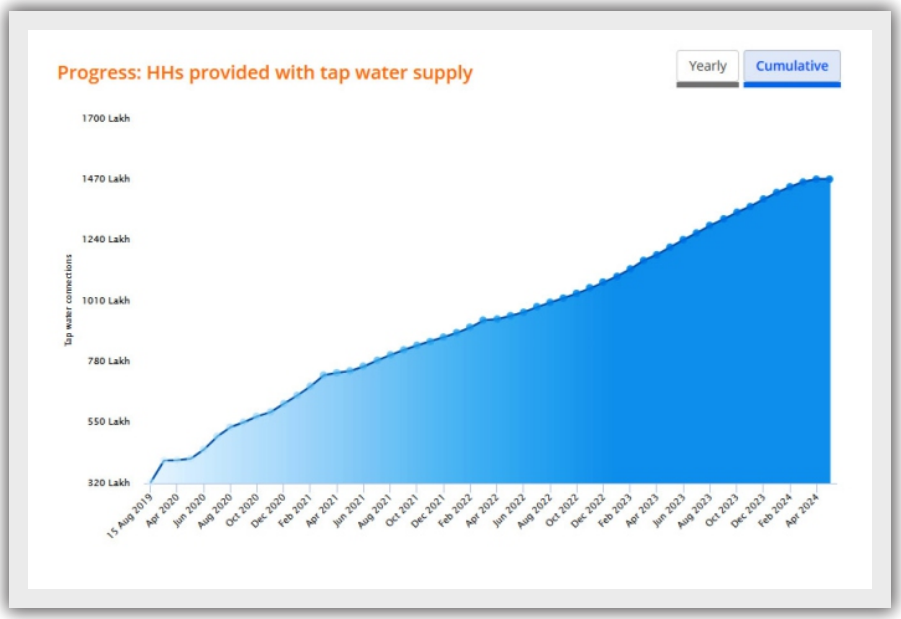
Benchmarking with UNICEF's JMP: JJM aligns with pivotal global systems such as UNICEF's Joint Monitoring Programme. This partnership enables a synthesis of country-specific data indicators with global benchmarks, affirming JJM's commitment to tracking parameters such as safely managed drinking services. JJM's alignment with JMP's stringent standards exhibits an extraordinary leap in fulfilling the promise of SDG6.

Comprehensive Data Reporting

Tracking Progress with Precision: JJM employs the JJM Dashboard to meticulously track and report its initiatives, ensuring complete transparency at every stage—from sanction to completion. Every statistic, from individual tap connections to aggregate water supply schemes, is documented and made public, underscoring the program's dedication to wholesomeness and precision in data handling.



Source - Washdata.org



Source – JJM Dashboard

Toward Water Quality and Assurance

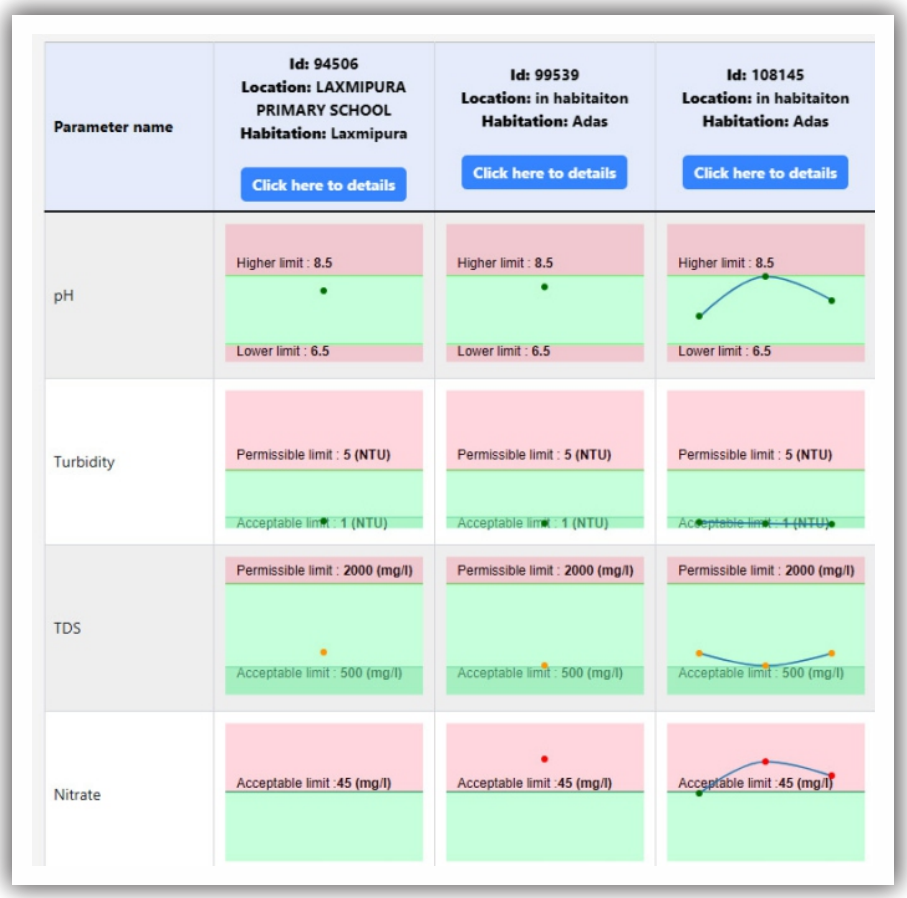
Guaranteeing Safety: The JJM WQMIS becomes integral to the mission's surveillance mechanisms, rigorously assessing water quality and making this information accessible for public scrutiny. By embedding quality checks within the mission's workflow, JJM ensures that India's push for water accessibility also upholds global health standards.

Data Accountability: A Comparative Global Analysis

JJM's commitment to data-driven progress stands in sharp comparison to similar international initiatives.

A Paradigm of Transparency

- **Benchmark for Participation**: JJM sets new standards with its inclusive policy design that transcends mere service



Source – JJM Citizen Corner

delivery. It exemplifies the imperative role of transparent data handling in fostering public trust and enforcing accountability.

Tech-Forward Accountability

- **Digital Superiority**: The mission's embrace of digital solutions such as real-time data analytics creates a legacy of tech-forward accountability. These strategies outshine many global water reforms, highlighting the importance of technology in driving systemic change.

Localized Data, Global Relevance

- **Micro-Data Managed for Macro Impact**: JJM's decentralized data system amplifies the global discourse on localized water governance. By fine-tuning data accountability at the community level, the mission underpins the principle that global relevance is nurtured through local excellence.

JJM and the WASH Narrative

As WASH (Water, Sanitation, and Hygiene) policies define the global template for water governance, JJM's role offers profound insights.

Aligning with WASH Goals

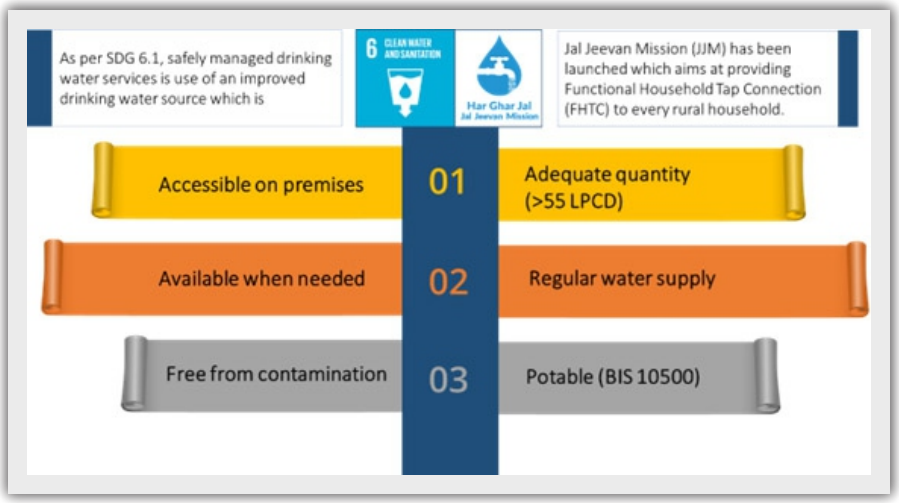
- **Sustainability and Accessibility**: JJM stands as a testament to the power of integrating stringent data management with WASH goals. It exemplifies converting challenges into milestones through the prism of sustainability and accessible measures.

An Exemplary Model for WASH

- **Inspiring Global Policies**: The values and methodologies that run through the veins of JJM can inspire a multitude of nations grappling with WASH challenges. Community is always in the centre stage in planning, implementation and O&M of JJM scheme. India's model reveals the colossal impact of harnessing data for progressive water governance.

Comparative Analysis: JJM in the Global Water Initiative Spectrum

On a comparative front, JJM stands out for its incorporation of advanced technological tools like the JJM Dashboard and WQMIS, which are not as widely used in water initiatives in many other countries. These tools facilitate the real-time monitoring and reporting of data, setting a high standard of accountability unrivalled by many global counterparts.



For example, while many nations continue to grapple with establishing baseline data for water services, JJM's digital infrastructure ensures that not just baseline data, but continuous real time data is captured and monitored for strategic decision and key actions. This proves essential in contexts where rapid response to water quality issues or infrastructure deficits is required.

Moreover, JJM's robust data infrastructure allows for a level of decentralized data accountability that enables localized response and empowers community participation, which is often recommended by global organizations but hard to implement.

Challenges and Prospects: Data in Development

For JJM, the path to redefining water governance is dotted with universal challenges and opportunities for technological integrations.

Navigating through Challenges

- **Data Security and Privacy**: On the forefront of JJM's challenges is ensuring data integrity and security. It involves a commitment to protect consumers' data, uphold privacy, and instil data safety measures – a critical concern for global water initiatives.

Prospects of Partnerships

- **Collaboration for a Water-Secure World**: JJM's journey underscores the strength of strategic partnerships. Encouraging alliances that cut across sectors and borders could propel JJM further, allowing it to catalyze its advancements into global success stories.

Technology and Future-Proofing

- **Embracing Innovation**: JJM is a lodestar for integration of contemporary technologies in public service. From automating monitoring to innovating data reporting, JJM commits to keeping technology at the forefront, ensuring a resilient mission ready to face future challenges.

The Global Context and the Way Forward

In the broader scope of global water initiatives, JJM's approach to data accountability offers valuable insights. The use of digital platforms for data management, the emphasis on the quality of services, and the commitment to community participation set examples for similar initiatives worldwide. It aligns with the push for evidence-based policy within the SDGs, particularly SDG 6, which calls for clean water and sanitation for all.

The transparency and accessibility of data through JJM's mechanisms also encourage scholarly research, furthering global understanding of water management challenges and solutions. The mission's relative success, predicated on data accountability, can inspire an international discourse on leveraging technology to improve governance in water services. In conclusion, the Jal Jeevan Mission's focus on data accountability not only ensures the effectiveness of its endeavour but also contributes to the global knowledge pool on sustainable water resource management. As countries work towards the SDGs, the initiatives and learnings from JJM could serve as a template for establishing robust accountability mechanisms that are indispensable for achieving universal access to water and sanitation.

Conclusion: JJM as a Beacon of Data-driven Governance

Marking a significant stride in governance, JJM showcases how proactive data management can fortify a nationwide initiative. It thrusts forward, inspiring other global programs with its distinct blueprint. Undeniably, JJM's narrative elucidates a poignant truth: judicious data management is instrumental for achieving sustainable development in water governance, and thus, for nurturing a water-wise future for all.

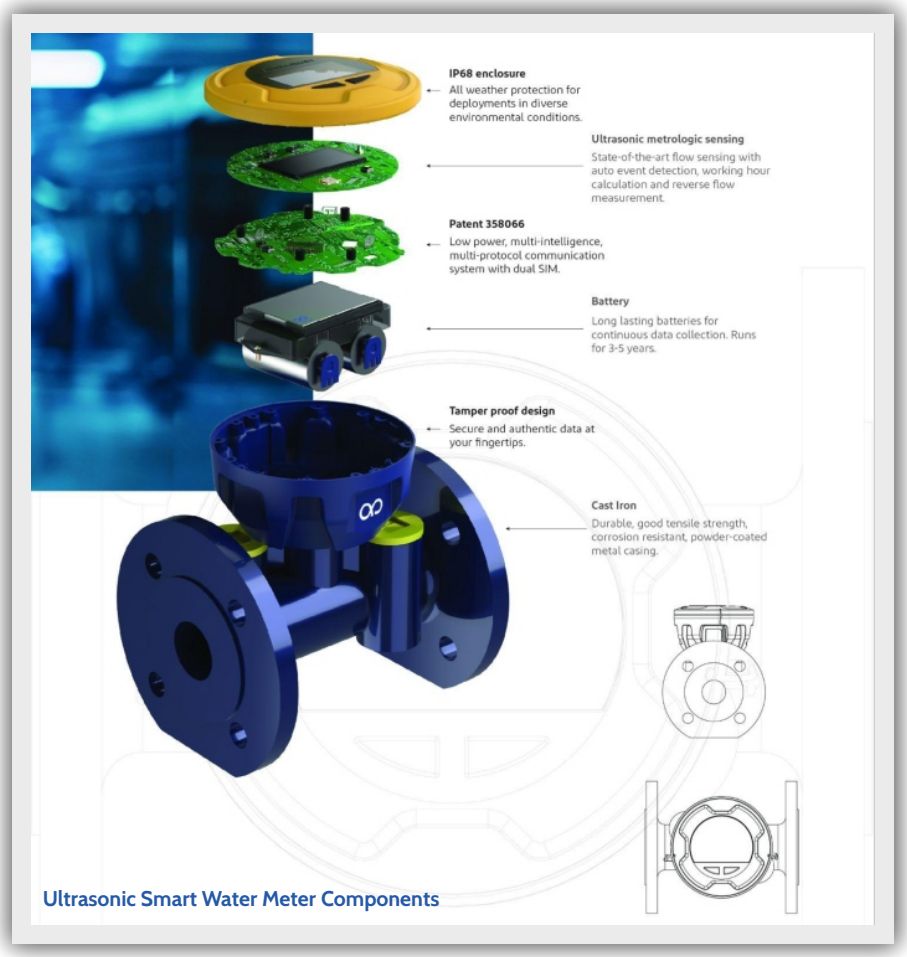
Enhancing Water Governance in JJM through Smart Water Metering

- **Rohini Srivyshnavi Korlakunta and Vinay Chataraju,** Kritsnam Technologies working with Piramal Foundation (RWPF)

Introduction

In the quest to ensure universal access to safe and sustainable drinking water across rural India, the Jal Jeevan Mission (JJM) stands as a beacon of hope and progress. At the heart of this ambitious endeavor lies the imperative for efficient water governance, driven by the seamless integration of digital technologies and innovative solutions.

Smart meters represent a cornerstone in the journey towards achieving the mission's objectives from providing real-time insights into water consumption patterns to facilitating data-driven decision-making at every level. Through insightful analysis and compelling case studies, we delve into the manifold benefits of smart metering, underscoring its potential to revolutionize rural water management and pave the way for a more water-secure future.



Ultrasonic Smart Water Meter Components

What are Smart Water Flow Meters

Smart water flow meters represent a significant advancement in water measurement and management technology. Equipped with sensors, communication modules, and data analytics capabilities, these devices offer increased accuracy and efficiency in capturing water flow data. Ultrasonic sensors precisely measure velocity and flow rate, even in intermittent flow conditions. With integrated design and seamless data transmission, they enable real-time monitoring and management of water usage, empowering stakeholders with timely insights without the need for external power sources or additional IoT components.

Key features of smart water flow meters:

1. Accuracy: Utilize digital sensors with Ultrasonic transit time principles for precise water flow rate measurement, ensuring accurate data collection.
2. Battery Operated: Operate independently from external power sources, enhancing flexibility, ease of installation, and uninterrupted functionality.
3. Tamper Proof: Robust design and security features prevent unauthorized tampering or

manipulation, with tamper alarms activated to alert upon any interference.

4. Extended Parameters: Capture comprehensive data beyond volumetric measurement, including event detection, working time, and flow rate.

5. Internal Data Logging and Cloud Transfer: Securely store data internally and transfer it seamlessly to cloud platforms for centralized access and analysis.

6. Real-time Data Transmission: Continuously transmit real-time data, facilitating prompt response to emerging issues and trends.

7. Customer Dashboards: Provide user-friendly interfaces for stakeholders to access real-time data and insights via mobile apps and dashboards.

8. Advanced Data Analytics: Employ sophisticated analytics tools to extract actionable insights and optimize water management practices.

Governance in JJM

The integration of smart water flow meters in the Jal Jeevan Mission marks a significant advancement in water governance, enabling robust monitoring and management of scheme performance nationwide. To ensure efficient service delivery and adherence to standards, real-time monitoring and data-driven decision-making are essential.

Installed strategically at various levels, including Overhead Tanks (OHTs), distribution lines, and District Metering Areas (DMA), smart meters become essential tools for improving service delivery and governance. By providing insights into consumption patterns and supply trends, they empower rural communities to understand their water needs in real-time, facilitating proactive measures to meet demand and ensure equitable distribution.

Ultrasonic Smart Water Flow Meter installed at the OHT in Seemunapalle, Andhra Pradesh

At the OHT level, smart meters play a crucial role in continuously monitoring water supply, documenting volume and supply time every day. This real-time data helps stakeholders assess compliance with service level benchmarks and identify opportunities for optimizing supply and minimizing wastage. They enhance operational efficiency and resource conservation by preventing overflow, leakages, and unnecessary energy consumption.

In areas reliant on groundwater, smart water meters at abstraction wells offer insights into source sustainability. By monitoring withdrawal rates and correlating them with water level data, stakeholders gain visibility into groundwater trends and borewell health, enabling informed decision-making on sustainable withdrawal volumes, ultimately enhancing source longevity and reliability, reducing water risk, and increasing water security.

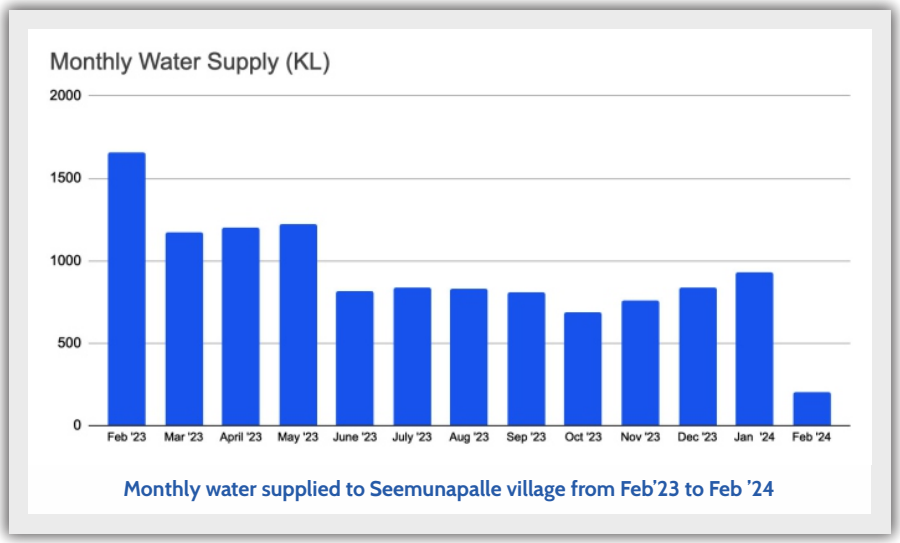
Smart water flow meters in the JJM framework contribute to sustainable water management, data-driven decision-making, and streamlined governance. By empowering communities with real-time consumption data, facilitating future demand estimation, optimizing tank operations, and analyzing source sustainability, these meters play a crucial role in realizing water accessibility and conservation objectives in rural India.

How Seemunapally and Mycherlapalem are empowered with Smart Meters?

The VijayaVahini Foundation, as one of the implementing agency for the Jal Jeevan Mission (JJM) in the villages of Mycherlapalem and Seemunapalle, Andhra Pradesh, embarked on a pioneering initiative to install Smart Water Meters at the OHT inlets in December 2022 and February 2023. With approximately 300 households each, these villages were equipped with individual tap connections under JJM, with the smart meters installed to estimate water supply.

Initially installed to understand and document volume of water supplied, the smart meters yielded interesting insights after a few months of operation. One of the primary benefits was the ability to monitor compliance with the service level benchmark of 55 LPCD. For example, in Seemunapalle with a population of 1,250, equating to 68.75 m3/day at 55 LPCD, the smart meter facilitated tracking of water supply to ensure it met this benchmark. By correlating this data with tank capacity, the operators could prevent overflows, conserving water and reducing electricity consumption for pumping.

In the initial stages, Mycherlapalem experienced some instances of supply exceeding 90 LPCD, surpassing average consumption levels. However, the daily meter readings presented on an interactive dashboard enabled timely intervention. Coordinators from the Vijaya Vahini Foundation shared this data with the community, raising awareness about excessive usage. Over a span of four months, consumption gradually stabilized, leading to consistent water supply levels. Seemunapalle witnessed a daily water saving of around 10,000 liters due to reduced water usage and wastage, resulting in significant electricity bill savings of 1500-2000 Rs/month.



Monthly water supplied to Seemunapalle village from Feb'23 to Feb '24

"Villagers expressed satisfaction with the consistent water supply, despite receiving 60 LPCD, compared to inconsistent supply at higher volumes"

- Srinivas, Cluster Coordinator, Vijaya Vahini Foundation

"The availability of real-time data through dashboards enhanced transparency and instilled confidence among the villagers regarding their access to water"

- Sarpanch, Seemunapalle

Furthermore, consistent water supply eliminated the need for villagers to spend hours fetching water or relying on community hand pumps or borewells, thereby mitigating physical exertion and minimizing groundwater depletion. Additionally, uncertainty about water availability led to hoarding, exacerbating wastage when water was eventually supplied. The implementation of smart meters addressed these challenges, ensuring efficient water management and equitable distribution, thereby improving the quality of life in rural communities.

The case of Mycherlapalem and Seemunapalle underscores the transformative impact of smart water metering in enhancing water governance, promoting sustainability, and empowering communities to exercise their right to reliable water access.

Conclusion

In conclusion, the integration of smart water meters within Jal Jeevan Mission framework marks a substantial leap towards accomplishing its goals. Beyond mere tools for monitoring water flow, these meters signify a transformative approach to water governance.

They empower all stakeholders to become water stewards: bureaucrats in making informed decisions and practicing real-time governance; local administrators in streamlining processes; local communities in asserting their right to water; legislators in ensuring equitable water distribution; the nation in fulfilling its Har Ghar Jal vision; and the planet by fostering behavioral change and optimizing the use of our precious water resource.

Democratise Knowledge: Building Capacity of Ground Force

- **Shri Sanjay Joshie,** Head – Agriculture, Livelihoods and Climate Change, ECHO Foundation (RWPF)

In the quest to tackle complex societal challenges, it's clear that no single organisation or solution can do it alone. The key lies in empowering diverse problem solvers with the capacity to cocreate solutions. This is where the ECHO model shines, enabling people to address local priorities within their unique context and in scaling solutions not horizontally but exponentially.

The ECHO Model: Empowering Through Knowledge Sharing

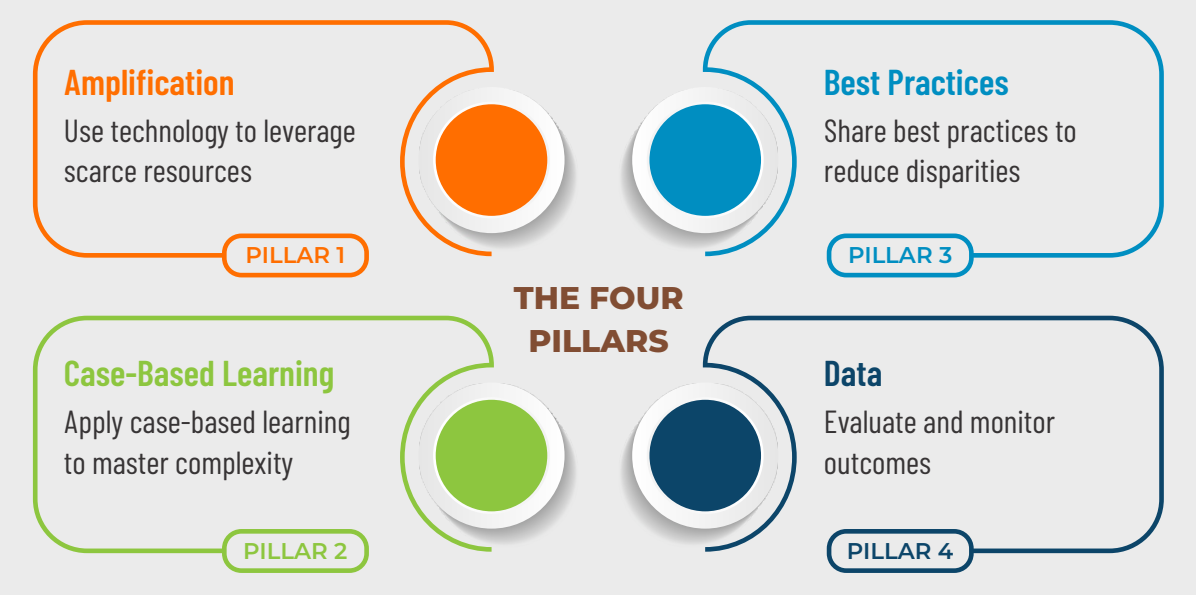
The ECHO model, conceptualised by Dr Sanjeev Arora in 2003, stems from a simple yet powerful insight. As a senior gastroenterologist specializing in Hepatitis C treatment, Dr Arora witnessed patients enduring an eight-month wait to seek treatment from the desired physician. Determined to bridge this gap and ensure equitable access to treatment, he pioneered the "All teach, All learn" tele-mentoring model, later known as ECHO.

At its core, the ECHO model features a hub-and-spoke structure. Multi disciplinary experts stationed at regional academic hubs engage with local frontline professionals via video conferencing, facilitating tele-mentoring sessions. This model operates on four pillars:

ECHO's Impact and Expansion

Established in the year 2008, as a non-profit Trust, ECHO India aims to impact the lives of 400 million people in India by the end of 2025 through Capacity building on healthcare, education, and livelihood. ECHO's 'Hub and Spoke' Model of learning; the hub being a group of experts who regularly mentor the learners (spokes); uses cutting-edge digital infrastructure to enable capacity building at speed and scale in a sustainable and cost-effective way.

ECHO India along with its collaboration partners has launched over 400 hubs across 35 States/ UTs. These hubs have seen 1,410 capacity-building programs being delivered over 25,000 sessions, covering more than 30 disease areas. These programs have witnessed over 1.7 million attendances (2,00,000+ unique participants) from healthcare workers and educators across the country, with remarkable results.



Multiple National Health Missions in India have now adopted the ECHO model, including, The National Tuberculosis Elimination Program (NTEP), The National Viral Hepatitis C Program (NVHCP), Ayushman Bharat Yojana, National Cancer Screening Program (NCSP) and National Mental Health Program (NMHP).

Collaboration and Technology Integration

ECHO's success lies not only in its model but also in its digital infrastructure. The iECHO platform, designed with an interoperable architecture, serves as a centralised hub for knowledge, processes, and data. This cloud-based platform streamlines onboarding, program management, data analytics, and certification issuance, enhancing productivity and impact.

Beyond Healthcare: Expanding Horizons

While ECHO's roots are in healthcare, its impact extends beyond. Over time, it has diversified into education, water management, livelihoods, and more. Over time it is realised that direct consumption of contaminated water leads to water borne ailments like diarrhoea and dysentery. By leveraging case-based learning strategies and theoretical frameworks like Social Cognitive Theory and Community of Practice Theory, ECHO fosters interdisciplinary education and collaboration.

ECHO's Collaboration with Jal Jeevan Mission (JJM)

In 2023, ECHO India and Jal Jeevan Mission collaborated to establish the JJM Digital Academy – a transformative learning platform designed to equip professionals and communities with the necessary knowledge and skills to contribute effectively to the Missions' objectives. The academy ensures comprehensive capacity building of the front-line professionals and communities, using the ECHO model, to empower them to effectively implement sustainable water management practices thereby ensuring universal access to safe drinking water.

Since 2023, six training and 36 sessions have been organized on three themes – Water Quality management, water safe communities and WASH Hub. Trainers certificate course was conducted. Sessions on water quality learning groups, water and storytelling, engendering water safe communities and Swachta hi Sewa were held.

By providing trainings through digital platform, Jal Jeevan Mission is –

a) Larger number of people can participate in the training program;

b) Reducing the cost of training as cost towards booking of venues, travel in curtailed;

c) Attendance has improved as people can join the program and learn sitting at the ease of their office/ residence;

d) People are confident to pose question as they are surrounded by their own people;

e) Senior experts on the subject matter are able to hold sessions as limited time is sought from them.

The digital platform will go a long way in supporting the trainings and building the capacity of the ground force who are important stakeholders and play a crucial role in planning, implementation, operation, maintenance and management of the water supply infrastructure.

INREM-Catalysing interactions using the ECHO Model

Once the avenue for foundational knowledge was created, it was important to provide a space for these Water Quality Champions to meet, discuss and collaboratively solve the problems they face. ECHO India's 'all teach, all learn' model has inspired a number of people. A modified version of guided mentoring was designed to suit the WASH sector's requirements – fostering open discussion, breaking communication barriers, and encouraging participants to share experiences from the field. Each guided mentoring on water quality session is attended by 30-50 Water Quality Champions.

The Government of India's Department of Drinking Water and Sanitation expanded this approach within the Jal Jeevan Mission, offering case study-based learning on Water Quality Monitoring and Surveillance (WQMS) to all States and Union Territories. The ongoing Learning Group initiative on the JJM Digital Academy involves active participation from 23 States and UTs. Currently, more than 10 sessions, each addressing 2 themes relevant to the Jal Jeevan Mission, have been completed.

Navigating Water Security: Leveraging Technology for Collective and Sustainable Futures

- **Sahana Srinath, Treeza Naidu** and **Chiranjit Guha**, Foundation for Ecological Security (FES)

Understanding the water governance matrix

Water as a resource is both visible and invisible – while surface water is fairly well-accounted for and garners the attention of communities and other stakeholders, groundwater remains less understood and unaccounted for. Often, the interconnectedness of surface and groundwater - its flow and exchange - is overlooked, and impacts effective water use and management practices.

Moreover, the deteriorating notion of water as a shared resource undermines the value of collective action in using, conserving, and managing it.

The consequences are dire, particularly for small and marginal farmers who bear the brunt of its impact. It also disadvantages livestock rearers, the landless, especially women and other vulnerable groups, whose lives and livelihoods are closely intertwined with natural resources, water being a key resource. Water scarcity jeopardises agricultural productivity, exacerbates food insecurity, and restricts access to clean drinking water, endangering the livelihoods of 350 million rural poor across the country.

The issue intensifies when rural communities are perceived as mere users, and side-lined in decision-making processes. They need to be positioned as custodians and stewards of this vital resource, with local institutional mechanisms in place for governing and managing different water use regimes - right from domestic needs to livestock and irrigation. This requires a holistic approach towards water management that appreciates the interconnectedness of water systems, and facilitates its conjunctive use for source sustainability.

While several stakeholders are undertaking efforts to address these challenges at different levels, their actions remain less coordinated, thus limiting their impact. Often, they have insufficient information and capacities to be able to integrate information and action at multiple levels. While a wealth of information exists in government portals, databases and with stakeholders, there is immense scope to simplify them and make them easily accessible for stakeholders on the ground, especially rural communities.

Applying a scientific, landscape approach to water conservation and management

Amidst the accelerating climate crisis, community-led scientific and sustainable natural resource management is imperative. Adopting a landscape approach is critical while planning and implementing water-specific interventions, acknowledg-

ing the interconnectedness of resources and resource systems. Here, access to simple, reliable data and information can become transformative - when data, information and technology are integrated into the system infrastructure, and capacities to engage with this are created across the system, it can transform degraded water bodies and other water sources into healthy, restored wellsprings of life.

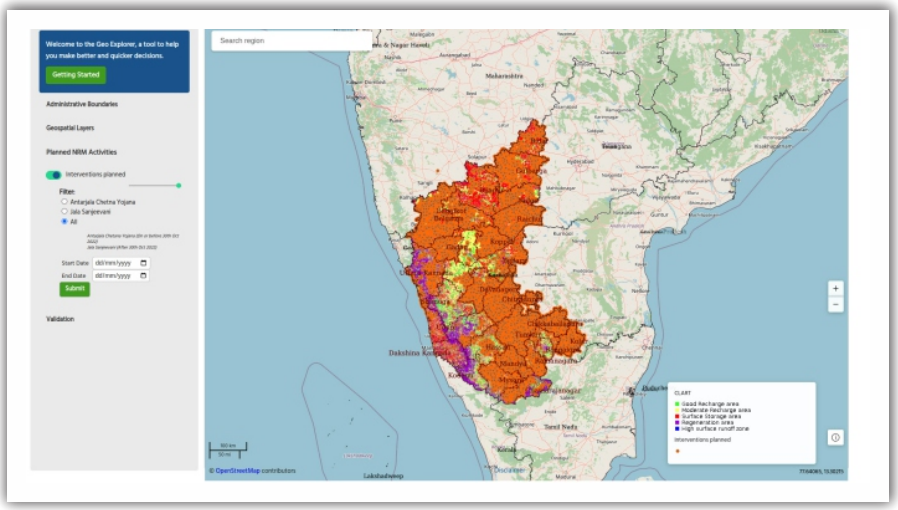
Programmes such as the Jal Jeevan Mission and Atal Bhujal Yojana offer immense scope for community-led water management efforts to gain and sustain momentum, thereby securing source sustainability. The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) can enable community-led scientific planning of water resources by integrating tools and technologies into the programme infrastructure, enabling digital governance and monitoring of the works undertaken. States like Karnataka have evolved sub-programmes within MGNREGS for groundwater recharge and gomala (pastureland) restoration using technologies like the Composite Landscape Assessment and Restoration Tool (CLART).

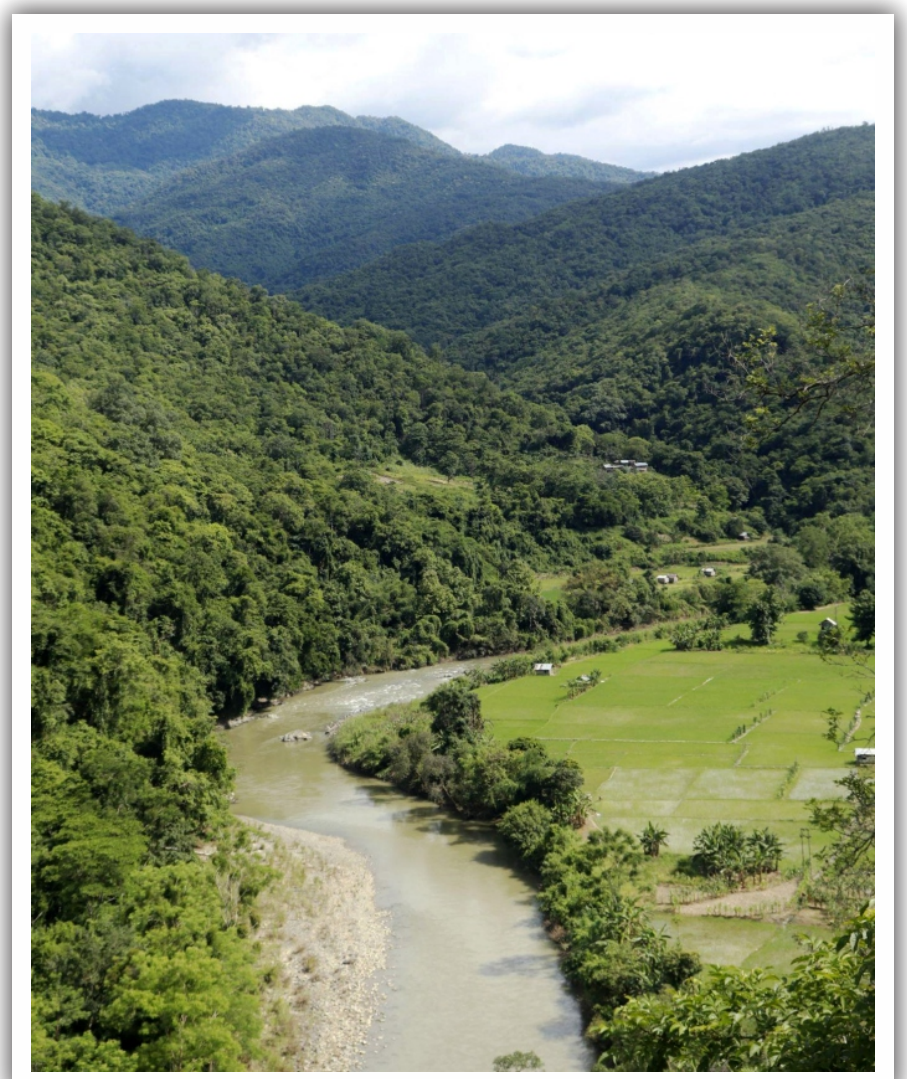
CLART is a GIS-based support tool that provides location-specific information in a user-friendly manner to aid planning and designing of soil and water conservation interventions. By overlaying information layers such as rock type, slope, landuse/ landcover, it calculates the recharge potential of a given area, and colour-codes the region on the map - different colours indicate different recharge potentials, based on which stakeholders can plan suitable interventions. By demystifying data and supporting decision-making through a suggestive approach, the tool enables community-led scientific planning.

At the programme level, the tool's ability to provide trusted data in the form of geo-coded information, photographs, and estimates enables technical staff to understand and approve plans in an informed manner.

Tools like CLART can enable source sustainability by supporting a range of water-specific interventions. While planning for source sustainability, it is critical to understand and appreciate the interconnectedness of resources across the landscape.

Water resources – such as ponds, tanks, wells – and other natural resources such as hillocks, forests, pasture lands, and agricultural lands exist in a continuum. They interact through water, nutrient, and carbon cycles. For instance, local vegetation and water recharge measures on the slope arrests soil erosion, enhances rainwater percolation, and creates streams that flow down. This replenishes groundwater and improves water availability in tanks, ponds and other water bodies. Reduced erosion also prevents silt buildup in water bodies, improving storage capacity and longevity.





An integrated and collaborative approach to the restoration and management of common lands is, thus, the cornerstone of water-specific interventions to ensure and secure source sustainability.

While working on enhancing water supply is one component, equal importance must be given to the demand-side management. It is key for rural communities and other stakeholders to understand changes in water levels, monitor them, and make water-use decisions based on this information. The Ground Water Monitoring Tool (GWMT) and Jaldoot App aid in mapping well water levels across seasons and present the information through visual aids such as maps and graphs. The Crop Water Budgeting (CWB) tool enables rural communities to make sustainable crop choices by mapping surface and groundwater use and availability.

Implementing this requires a bottom-up approach – the interventions need to be community-centric, participative and responsive. Institutional mechanisms at the community level need to be strengthened to facilitate a holistic approach towards water, position them as shared resources, and appreciate the interconnections between surface and groundwater to enable conjunctive use.

Experiences from the ground

The Rural Development and Panchayat Raj Department (RD&PR), Government of Karnataka, launched the Antarajala Chetana programme in 2020 (renamed as the Jala Sanjeevini Programme in July 2022) to improve groundwater status, including surface water bodies, increase green cover, and improve soil productivity, thereby enhancing agriculture production. Under this, Gomala sub-plans were prioritised to restore pasturelands using CLART, and remove encroachments on them. A Memorandum of Understanding was signed by the Government of Karnataka, FES, Arghyam, and Socion Advisors LLP to enable field functionaries in utilising data and technology for planning and implementation. Through this, clear

guidelines for Gomala sub-plans were made accessible through an open platform, including in-person and virtual capacity-building sessions and guided mentoring were facilitated.

Data systems were enhanced for better access, visibility, real-time planning and support, including co-designing the Jala Sanjeevini programme dashboard. Legal recognition of village institutions as Gram Panchayat sub-committees, and constant engagement with them has strengthened capacities for inclusive and collective CLART-based natural resource management. The RD&PR, Karnataka, has now mandated CLART usage across the state for assessing site feasibility during MGNREGS planning. The state government has also issued a joint circular with guidelines detailing the role of different line departments in gomala restoration.

A similar programme was implemented in Andhra Pradesh, where an MoU was signed with the state government to enable community-led planning of common lands using CLART under MGNREGS, coupled with capacity-building for MGNREGS functionaries at all levels.

So far, a total of 4,53,142 plans have been prepared across the country under MGNREGS using CLART, with 1,96,783 in Karnataka, and 2,06,067 in Andhra Pradesh.

Charting a collective future from water scarcity to water security

As is visible from ground experiences, simple and easy-to-use tools and technologies strengthen the agency of communities to discuss, negotiate and plan interventions as they navigate the complex challenge of water scarcity. There is a need, thus, to build capacities of communities and field functionaries to facilitate technology-based nature conservation, particularly water conservation, across the country. It is equally important to acknowledge the role of rural communities as custodians and stewards of their natural resources and position them as key stakeholders in the scientific planning and management of these resources.

Further, the 'digital nutrients' - data from tools and technologies that are available on open digital platforms, can be used by stakeholders across the ecosystem to cater to diverse needs. Improved accessibility to trusted data fosters convergence, facilitates evidence based decision-making and energises the system as a whole to function in a more unified and sustainable manner.

Further, digital nutrients also enable the co-creation of newer, more innovative solutions, paving the path towards a collective, water-secure future for all.

Lifecycle Approach through Integration of Digital Processes

- **Ruchika Shiva**, Director of Asia Regional Programme - IRC

The use of digital technology in our lives has increased exponentially in the last decade. This has not been restricted to urban areas or a certain economic stratum. According to the Ministry of Information and Broadcasting, there are 600 million smart phone users in India[1]. Their use in communication, entertainment and financial transactions through digital platforms has increased significantly.

Similarly, in governance and management of basic services, relevant government departments/utilities progressively digitised their services for wider dissemination, payments of taxes and tariff and complaints redressal mechanisms. The state and national government have used digital dashboards to monitor progress of key centrally sponsored schemes such as the Jal Jeevan Mission and the Swachh Bharat Mission.

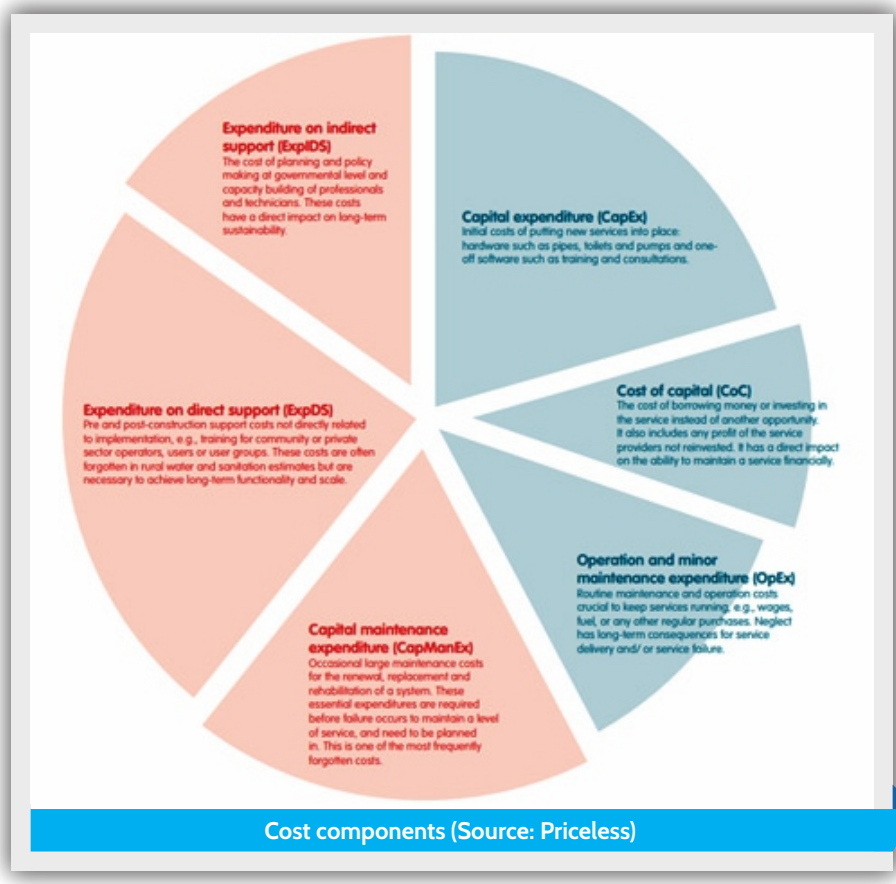
Digital technology can be used to support decision making throughout the life cycle of public services, including water supply and sanitation. Like any other technology, digital technology needs to be appropriate for providers and users.

From the planning phases to implementation and post implementation digital technologies support and ensure the effectiveness, transparency and continuity of services.

The article focuses on rural water supply, although the content and context is equally applicable for urban water supply and sanitation.

The role of governance and management of rural water supply differs per administrative level: national and state governments (for policy, programme and guideline formulation, financial support and monitoring, fund allocation), district (for implementation, project approval, implementation support, monitoring) and the Gram Panchayats (for local planning processes with the community, implementation monitoring, financial support from finance commission funds, addressing community concern/redressal of complaints, escalating the issues to relevant departments).

The planning starts with an understanding of what is there, and what



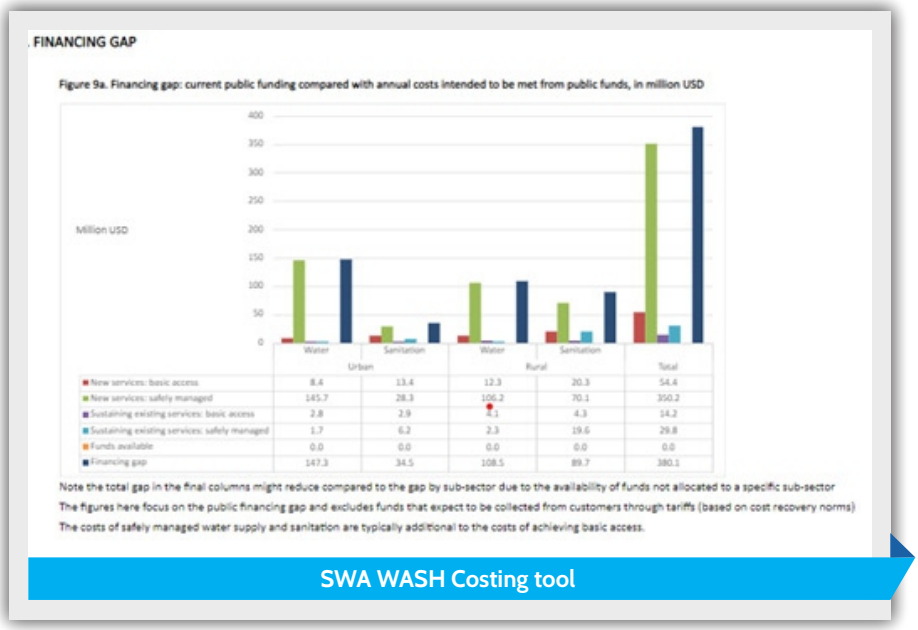
Cost components (Source: Priceless)

[1] India has over 1.2 bn mobile phone users: I&B ministry | Mint (livemint.com)

needs to be done. It is dependent on the water resources available to provide the water supply locally and an understanding of household water supply status (this is in the context where other schemes also have been implemented and also some households that have self-supply).

Social mapping can capture the above-mentioned information, which can be digitalised, including the map itself and the data extracted from the map – it can be used for monitoring and to inform annual planning and budgeting processes. This can be a community tool for monitoring and transparency as well. as well as a tool to engage youth and build their leadership at the local level.[2]

Finance is key to realising the plans where cost and source of funding has to be specified.. With regard to water supply, like most other public services, it is crucial to not only consider the cost of the new infrastructure, but also other components that are crucial to ensure that this infrastructure provides the services which they are intended for[3]. The cost components include – capital expenditure (the cost of building the initial infrastructure, including the initial software activities with the community), operation and maintenance (these are recurrent expenses of operation and minor maintenance), capital expenditure costs (these are irregular and high, when the main parts of the infrastructure are to be replaced/ repaired), the direct costs (these include costs of regular support from the block or/ and district administration for technical inputs, capacity building, monitoring) and the indirect costs (for policy, programme development, monitoring – state department/ministry level costs). There are tools to calculate the costs, at the district, state or national level- such as the SDG WASHCost tool developed by Sanitation and Water for All (SWA), which determines the projections of annual costs for the state/ country over a certain period[4].

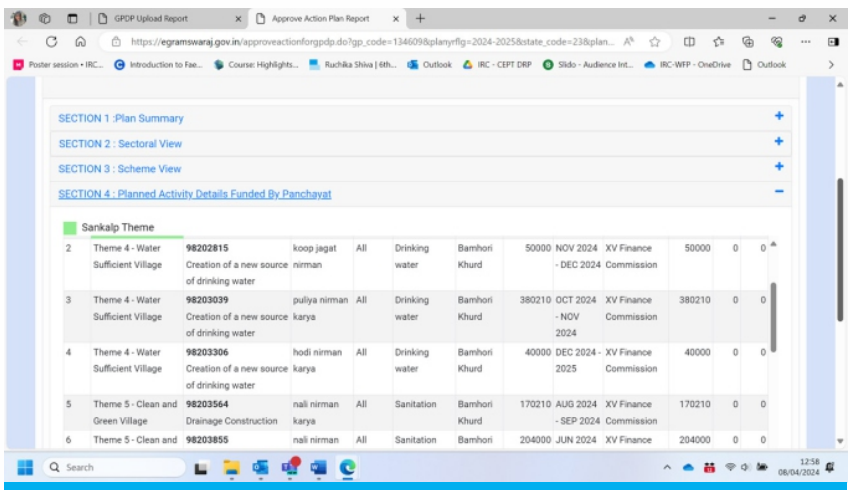


SWA WASH Costing tool

In rural contexts, where the Gram Panchayats is entrusted with the responsibility of provision of water and sanitation services (with the technical support of the line departments), the e-Swaraj platform is a tool that captures information with respect to the plans, budgets of the gram panchayats, which include the 60% ringfenced for water and sanitation. This is in addition to the tied funds from the central sponosred scheme – Jal Jeevan Mission, for which the funds are distributed via the line departments. The central and state government dashboards capture the physical and financial progress for the JJM. However, with the focus on sustainability of services, the use of tools like e-swaraj for plans and budgets that flow to the Gram Panchayats becomes key to ensure that all cost components are considered in the planning. Presently, in many states Gram Panchayat leadership lack the awareness/ capacity or understanding of such tools.

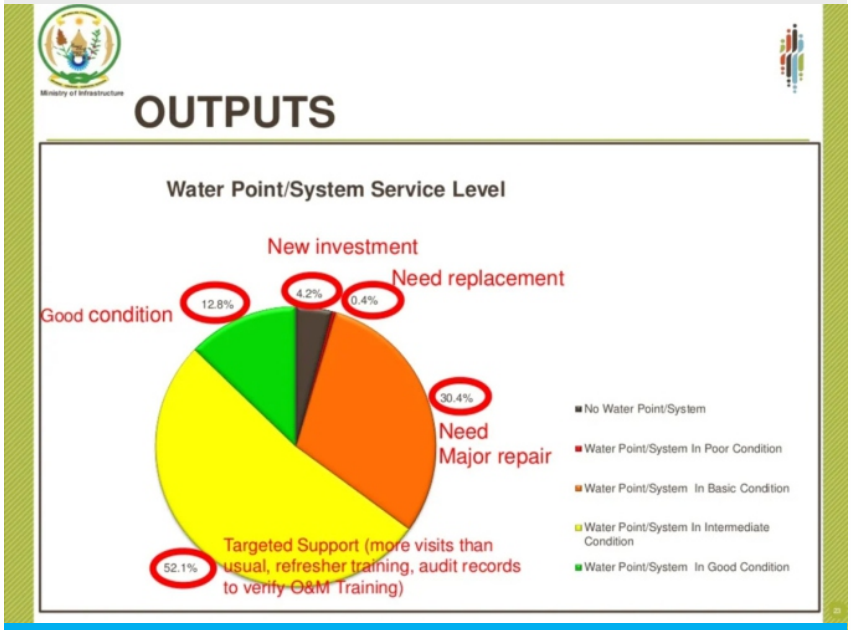
Asset management, which can be fairly sophisticated in the case of urban contexts, is helpful for planning, budgeting and monitoring. The asset management tool can be made fairly simple and relatable, and hence of use to Gram Panchayats for water supply planning in communities. The purpose of the tool is to capture all the water supply assets in the village, their age and functionality. The functionality has to be updated on a regular basis every quarter of twice in a year, and especially when parts are creating problems or falling into disuse. The tool provides a snapshot of the assets that need repair and replacement. The data can be consolidated at the levels of block, district and state, especially for major parts which will require larger funds from the department.

[2] Briefing Note, August 2020 | 084-202010BN_Social_mappingdef.pdf (watershed.nl)
[3] 2014_priceless_mcintyreetal_0.pdf (ircwash.org)
[4] https://sanitationandwaterforall.org/sites/default/files/2020-09/SDG_WASH_Cost_Tool_EN_Updated%202020.xlsm



Example of Gram Panchayat Development Plan (Source: https://egramswaraj.gov.in/approveactionforgpdp.do?gp_code=134609&planyrflg=2024-2025&state_code=23&plan_code=5139600&local_body_typ_cd=3)

Risk Based On Age	Risk Based On Current Condition	Level Of Service: Water Point/System	Level Of Priority To Replace/Repair The Water Point/System
High Risk	Medium Risk	Intermediate Level of Service	Medium Priority
High Risk	Medium Risk	Basic Level of Service	High Priority
High Risk	Medium Risk	Basic Level of Service	High Priority
High Risk	Medium Risk	Basic Level of Service	High Priority
High Risk	Medium Risk	Basic Level of Service	High Priority
High Risk	High Risk	Basic Level of Service	High Priority
No Improved Water Point/System	No Improved Water Point/System	No Improved Water Point/System	New Construction Needed



Example of Asset Management excel sheet and the result in a visual from Rwanda

For regular management of water supply, service levels need to be monitored and the tariffs need to be collected. There are mulitple digital tools for service level monitoring – quality, quantity and reliability, are the key parameters. This also forms (over time) the basis of trust in the community, which is required for continued and regular tariff collection. Examples of tariff collection are available from the Jal Sathis in Odisha.

In a world of increasing digitisation, it is crucial to understand the purpose of digitisation, i.e. efficiency, effectiveness and transparency. For governance of rural water supply which starts from the Gram Panchayat which is closest to the communities to the ministry at the national level, it is essential that the complexity and user friendliness of the tools that enable better governance and management of rural water supply are taken into account. It is essential to provide regular capacity inputs and listen to user feedback on the tools to enable the use of the tools for decision making at all levels. Simple digital tools can support decision making for improved governance and management of water supply by timely manner – they can help us to learn, modify and more importantly improve!

Resources:

https://www.ircwash.org/tool-subcategory/finance

https://www.ircwash.org/tool-subcategory/asset-management

https://www.ircwash.org/tool-subcategory/monitoring

Finance for sustainable WASH systems :: IRC (ircwash.org) & Costing sustainable water services :: IRC (ircwash.org)

Geospatial Pioneering in Jal Jeevan Mission: A Keystone for Sustainable Water Management

- **Anand Pandey**, NJJM

The Jal Jeevan Mission (JJM), a cornerstone of India's commitment to ensuring water access for all, is poised to integrate Geographic Information Systems (GIS) mapping into its five-year strategic plan. This groundbreaking initiative aims to revolutionise the operation and maintenance (O&M) of rural water supply by meticulously documenting the locations of water infrastructure components such as pipes, tanks, and treatment plants across India's vast rural landscapes.

GIS technology's incorporation into JJM is in seamless alignment with the PM Gati Shakti Portal, designed to foster synergy between water supply schemes and other infrastructure projects. This integration is critical to ensuring that the construction of new developments does not disrupt existing water systems, thereby maintaining their operational continuity and structural integrity. The adoption of GIS-informed O&M practices is expected to significantly improve the efficiency and durability of rural water supply systems.

Moreover, the GIS mapping initiative within JJM is set to serve as a risk mitigation tool in infrastructure development and a strategic compass for prudent resource utilisation in forthcoming expansions. By enabling targeted investments, the initiative will direct funds to regions most in need, stimulating economic growth in local communities while concurrently safeguarding ecosystems by avoiding environmentally sensitive areas.

Over the next five years, the GIS mapping project under JJM aims to set a global standard, demonstrating the pivotal role of technology in supporting sustainable infrastructure and fostering community-driven development. This visionary approach ensures that every resource employed is leveraged to contribute to a robust and sustainable future.

As JJM embarks on its GIS mapping journey, the initiative is expected to transform local water resource management. Real-time monitoring and data analytics will empower local authorities and policymakers to make well-informed decisions regarding water distribution, demand management, and emergency response. This capability is especially vital in areas susceptible to extreme weather events, where water availability can be unpredictable. The use of GIS will equip communities to anticipate and navigate these challenges, maintaining water security in the face of adversity.

Additionally, the GIS framework within JJM will encourage community involvement and awareness. Making geospatial data publicly accessible will increase local engagement in water resource management, leading to greater accountability and improved conservation practices. Educational programs based on this data can foster a culture of water conservation and responsible usage, furthering the mission's objectives. As JJM progresses, the synergy of technology and community participation is expected to create a replicable model for sustainable water management, applicable to other regions grappling with similar issues.

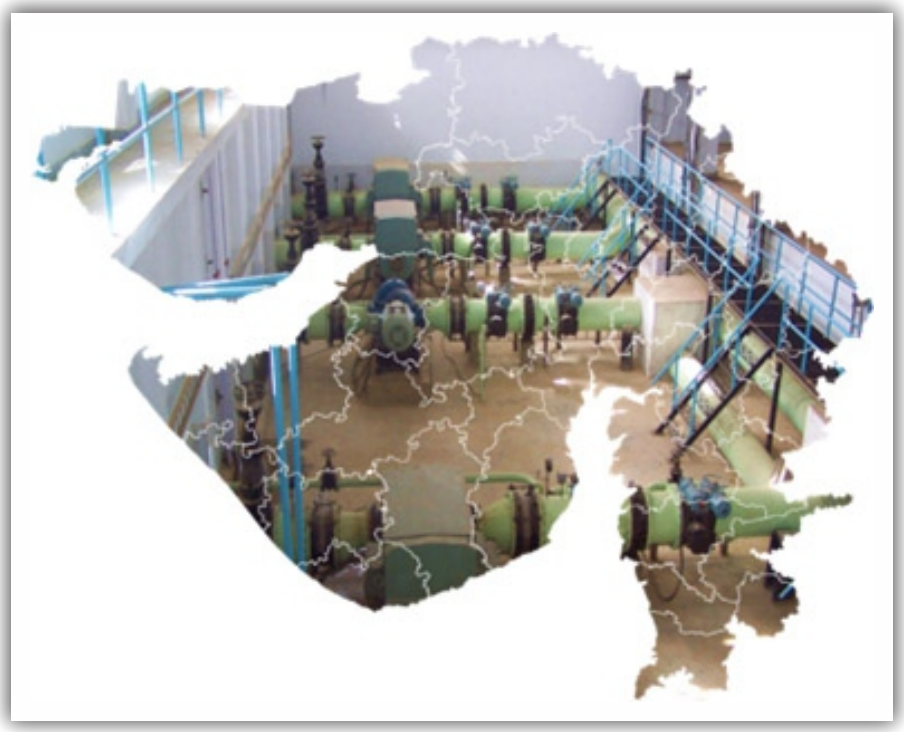
Sustaining the Flow by Incorporating Digital Technology for O&M of Water Supply System

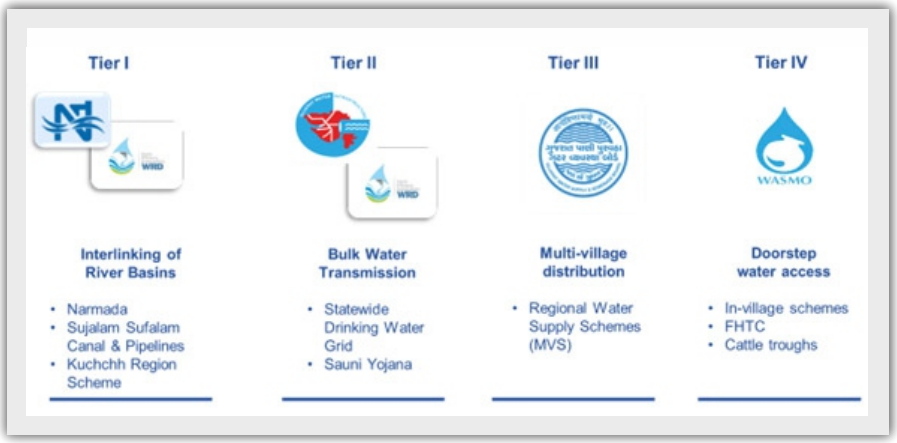
- **Nirav Solanki,** Chief Engineer, GWSSB, Gujarat and **Lopamudra Panda,** NJJM

The Jal Jeevan Mission (JJM), launched by the Government of India, is a visionary initiative aimed at providing piped water supply to every rural household. In a world where water scarcity is becoming increasingly prevalent, the effective operation and maintenance (O&M) of water supply schemes emerge as vital components in ensuring reliable access to clean water. O&M encompass a range of tasks aimed at ensuring the continuous functioning of water supply systems. These include regular inspections, repairs, cleaning, and upgradation, among others.

Leveraging innovation and technology is an important cornerstone of Jal Jeevan Mission's approach to O&M. **Remote Monitoring Systems, Sensor-based Technologies, and Data Analytics Tools** are utilised to optimise asset management, detect leaks, and improve operational efficiency.

States play a crucial role in implementing Jal Jeevan Mission and fostering effective O&M practices. Several states implemented innovative strategies to enhance O&M under Jal Jeevan Mission. The water supply departments (GWSSB, GWIL and WASMO) of **Gujarat** has come up with comprehensive strategies and initiatives to enhance water quality monitoring, maintenance practices, and community engagement, thereby ensuring the sustainable and equitable distribution of clean water resources.





The Gujarat Water Supply department has more than 350 MVS comprising of 3000 km of bulk transmission network, 270+ WTPs, ~1,50,000 km of distribution network that distributes bulk water to both urban and rural areas of the state. For the water supply value chain, it has a four-tiers institutional arrangement.

Maintenance & Monitoring Practices

I) Multi-Village Schemes (MVS)

Record-keeping: More stress is given to record-keeping at different levels during the O&M in MVS by RWSS.

Sl. No.	Report or Record	Mechanism	Tools	Responsibility
		Operational		
1	Filter plant operation (quantity, quality, duration)	i. Automated via flowmeter and quality analyser ii. Reporting in ERP iii. Manual logs on site	• ERP • CMS • Manual logs	DEE/AE and O&M Partner
2	Beneficiary wise supply log (quantity, regularity, duration)	i. Automated via water meter ii. Manual logs on site	• CMS • Manual logs	DEE/AE and O&M Partner
3	Pumping station operation (hours, quantity, power)	i. Automated via flowmeter ii. Manual logs on site	• CMS • Manual logs	AE and O&M Partner
4	Chemical dosing and stock	I. Manual logs on site	• Manual logs	AE and O&M Partner
5	Filter bed backwash register	I. Manual logs on site	• Manual logs	AE and O&M Partner
6	Inventory (material receipt and issue logs)	I. Automated in ERP ii. Manual logs at site stores	• ERP • Manual logs	AE - Stores in charge
7	Electricity bills	I. Manual register on site	• Manual	AE/DEE
8	Manpower attendance	i. Automated in biometric attendance system ii. Manual register on site	• BAS system • Manual	AE/DEE and O&M Partner
		Maintenance		
9	Daily checklist for equipment/ asset startup	i . Manual checklist at location	• Manual	O&M Partner
10	Preventive maintenance checklists (incl. Overhaul)	i . Manual checklist on site	• Manual checklist on site	O&M Partner
11	Corrective maintenance & repairsl	i . Manual register on site	• Manual on site	O&M Partner
12	Calibration log (incl firefighting equipment)	i . Manual logs on site	• Manual logs	DEE and O&M Partner
13	Leak repair register	i . Manual register on site	• Manual logs	AE and O&M Partner
14	Handover documentation	i. Manual in Asset Management System ii. Manually at subdivision	• Manual logs	

Systems in Use

- Advance instrumentation and sensors including IT based tools (SCADA, CMS)
- Asset and customer database in ERP & GIS
- Commissioned independent surveys and studies

O&M Reporting in ERP

The field staffs of GWSSB regularly reports on key parameters on daily/monthly basis in the MIS system. Performance operational parameters includes:

Parameter	Target	Unit	Reporting Frequency
Number of villages and cities covered	100%	No.	Daily
Quantity of water supplied	100% of demand	MLD	Daily
Raw water turbidity	N/A	NTU	Daily
Treated water turbidity	≤ 1	NTU	Daily
Treated water pH	6.5 to 8.5		Daily
PAC/Alum dose		mg/L	Daily
Residual chlorine	≥2.00 at H/W	mg/L	Daily
Pumping hours	As per design & 100% demand	Hours	Daily
Staff attendance (agency)	Verification and registration of all staff on BAS		Daily
Power consumed		KWH	Monthly
Power Factor	≥0.9		Monthly

Monitoring of Quantity, Quality & Regularity by sensor-based flowmeters and quality analysers

Gujarat has introduced digital transformation for all water supply schemes ;

i. Use of **sensors** for monitoring water level, discharge, water quality, automatic motor operation, data logger for capturing the data, etc.

ii. Bulk flow meter and water meter are installed in every village that receives water in their sump.

iii. **Supervisory Control and Data Access (SCADA)** systems for large treatment plants will be mandatory for both operation of the plant as well as for monitoring (parameters like pressure, water quality, flow rate, etc.) and distribution system

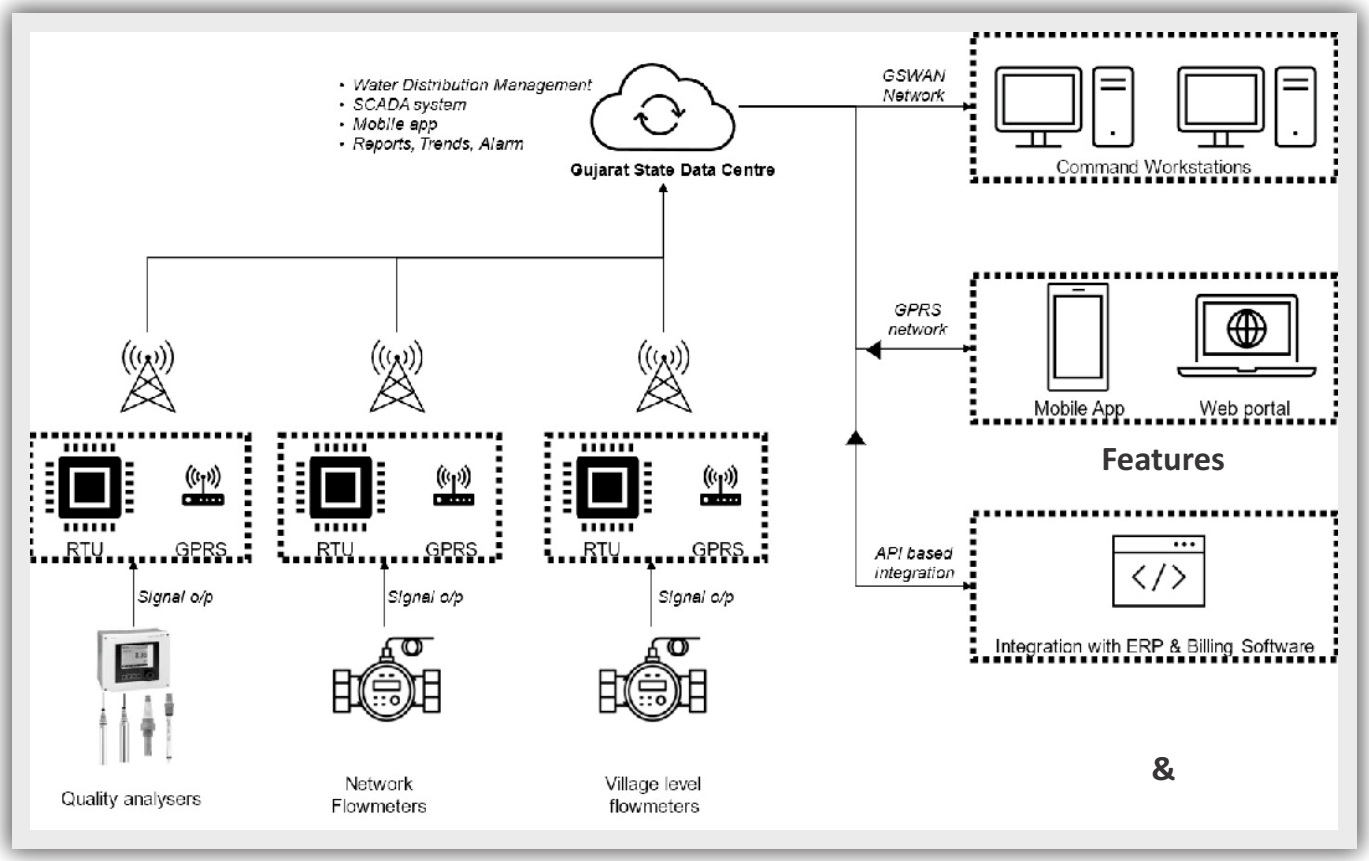
iv. Use of **IoT** for capturing and transmitting the above data using mobile networks for analysis and use as decision tools

The infrastructure setup for this includes:

- 1,246 line powered flow meters and 1,017 battery operated flow meters (Total 2,263)
- 500 pH analysers
- 500 Chlorine analysers
- 1000 Turbidity analysers
- Remote terminal units for flowmeters
- Centralized Monitoring System & Video wall
- Water Management Software: Water Distribution & Quality Management, Reports, Alarms, Trends, Geographical Information System, and Demand Forecasting accessed via mobile app and web portal

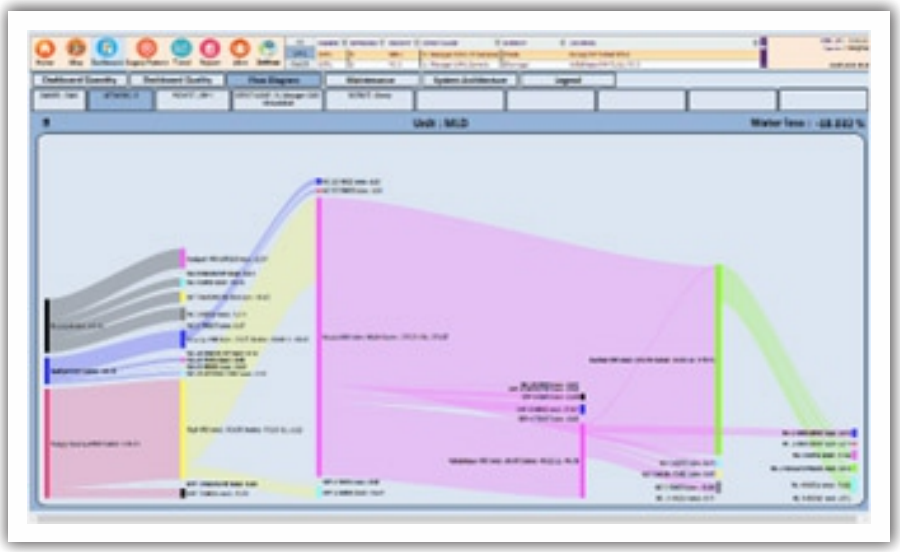
- Hosting arrangement: The application is hosted on the state's data centre (GSDC), hence GSDC's policies pertaining to patch management, ISO compliance, consent management, data privacy and cyber security are also followed apart from organisation's own policies.
- Security: The application security audit was carried out by CERT-In empanelled application security auditors before go-live.
- Back-ups are carried at two levels viz. GSDC and by organisation (WSD).

The Architectural Flow



Benefits of the IOT System

- Real time service level (quantity and quality) monitoring
- The system provides quality and quantity dashboards for enterprise-wide view covering important KPIs such as spatial mapping, differential flow data between two points, SLA performance etc. that enhances governance.
- With the system's capability to detect line loss in any section through differential flow



mapping, the state is able to attend leaks in a time bound manner.

- The accuracy of flowmeters is ±0.5% whereas quality analysers have accuracy of ±5%. The software's analytical abilities allow the decision makers visualise the data spatially, observe patterns and trends, and forecast the same for a given period.
- In case of any abnormal process values or KPIs the system generates alarm-alerts for the users which ensures timely corrective action.
- Periodic report generation (daily/weekly/ monthly/yearly) for given location/region/ parameter which is helpful for billing the consumers.
- It helps to observe the target/ sanctioned values for abnormalities or deviations. This is used to monitor service quantity v/s sanctioned quantity, and actual quality parameters against the permissible values.
- Ensuring coverage of remote/ tail end regions: Through the spatial mapping of live data, the user can monitor whether remote/ tail end regions are receiving adequate water or not.
- Quality surveillance from remote location is now possible. The parameters monitored pH, turbidity and chlorine.
- Efficient utilisation of manpower: The system has helped decision makers visualize and pinpoint exact regions and areas where focussed approach is required. The management is able to identify areas having recurring issues or higher occurrences of problems and deploy the staff accordingly.

Performance-based O&M contracts in line with the new O&M policy

The new performance based contracting model aims at promoting comprehensive O&M (covering all aspects and components viz. civil, electromechanical etc.) for a duration of 5 years in order to improve accountability.

Key features

I. Preventive & curative maintenance framework

For optimal performance and durability, Gujarat adopts a proactive approach that aims to prevent breakdowns, equipment failures, and other malfunctions before they occur. Under preventive maintenance, scheduled maintenance activities such as inspection, repairs and servicing are being taken. Regular servicing, oil replacement, replacement of spares, cleaning works helps in reducing downtime and increase reliability and lifespan of the asset.

The approach for preventive maintenance is focussed on scheduling activities. A master framework shown in the table below provides schedule for each periodicity maintenance activity.

Periodicity of activities	Time frame to complete	Recording mechanism
Daily preventive maintenance activities	Daily morning in the first hour as part of the start-up activities	Daily checklists pasted near the asset
Monthly preventive maintenance activities	1st or 2nd of every month	Monthly maintenance checklist
Quarterly preventive maintenance activities	8th to 14th of January, April, July and October of every year	Quarterly maintenance checklist
Half yearly preventive maintenance activities	Between 8th to 14th of January and July of every year	Half-yearly maintenance checklist
Yearly preventive maintenance activities	Between 15th and 30th of January of every year	Annual maintenance checklist
Calibration & servicing	Along with the yearly preventive maintenance activities	Calibration and servicing log
Overhaul activities	*15th to 30th of January every year* *Clariflocculator: every year* *Civil and plant: every 2 years* *Pumping machinery: every 1 year (submersible) or 2 years (VT, centrifugal)* *Transformer: every 5 years*	Overhaul checklist
Painting works	Between 1st to 30th of October of the year (after monsoon)	Record log

Furthermore, it also included **weather-specific preparedness activities** as part of preventive maintenance framework. The same is mentioned below:

Periodicity of activities	Time frame to complete	Recording mechanism
Pre-Summer: Yearly performance testing	Testing from 15th to 30th of January of every year Systems should be ready for summer by 28th February with all corrective actions	Performance testing log
Preparedness for Monsoon	15th June to 30th June of every year. Systems should be ready by 1st July with all corrective actions	Record log

The pre-summer performance testing follows the below protocol

Period/ Time	15th January to 30th January of each year
Parameters to be observed and recorded	• Head achieved • Discharge achieved • Power Input to motor & Speed of pump • Water distribution to tail end • Leaks

Test codes	BIS 9137, 10981 and 512
Performance tests for	i. All pump- motor set (including working & standby) shall be tested one at a time. ii. All working pump-motor set to be tested (30-60 minutes) iii. All standby pump-motor set to be tested (30-60 minutes) iv. Filter plant to be operational for entire test duration (i, ii, iii)

ii. Standardised checklists and templates

Based on the periodicity, preventive maintenance activities are categorized as follows:

- Daily Checklist: Observation based actions. Only if found not okay, troubleshoot or remedial action is required:
- Monthly & Quarterly Maintenance Checklist: For each equipment/ asset.
- Annual Maintenance Checklist: For each equipment/ asset (including calibration, servicing etc)
- Overhaul Checklist: For pumps, bridge, filter plant
- Weather specific activity log: Summer & Monsoon preparation

iii. Periodic planning & review framework

For efficient functioning of Regional Water Supply Schemes, regular interaction with scheme operating staff and officers is practiced. This collaborative approach helps in ensuring that insights from site are visible and communicated through different levels to ensure bottom-up innovation. To achieve this, schedules with periodic meetings with assigned responsibilities have been defined.

- Daily Planning Meeting (DPM) – Conducted by Maintenance Engineer
- Weekly Planning Meeting (WPM) – Conducted by AE/ AAE/ JE
- Monthly Review Meeting (MRM) – Conducted by Deputy Executive Engineer
- Quarterly Review Meeting (QRM) – Conducted by Executive Engineer

For each of these, the following parameters were defined and set to ensure compliance: a) Attendees, b) Officer responsible, c) Time & Venue, d) Topic/ Agenda items, e) Record formats. The key discussion topics of these meetings include target service levels, review performance and preparedness for breakdown or major incidents.

iv. Performance monitoring

The performance parameters which are directly linked with the payment terms for enhancing O&M is being adopted with the aim to provide intrinsic motivation to the contractors in maintaining service delivery and avoid interruptions. At higher level, the evaluation framework is categorised as follows:

- Operational – Service level benchmarks for water supply to citizens are established
- Maintenance – Efficient operations of assets and asset life
- Emergency response – Faster resolution of issues & restoration of supply

The evaluation mechanism is designed in such a way that the operator has opportunity to take corrective actions in a timebound manner. For this, a 2-day block period

Asset	Daily checklist location	Responsible signatory
Pump & Motor set	Near pumping machinery	Pump operator
Panels, Circuit Breakers, Starters	Near respective asset	Electrician
Transformer & Substation	Substation	Electrician
Filter plant	Headwork office	Maintenance Engineer
Valves and gates	Near respective asset	Operator
Calibration log	Near respective asset	Maintenance Engineer

is used for evaluation of performance against Service Level Agreements. In case of unavoidable technical issues, there is an opportunity to compensate any shortfalls in quantity by the next following day. Further, the KPI evaluation follows a tiered system to ensure that penalties do not compound, and operator remains motivated to improve performance.

KPIs are as follows;

Quality Monitoring Protocol

S. No.	Level	Frequency, samples
1	Testing of water quality using Field Test Kit (FTK)	VWSC/ Paani Samiti/ User Group, etc. will ensure to test 100% drinking water sources including private sources and sanitary inspection under its jurisdiction using FTK.
2	Sub-division/ block laboratory	Test 100% water sources under its jurisdiction; **once for chemical parameters and twice for bacteriological** parameters (pre and post monsoon) **in a year,** covering all sources of a block at least for 13 basic water quality parameters
3	District laboratory	**Test 250 water sources/ samples per month.** sources randomly spread geographically including the positively tested samples referred by the sub-division/ block laboratory/ mobile laboratory
4	State laboratory	**Test at least 5% of the total drinking water samples** across all district level laboratories with random and uniform geographical spread including positive tested samples.

Infrastructure & systems for sample collection & testing

Tier-1: 80 laboratories (76 NABL accredited) at State, District & Block level

Tier-2: Service contract at 80 field level offices to collect samples and test using FTKs (additional to VWSC samples). Here the payment is linked with the number of samples collected by the agency.

Tier-3: 13,442 Pani Samitis (VWSC) carrying out FTK based testing within villages.

Tier-4: Sensor based 500 Smart Quality Analysers testing the water quality for pH, turbidity and chlorine in the bulk transmission system of MVS. These analysers are IOT enabled and collects real-time data.

ii) In-village Water Supply Schemes

Quality testing protocol

S. No.	Parameter	Description
1	Quality standards	Conforming to **BIS 10500: 2012,** and as amended for basic water quality parameters: p H value, TDS, Turbidity, Chloride, Total alkalinity, Total hard ness, Sulphate, Iron, Total arsenic, Fluoride, Nitrate, Residual chlorine Total coliform bacteria and E. Coli or thermo tolerant coliform bacteria
2	Measured at	Village ESRs/ tanks and at end users HH tap
3	Measured by	VWSC/ GP
4	Monitored By	WASMO and GWSSB - As per surveillance protocols
5	Protocol	GPs shall test water quality using FTKs on a regular basis. If any discrepancy is found in the FTK tests, such matter shall be referred to GWSSB/ WASMO and water samples shall be sent for testing at NABL accredited Water Quality Testing Lab.

Note: *In case of source failure (local), new source is created (provided) by the state (GWSSB)*

Maintenance Activities & Troubleshooting

Components and assets within the village water supply infrastructure includes following:

- Water source: Local source (well, bore, handpump) or reservoir, and bulk pipeline-based source (from MVS)
- Pump house & pumping machinery: comprises of pump, electric motor and panels
- Rising mains: For lifting water to elevated tanks
- Distribution network: It is a network of pipeline for distribution of water from sump or service reservoir to household or community taps
- Standpost: It is a community tap for consumption near public places
- Chlorination plant: To treat water from biological contamination

Maintenance activities are carried out by the VWSC (as per the O&M manual provided to the VWSC in O&M kit). The O&M manual for VWSC is a comprehensive document providing guidance on roles, responsibilities, records and report maintenance, preventive maintenance activities, and troubleshooting information. SOPs is provided covering all assets of the in-village infrastructure for timely management.

To troubleshoot issues in pumping machinery or panel board, following action are followed:

For pumping machineries:

S. No.	Issue	Actions
1	Pump not able to lift water	• Carry out priming of the pump by filling water in suction line • Check suction line length. Extend if necessary • Check if pump is rotating in opposite direction. Change connection terminals • If the head is higher than pump's rating, then change pump • Check if suction pipe is 2 feet below the water level • Check for foreign objects in the impeller. Clean if found. • Check if voltage is as desired
2	Too much vibration or noise in the pump	• Tighten foundation • Pump and motor alignment check • Clean the impeller and chamber • Repair or replace if shaft is bent

S. No.	Issue	Actions
3	Less water supply	• Fix suction lift. Lower the pump towards the water level • Check suction pipe for leakage • Check gland and packing if not airtight, replace • Check for issues in foot valve • If the head is higher than pump's rating, then change pump • Check for voltage fluctuations
4	Excess leakage in stuffing	• Water dripping is normal. • Inspect gland packing and fix • Pump and motor alignment • Check for bent shaft
5	Pump works for a while, then gives up suction	• Correct if suction lift is high • Make sure there is no air leak from suction pipe • Check alignment and packing of stuffing box and fix
6	Overheating of pump and shuts off	• Use a higher capacity pump • Check for low voltage

For motors:

S. No.	Issue	Actions
1	Motor not starting	• Check voltage and connections • Check for earthing faults in winding • Check for faults in control circuit • Clean bearing if jammed
2	Vibration in motors	• Check motor-pump alignment • Strengthen foundation • Check bearing, replace if necessary • Correct if axial play is excessive
3	Difficulty in starting of motor. Excess load	• Check for low voltage • Voltage drops and fluctuations • Check connections in starter • Replace winding if short
4	Buzzing sound in motor	• Check rotor for issues

S. No.	Issue	Actions
5	Excess load in motor	• Reduce load or replace motor • Check if low voltage • Check if contact is proper
6	Motor heats up quickly	• Check for phase short • Winding short circuit, replace

For panels:

S. No.	Issue	Actions
1	Non-availability of power supply	• Check voltage using voltmeter or lamp test. If lamp does not light up, remove fuse and check if repair is needed
2	Pump not starting when starter switched on, power supply is there	• If power supply is adequate, check wiring, contacts, coils and replace if necessary • Check the pump/ motor. Disconnect motor from the starter and check its winding with test lamp
3	Fuse blown or starter shut off on pump start	• Check wiring or earthing in motor using a test lamp • Free motor/ pump if jammed • Remove if wiring is earthed

For Quality related issue:

S. No.	Issue	Impact	Actions
1	Floating impurities, debris like paper, wood, plastic etc	Obstructs the pump	Filtration by screens/ mesh
2	Impurities that settle at the bottom like sand, gravel etc	Occupies storage space in tank, impediment in pump	Let it settle to the bottom and clean periodically
3	Presence of soil, food, organic, insoluble chemicals, human waste etc	Unfit for drinking	Use of alum and better filtration system
4	Soluble impurities such as chemicals, salts etc	Spoils taste, fluoride contamination, joint problems etc	Not easily removed Desalination process Membrane filtration
5	Biological impurities	Water borne diseases	Chlorination Filtration

Conclusion

The integration of digital technology within the O&M framework of water supply systems under Jal Jeevan Mission in Gujarat represents a significant stride towards sustainable and efficient water management. The adoption of Remote Monitoring Systems, Sensor-Based Technologies, Data Analytics Tools, and IoT-enabled solutions has not only optimized asset management but also enhance the monitoring of water supply quantity, quality, and regularity in real-time. The meticulous record-keeping, proactive maintenance schedules, and performance-based contracting models underscore Gujarat's commitment to ensure uninterrupted access to clean water for its rural and urban populations. By leveraging these innovative strategies and initiatives, has set an example of how digital transformation can revolutionise O&M practices, promote accountability, and ultimately contribute to the overarching goal of equitable and sustainable water distribution.

Lifecycle Approach through Integration of Digital Processes

- **Rahul Sinha,** State IT Programmer, DWSD Jharkhand; **Biplab Shankar Dey,** SPM, Piramal Foundation

Sarvajal Enterprise Management System (SEMS) is an online enterprise resource planning (ERP) tool developed in-house by a team of software experts from Piramal Foundation. SEMS is an integrated system that provides comprehensive data and administration control over the operation of water purification and dispensing units and also enables us to monitor the groundwater levels. The system has a proactive and community-centric approach to water management in rural areas. By empowering local committees, leveraging technology for monitoring and decision-making, and prioritising water quality, Piramal Foundation is making significant strides towards safe drinking water and enhancing the well-being of rural communities.

The system is continuously monitoring over 1,100 safe water infrastructures installed, helping the team to maintain uninterrupted 24x7 safe water availability in around 20 states. The village water committees, which are entrusted with the responsibility of managing purification units and monitoring water distribution, are able to control usage, adapt to seasonal changes, and make better decision makers towards water management. Furthermore, by analysing results from water level monitoring, the water committees and communities are able to make informed decisions regarding water management and budgeting. This data-driven approach helps optimize water usage and ensures sustainable utilization of available water resources.

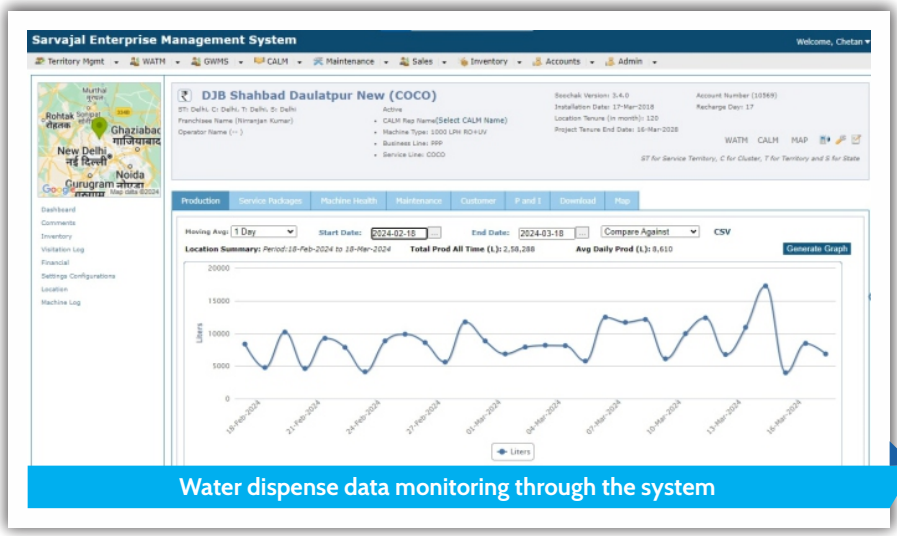
SEMS contributes to quality, accountability and operational transparency which enables the team to access and control the units from a central location and ensure smooth on ground operations:

Real-time Data Aggregation and Processing: Keeping a check on the water dispense and enabling the communities to access round the clock safe drinking water.

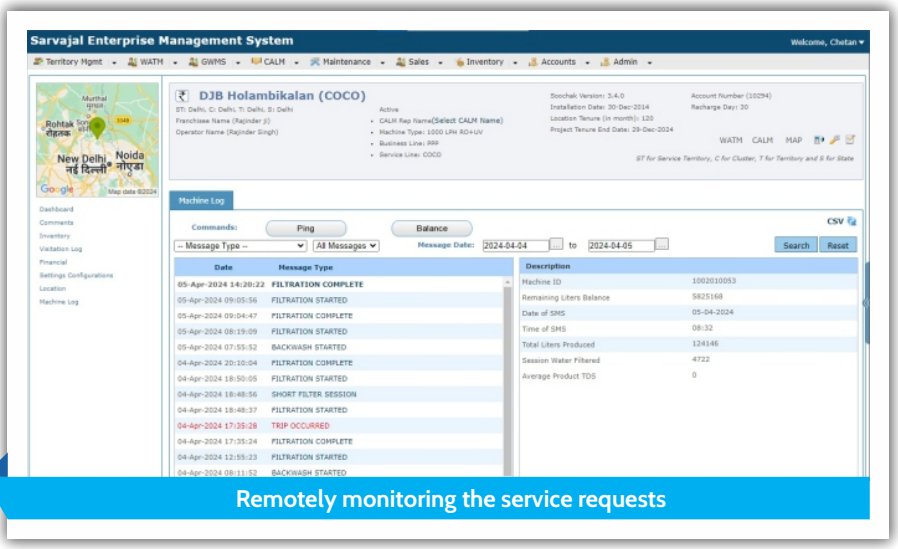
Supply Monitoring: A visibility into the amount of water being supplied through the water infrastructures in provided. This data helps internal team to understand the consumption patterns, identify areas of high demand, and optimize supply to meet the needs of users effectively. This real-time data also provides valuable insights into the regular functioning of each of the solutions, enabling our partners to monitor operations closely.

Alerts and Control Mechanisms: SEMS is equipped with optimization algorithms that generate relevant alerts. These alerts enable key process-related controls, allowing maintenance team to respond promptly to critical or emergency issues and ensures the 24x7 service availability.

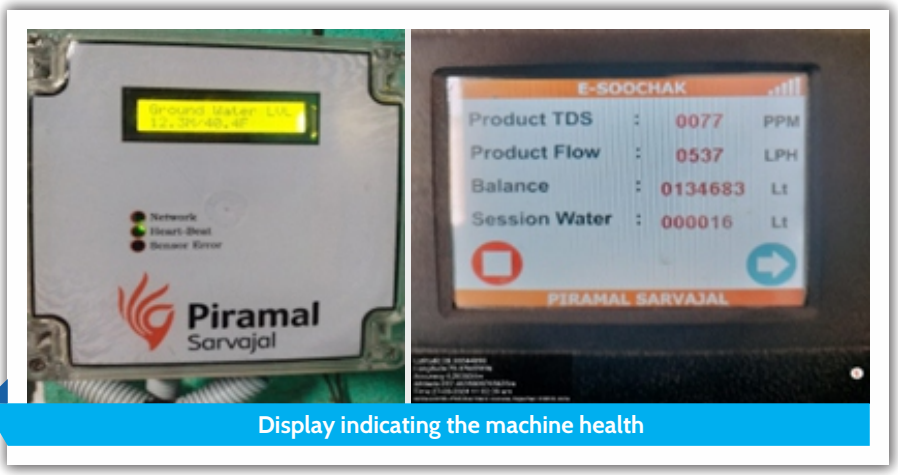
Prompt Respond to Service Requests: The system allows the internal team to monitor and facilitate timely maintenance and repairs at all the locations along with tracking of the performance of water units, detecting any potential issues or malfunctions. Whenever there is any breakdown or maintenance issue, an immediate service ticket gets raised specifying the nature of the issue and the materials required for repair. This



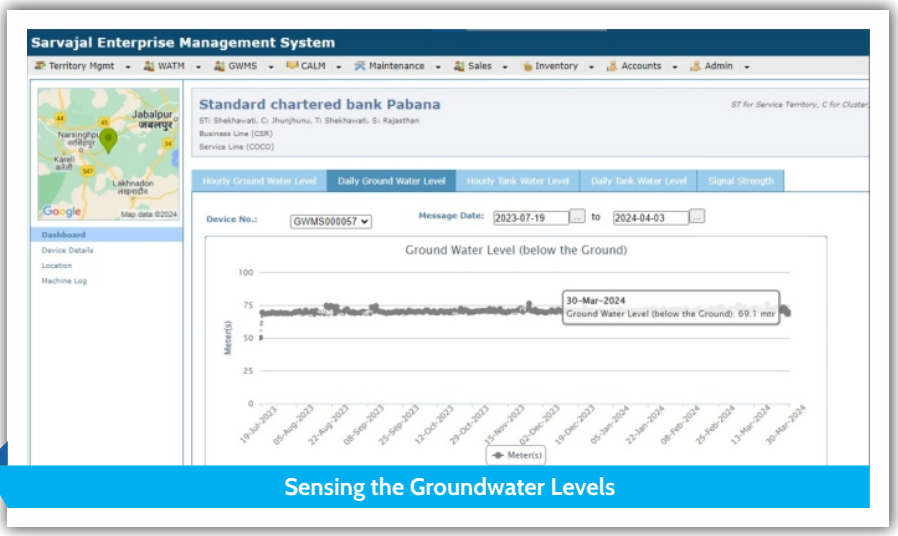
Water dispense data monitoring through the system



Remotely monitoring the service requests



Display indicating the machine health



Sensing the Groundwater Levels

allows the team to immediately respond on the request generated.

Ensuring Greater Reliability: The integration of low water level indicators within the system is a crucial feature that enhances reliability by allowing unit operators to monitor water levels in tanks effectively. This proactive approach enables operators to refill tanks promptly, preventing any downtime for water users. Moreover, the inclusion of **quality monitoring functionalities** provides consumers with assurance regarding the quality of water being consumed. By monitoring parameters like the TDS in water helps in ensuring water purity and safety. This aspect not only promotes consumer confidence but also contributes to their overall health and well-being.

Restoration of Groundwater Levels Through Borewell Strengthening: Piramal Sarvajal in collaboration with its technical partner Urdhvam has undertaken initiatives to strengthen 59 borewells across 28 villages in Madhya Pradesh, Rajasthan, and Maharashtra. Water conservation structures and soak pits are built to promote water retention and infiltration into the ground, leveraging the technology and community involvement to address water scarcity issues. Sensors are deployed at each of these water conservation structures and are connected to the SEMS platform, enabling the collection, analysis, and monitoring of water outflow. The data collected is analysed through SEMS, enabling the team to empower the community to make efficient water management decisions through water budgeting. By understanding water usage patterns and the impact of conservation efforts, the community can also optimize water utilization and promote long-term sustainability.

Overall, the ERP system (SEMS) designed and deployed plays a crucial role in enhancing quality, accountability, operational transparency and monitoring the levels within the water structures created by Piramal Sarvajal, allowing the internal and external stakeholders with actionable insights and control mechanisms to optimize performance and address water related challenges effectively.

Transforming E-Governance by Digital Metering in Goa

- **UP Parsekar,** Principal Chief Engineer, PWD & Mission Director, JJM – Goa; **Punam Singh,** NJJM

Digitisation provides more efficient and higher level of services and provides utility boosts to communication between governments and citizens. The three most captivating qualities of a digital government are its capacity for effective service delivery, affordable scaling and quick adaptation. According to the World Bank[1], the concept of digital government represents a fundamental shift in how governments around the world embrace their mission. From setting their measurable administrative goals to improve public service delivery, and enacting evidence-based policies, to ensuring greater accountability and transparency within government, governments are leveraging the power of information technologies in transformative ways.

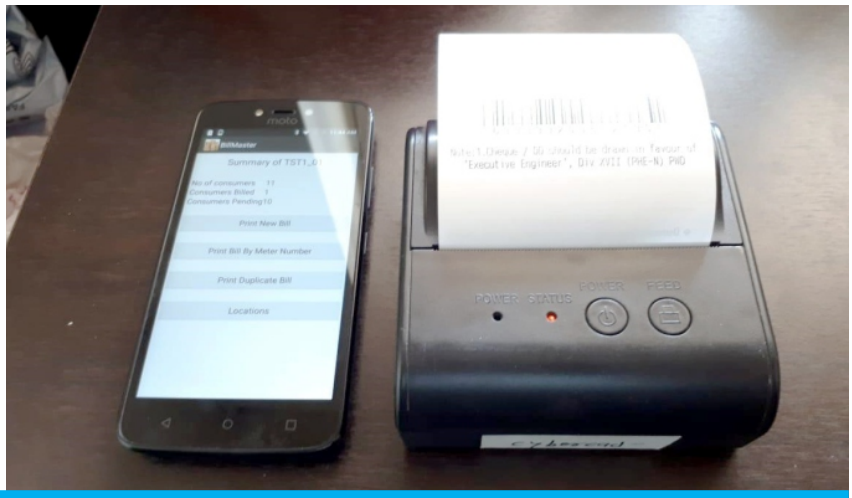
As water is a daily need for everyone, the scarcity of water remains a critical issue across the world. To beat this touch challenge, Goa has taken an initiative by placing smart meters to reduce misuse of water. Simultaneously, the billing of water is giving public a sense of responsibility as well as accountability in collecting revenue through water supply. As a pilot project, Public Works Department (PWD) in Panaji has awarded a contract to a company to replace consumer grade mechanical water meters with LoRaWAN-enabled ultrasonic smart water meters, marking a significant step towards water security.

Planning of Water Requirement and Consumption

According to PWD[2], Goa, the urban and rural population of Goa was 62% and 38% respectively as per census 2011. The Central Public Health and Environmental Engineering Organisation (CPHEEO), GoI's Manual of Water Supply and Treatment set the maximum consumption of water for the population with facilities of flushing sewerage system as 135 litres per capita per day (lpcd) and without sewerage system, the consumption recommended was 70 lpcd.

The State had achieved the service of 82 lpcd in rural areas and 143 lpcd in urban areas at the end of the Tenth Five Year Plan. It was proposed to increase the supply level to 100 lpcd in rural areas and 150 lpcd in urban areas with the emphasis on 24x7 water supply ensuring all safety parameters of drinking water as per standards.

Checking of meter



Digital billing and payment mode

Spot Billing with Digital Payment Facility

The practice of generating bills instantly at the point of service has witnessed a significant transformation with the integration of digital payment options. This synergy between billing and digital payment technologies not only streamlines the billing process but also enhances customer convenience and operational efficiency.

Traditionally, billing processes involved manual data entry, which was time-consuming and prone to errors. Under spot billing, bills are generated instantly, eliminating the need for manual data entry. This automation reduces error and ensures accurate billing, and being on the spot, consumers can verify the reading on the meter versus on the bill.

Digital Payment making life easy for the customers

Digital payment options offer the customers greater flexibility and convenience, allowing them to make payments anytime and anywhere.

By digitizing billing and payment processes, the PWD can streamline their operations. Automated reconciliation of payments, real-time tracking of transactions, and centralised data management contribute to improved efficiency, an attempt for facilitating reduction of Non-Revenue Water (NRW).

Meter reading through digital device

Safety of Financial Information

Thane Janata Sahakari Bank (TJSB) Ltd under Bharat Bill Payment System (BBPS) has been enrolled as Bharat Bill Payment System Operation Units (BBPOU) for digital payment facility with the implementation of robust encryption protocols and secure payment gateways, digital payment options ensure the security and privacy of customer data. This instils confidence among customers regarding the safety of their financial information and fosters trust in the billing system.

Conclusion:

To summarise the whole process and its benefit, metering fulfils the need to know accurately the water produced and distributed by clear understanding of water balance. A well-placed metering system in the water distribution network also assists technical staff in identifying the location where water loss/ leakage is observed by comparing the water meter readings at the point of release of water with the reading at the consumer ends.

With the aim to ensure water conservation and reducing the misuse of water, metering of water is an excellent application of the principle "to measure is to know". The knowledge of how much water is being used in the water supply system is the key element in controlling the water loss and revenue loss thereof. Water tariff, based on consumption quantity, can increase the income of water supply agencies, subsidise needy consumers and manage water consumption. However, implementing a tariff policy requires a well-established metering system. Therefore, installing a metering system in the water supply network is essential.

References:
https://www.worldbank.org/en/topic/digitaldevelopment/brief/digital-government-for-development
https://cag.gov.in/uploads/download_audit_report/2014/Goa_Civil_2014_chap_2.pdf

IT/ AI-based Surveillance and Monitoring System for Drinking Water Supply Schemes, Real Time Monitoring of PWS and Use of Solar Energy for PWS

- **Anand Pandey**, NJJM

The Jal Jeevan Mission (JJM), with its forward-looking five-year action plan, is set to incorporate cutting-edge IT and AI-based surveillance and monitoring systems to transform the management of drinking water supply schemes throughout rural India. This technological leap involves implementing real-time monitoring systems for Public Water Supply (PWS) networks, equipped with an array of sensors and telemetry devices that constantly monitor water quality, flow rates, and system performance.

This sophisticated infrastructure will provide actionable intelligence, enabling swift maintenance actions and ensuring the reliable provision of clean drinking water. The integration of such advanced technology into the water supply framework is designed to prevent service interruptions, improve water quality, and proactively tackle potential system breakdowns.

In a stride towards sustainability, JJM is also championing the adoption of solar energy in PWS schemes. The move towards solarization not only reflects the mission's dedication to sustainable practices but also guarantees that water supply systems are less reliant on traditional power sources, which is particularly beneficial for energy-deficient remote areas.

Over the course of the next five years, JJM's pioneering efforts are expected to establish a durable, self-reliant water infrastructure that reinforces the mission's pledge to water security. This proactive strategy is likely to foster a more resilient and autonomous rural India, creating a benchmark for the global community in the fusion of technology and ecological responsibility in water service provision.

The integration of AI and IT systems into JJM's framework will enable a significant leap in the quality of water service management. By leveraging real-time data and predictive analytics, the mission can anticipate issues before they escalate into crises, ensuring that every individual has access to safe drinking water. The use of solar energy to power these systems will not only reduce the carbon footprint but also cut operational costs, making the water supply schemes more economically viable in the long run.

The JJM's commitment to utilizing renewable energy sources and advanced technology underscores a broader shift towards sustainable development in India's rural water management sector. By setting an example of innovation and sustainability, JJM aims to inspire similar initiatives worldwide, emphasizing the importance of integrating environmental considerations into the core of infrastructure development.

As JJM progresses with its plan, the expected outcomes include enhanced operational efficiency, reduced environmental impact, and improved water quality for rural communities. The mission's success in this endeavor will likely serve as a model for other nations seeking to modernize their water supply services while adhering to sustainable development goals.

Nationwide Kaleidoscope on World Water Day, 2024

- **Utkarsha Rathi**, NJJM

World Water Day, an annual event celebrated globally on 22nd March, serves as a poignant reminder of the critical importance of freshwater and the urgent need for its sustainable management. The Day witnessed a remarkable convergence of faith, knowledge, and action across regions, as communities came together to address the pressing challenges of water conservation and sustainability. In 2024, amidst growing concerns over water scarcity, pollution, and equitable distribution, the theme of 'Water for Peace' resonated profoundly across the nation, echoing the pivotal role of water in fostering cooperation, harmony, and sustainable development.

The subsequent article shares a comprehensive representation of the glimpse of activities conducted by diverse States/UTs, which is not reflective of all the activities held across the nation. These glimpses are presented to commemorate the World Water Day.

From the quaint landscapes of Meghalaya to the bustling streets of West Bengal, and from the tranquil valleys of Nagaland to the sacred banks of the Ganges in Uttarakhand, diverse initiatives were undertaken to promote the theme of 'Water for Peace' and foster a culture of responsible water management. The kaleidoscopic glimpse of the celebration across the nation is as follows:

Meghalaya's Call to Action

In the verdant landscapes of Meghalaya, World Water Day was observed with great fervour. The programme, organised by the Public Health Engineering Department in collaboration with the District Administration, West Garo Hills, Tura, brought together stakeholders and communities alike. Prior to the celebration, a series of events were orchestrated, culminating in a 'Model Exhibition' during the main function. Senior officials from the PHED department, accompanied by other dignitaries, felicitated the winners of various competitions held in anticipation of the World Water Day celebration, highlighting the importance of community participation. School children participated in the competitions with great enthusiasm. They are the change agents in the programme who will create a long lasting impact for water security and sustainability.

West Bengal: Mobilising for Conservation

In West Bengal, a district-level program, held in Nadia District became the focal point for World Water Day celebrations. Embracing the theme, the event witnessed active participation from diverse segments of society, including students, community members, and government personnel. A total of 18 individuals were felicitated for their exemplary contributions in the area of water conservation, showcasing the importance of grassroots endeavour. Cultural programs and oath-taking ceremonies pledging to

Community Engagement on World Water Day at District Auditorium Tura, Meghalaya

School Children performing a skit on conscious water management, West Bengal

save water resonated with the audience, symbolising the collective resolve towards water preservation.

In addition to the celebrations in Nadia District, West Bengal witnessed a plethora of activities across the state, aimed at spreading awareness about water conservation and Jal Jeevan Mission. Some of the key activities included: Student engagement, community outreach programs intended to gain momentum, to continue fostering a culture of water conservation for a sustainable and prosperous future.

Nagaland: Empowering Communities for Change

In Nagaland, people celebrated World Water Day by getting involved in engaging activities that focused on the importance of clean water and how to take care of it properly. From Zunheboto to Dimapur, educational institutions and community organisations took proactive steps to address the importance of freshwater and advocate for its sustainable management. Through seminars, walkathons, and technical sessions, participants not only gained awareness about water-related issues but also actively engaged in practical activities and discussions, instilling a sense of ownership and duty toward water conservation. Participants were actively involved in hands-on water quality testing and monitoring, culminating in a collective pledge to embark on a local-level mission for water conservation.

The Jal Shakti Committee (JSC) at Sao Chang College (SCC) orchestrated various activities commemorating World Water Day, aiming to underscore the importance of freshwater and advocate for its sustainable management. During the event, the JSC coordinator underscored the day's significance, emphasising the critical need to conserve freshwater resources. The event drew attendance from Ward of Zunheboto, representatives from Sumi Hoho, ZRSU, alongside other dignitaries, and students from Government College, Zunheboto.

Uttarakhand celebrates a Fusion of Leadership, Faith, and Innovation

The serene banks of the sacred Ganges River in Rishikesh set the stage for a momentous gathering of global leaders and passionate advocates for water conservation and peace. Jointly convened by the United Nations Office for Project Services (UNOPS) and the Global

PHED officials and others at Zunheboto

Observation of world water day at SSC

नवभारत
छत्तीसगढ़ • ओडिशा

Kanker - 24 Mar 2023 - 24kkr4
epaper.navabharat.news

जल जीवन मिशन अंतर्गत ग्राम इच्छापुर में विश्व जल दिवस कार्यक्रम आयोजित

नवभारत । कांकेर

जल जीवन मिशन अंतर्गत जिला जल एवं स्वच्छता मिशन कांकेर एवं प्रमुख संसाधन केंद्र जल सेवा चैरिटेबल फाउंडेशन के संयुक्त तत्वाधान में विकासखण्ड कांकेर के ग्राम इच्छापुर में विशेष ग्रामसभा आयोजित कर विश्व जल दिवस मनाया गया। कार्यक्रम का शुभारंभ जनपद सदस्य एवं कृषि उपज मंडी समिति के अध्यक्ष राजेश भास्कर, मुख्य अतिथि पीएचई खंड कांकेर के कार्यपालन अभियंता एसपी मंडावी, विशेष अतिथि ग्राम पंचायत इच्छापुर के सरपंच प्रतिमा तेता की उपस्थिति में की गई। विश्व जल दिवस के उपलक्ष्य पर कला जत्था के माध्यम से जल जीवन मिशन के उद्देश्यों एवं जल के महत्व पर नुक्कड़ नाटक एवं जल गीत के माध्यम से जन समुदाय को जल संरक्षण का संदेश दिया गया। कार्यक्रम में वाटर एड इंडिया कांकेर के जिला समन्वयक अजहर कुरैशी ने जन समुदाय को बताया कि जल का संरक्षण कर भूमिगत जल स्रोत का स्तर को बढ़ाना होगा, तब हमें शुद्ध पेयजल प्राप्त हो सकता हैं। उन्होंने कहा कि इच्छापुर गांव फ्लोराइड प्रभावित ग्राम हैं, यहां पर गहन शोध कर तेजपुर विश्वविद्यालय असम के विशेष सहयोग से फ्लोराइड जल शोधन संयंत्र स्थापित किया गया हैं, जिससे आप लोगों को शुद्ध पेयजल उपलब्ध कराया जा रहा हैं। कार्यक्रम के विशेष अतिथि जनपद सदस्य एवं कृषि उपज मंडी समिति कांकेर के अध्यक्ष श्री राजेश भास्कर ने जल की निकट समस्या से अवगत कराते हुए लोगों को बताया कि वास्तव में कलमूचे गांव के लोग पानी का असली महत्व को समझ रहे हैं और पानी बचाने के लिए कार्य कर रहे हैं, हमें भी जल संरक्षण, संवर्धन करना चाहिए। इसके पूर्व उपखण्ड कांकेर के सहायक अभियंता राजेश हिरकने ने कहा कि हम दूषित जल के सेवन करते हैं, तो विभिन्न बीमारियों से ग्रसित होते हैं। जन समुदाय को अजहर कुरैशी के द्वारा जल संरक्षण एवं संवर्धन के प्रति शपथ ग्रहण करवाया गया। तत्पश्चात स्लोगन एवं नारों के माध्यम से रैली निकालकर विश्व जल दिवस का संदेश देते हुए गांव का भ्रमण किया तथा तालाब के आसपास साफ सफाई कर पौधारोपण किया गया, जिसमें सभी ने बढ़ चढ़कर हिस्सा लिया। इस अवसर पर जल जीवन मिशन जिला नोडल अधिकारी नवीन कुमार साहू, डिस्ट्रिक्ट एसोसिएट शिवा रेड्डी, जिला समन्वयक सुश्री ज्योति शांडिल्य, सुश्री निशा वामन, श्रीकुमार सिंह तोप्पा, छत्रपाल साहू, स्वच्छ भारत मिशन के जिला समन्वयक नूतन, समस्त वार्ड पंच, गायता, पटेल, प्राचार्य, शिक्षक, वाटर ऐड इंडिया एनजीओ के सदस्य अरुण जैन, तिलक जैन, नरेंद्र सहारे एवं ग्रामीणजन बड़ी संख्या में उपस्थित थे।

Interfaith WASH Alliance (GIWA) the one-day event on the theme “Water for Peace” aimed to foster dialogue, inspire action, and honour remarkable contributions towards creating a water-secure world.

UNOPS India set the tone with an inspiring welcome address, emphasising collaborative efforts in addressing water-related challenges. Honourable Mrs. Ritu Khanduri, Speaker of the Uttarakhand Vidhan Sabha and other distinguished speakers from the Indo-Nordic Water Forum and Wildlife Institute of India underscored the interconnectedness between water and global stability, emphasising the need for collaborative efforts and innovative approaches to water management. Their insightful addresses shed light on innovative approaches to water management and conservation. Highlighting the significance of international cooperation, His Excellency Freddy Svane, Ambassador at the Royal Danish Embassy, delivered a special address, reaffirming Denmark's commitment to global water security initiatives.

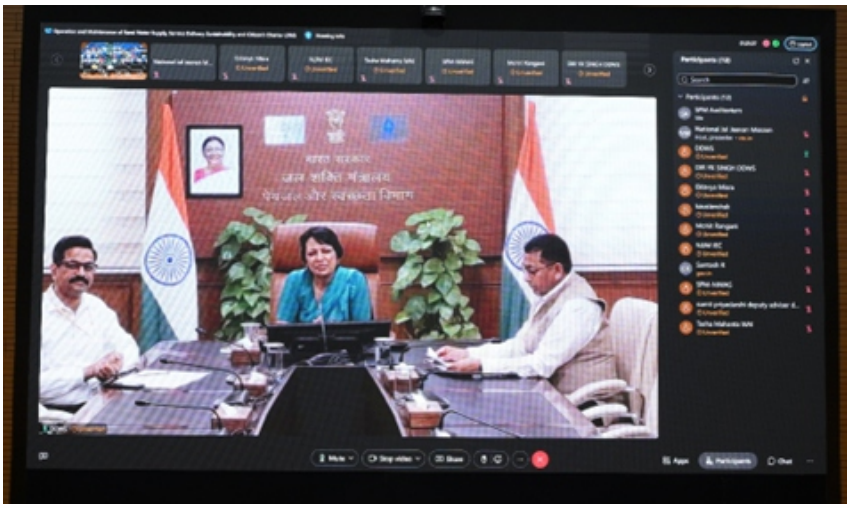
Through the release of 'Good Practices in Water Management' and the presentation of Ganga Awards, the event celebrated exemplary contributions towards creating a water-secure world while reaffirming the collective pledge for water conservation and peace.

The Nationwide Kaleidoscope on World Water Day, 2024, echoed collective commitment and action that resonated across regions. Through awareness, advocacy, and action, a collective foundation stone for a sustainable future can be laid, where every drop of water is cherished, protected, and shared equitably.

Trainings at SPM NIWAS, Kolkata

- NJJM

In the month of April three trainings were conducted at Dr Syama Prasad Mookerjee National Institute of Water and Sanitation (SPM-NIWAS) set up at Joka in Kolkata at a cost of Rs 100 Crore in 8.72 acre land. It is an apex institute on Water and Sanitation established by the Department of Drinking Water and Sanitation with the aim to bridge the knowledge and capacity building gap in the field of public health engineering, sanitation & hygiene covering various aspects of management, health, accounting, law and public policies.



Training on Operation & Maintenance of Rural Water Supply

With 75% rural population getting access to safe and clean drinking water in the villages the role of the Panchayats and its sub-committee becomes all the more important as they have to take on the responsibility of its upkeep and maintenance in the long run. It is therefore important that the community understands its role and responsibility. In order to fill in the gap, a training was organized at SPM NIWAS from 3rd to 5th April 2024 which had experts from PriMove, UNICEF, NTSEI, L&T, Water Aid and Evidence Action.

The 3-day training was attended by 75 officials belonging to rural water supply, public health department and State Project Management office from Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Odisha, Puducherry, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal.

The training focused on the following aspects of Jal Jeevan Mission –

1. Salient features of handling rural water supply infrastructure with Gram Panchayats and Village Water and Sanitation Committee and its institutional arrangement,
2. Defect Liability Period (DLP) and its management,
3. Operation & Management, financing of Single Village scheme (SVS), Multi Village scheme (MVS), large surface water based MVS,
4. 24x7 water supply/ Dwan to Dusk water supply,
5. Staff requirement and its training,
6. Social inclusion,
7. Citizens Charter Service Delivery,
8. Grievance Redressal

Training on Swachh Bharat Mission (Grameen) 2.0, Solid Waste Management, Liquid Waste Management and Faecal Sludge Management (FSM)

As Swachh Bharat Mission Phase II enters 4th year of programme implementation, achieving 100% targets is imperative to declare all villages Open Defecation Free (ODF) Plus. States/ UTs have outlined capacity building goals in their AIPs,

necessitating prompt initiation of training programme.

A comprehensive 3-day training programme was held from 8th to 10th April 2024 at SPM-NIWAS. The training was imparted to officials and engineers by experts from Water Aid, WASH institute, Centre for Environment Education (CEE), Primove and UNICEF.

The training focused on –

1. Liquid Waste Management,
2. Greywater Waste Management its planning and treatment,
3. Design principle with respect to technology options,
4. Analysis in MIS based saturated villages/ Gram Panchayats,
5. FSM fundamental, planning, site selection for plants and its design,
6. Operation & Maintenance of Faecal Sludge Treatment Plants, safety and health practices, regulating framework and its convergence,
7. Plastic Waste Management, waste segregation linkage with resellers, road construction, quality control and testing,
8. GOBARdhan Biogas plant technology, feedstock identification, safety and health practices

The training was attended by 58 officials from Sikkim, Jammu & Kashmir, Himachal Pradesh, Gujarat, Nagaland, Mizoram, Meghalaya, Punjab, Uttarakhand, Tripura, Ladakh and Assam.

Training on Project and Financial Management and Procurement

As Jal Jeevan Mission enters 5th year of its implementation, 11 States/ UTs are 100% saturated. A training was organized at SPM NIWAS on various aspects of project management, financial management and procurement with experts from HUDCO, KPMG, Shapoorji Palonji & Co private limited.

A 3-day Jal Jeevan Mission training was held from 18th to 20th April 2024 at SPM NIWAS which was attended by 48 officials from Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Jharkhand, Karnataka, Maharashtra, Odisha, Punjab, Uttar Pradesh and Rajasthan.

Th training covered following aspects –

1. Project management – its benefits, techniques and network analysis,
2. Project identification life cycle and its phases,
3. Resource planning,
4. MS Project software,
5. Statutory clearances,
6. Operation & Maintenance,
7. Financial management

Jal Jeevan Surveksha

In the month of **April-2024**, Unnao from Uttar Pradesh, Dharmapuri from Tamil Nadu, Jaunpur from Uttar Pradesh, Gadag from Uttar Pradesh & Vadodara from Gujarat have secured first rank in Aspirants, Performers, Achievers, High Achievers, and Front Runners sub-categories respectively under "Best Performing Category".

Followed by districts Unnao from Uttar Pradesh, Khairthal-tijara from Rajasthan, Anoopgarh from Rajasthan, and Annamayya from Andhra Pradesh have secured first rank in Aspirants, Performers, Achievers, and High Achievers sub-categories respectively under "Fastest Moving Category".

Har Ghar Jal
Jal Jeevan Mission

Jal Jeevan Samvad

Follow, like and subscribe

Jal Jeevan Mission, India
@jaljeevan_
Jal Jeevan Mission
@jaljeevanmission
jjm.gov.in
Jal Jeevan Mission

Government of India
Ministry of Jal Shakti
Department of Drinking Water & Sanitation
National Jal Jeevan Mission
New Delhi - 110 003
e - mail: njjm-ddws@gov.in