

A Digital Approach for Sustainable Rural Water Systems

Field Study Report from Assam

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Executive Summary

The digitalisation of public service delivery has the potential to enhance efficiency, financial sustainability, and user engagement across sectors. By leveraging technology, service delivery systems can improve operational oversight, streamline revenue collection, and foster greater transparency and accountability. In the context of water service delivery, digital tools offer an opportunity to strengthen infrastructure management and ensure long-term sustainability.

One of the most ambitious programs in water service delivery is the **Jal Jeevan Mission (JJM)**, a national initiative envisioned to provide safe and adequate drinking water through individual household tap connections to all households in rural India. As JJM ambitiously scales to all the villages in India, the integration of digital solutions becomes inevitable to enhance service delivery, improve financial viability, and engage communities in water management.

Taking this as a subject, this report utilized a **field study in Assam** to explore the role of **digitalisation in the sustainability of rural water systems**. The field study covered **17 villages** across diverse geographic setting in Assam, assessing the impact of JJM's interventions on water access, quality, and stakeholder engagement, and scoping the potential of digitising service delivery. The key themes that are covered in the report are:

1. With the introduction of JJM, **while water availability and quality have significantly improved**, key challenges persist, including **financial constraints**, **irregular maintenance**, and **low user fee collection**.
2. **Digital readiness assessments** reveal that most users are comfortable with smartphones, particularly **WhatsApp**, which can be utilised as the ideal channel for **reporting and communication**.
3. The citizens are willing to pay for water services, provided essential conditions—**regular supply, cleanliness, and reliable pressure**—are met. Based on this insight, the study provides **digital product recommendations** for **real-time water supply notifications**, **water quality test results**, **maintenance updates** and a **Public Grievance Redressal (PGR)** portal.
4. For **FTK (Field Test Kit) volunteers**, a dedicated digital interface with automated reminders and test result logging is recommended, along with financial incentives or recognition to improve engagement.
5. The study also proposes key **programmatic interventions**, such as **structured handover processes**, **targeted IEC** (Information, Education, and Communication) **campaigns**, **capacity-building programs**, **greater synergy between digital platforms** and **improved stakeholder coordination**.

By leveraging digital platforms alongside community-driven governance, the digitisation of JJM implementations can become a sustainable, scalable model for rural water service delivery and inform broader digitalisation efforts in public service delivery.

List of Abbreviations

In the order of appearance

JJM – Jal Jeevan Mission
PGR – Public Grievance Redressal
FTK – Field Test Kit
IEC – Information, Education and Communication
PHED – Public Health Engineering Department
WUC – Water User Committee
VWSC – Village Water and Sanitation Committee
NJMP – Nal Jal Mitra Program
O&M – Operations and Maintenance
SPOC – Special Point of Contact
GB – Gao Bora
OTP – One-Time Password
NJS – Nal Jal Seva
JM – Jal Mitra
DPI – Digital Public Infrastructure

About the Study

Study Rationale

The Jal Jeevan Mission is designed to support, empower, and guide States and Union Territories in developing a participatory rural water supply strategy that will ensure long-term potable drinking water security for every rural household. As the technical partner for JJM, eGov has been in the process of digitising operations under JJM in order to improve collection efficiency, visibility and financial sustainability.

However, due to the significant diversity among Indian villages in terms of economic, geographical, and cultural backgrounds, the motivations and challenges for sustainably maintaining water supply infrastructure will vary from one village to another. Therefore, it is essential to gain a deeper understanding of these diverse drivers when considering the sustainability of water supply infrastructure.

To understand the variations in the motivations and challenges for maintaining water supply infrastructure across diverse villages and scoping the potential of digitisation, the study will employ an **exploratory qualitative research approach**. This approach is chosen due to its flexibility in capturing the nuances of village-level dynamics and its effectiveness in uncovering insights that may not be apparent through quantitative methods.

Assam was the first state to adopt the Nal Jal Seva (NJS) platform as part of JJM's digitisation efforts, and eGov is collaborating with the Public Health Engineering Department (PHED) for the implementation of the platform. This collaboration provided a valuable opportunity to conduct the study in Assam, leveraging early insights from the digitisation pilot.

About the Study

Objectives

- To understand the current state of drinking water service delivery at the Village level.
- Map the stakeholders involved in drinking water service delivery.
- To understand the drivers and constraints for sustainable water service delivery at the village level.
- Exploring the potential of digital tools in improving water service delivery.
- To evaluate the effectiveness of IEC activities and capacity-building efforts in promoting community engagement.
- To examine the adoption and integration of digital tools like NJS and Jal Mitra App.

Sampling

Phase 1: A sample of 11 villages were selected stratified based on physical geography and the JJM handover status. This stratification ensured that the study captured a diverse range of conditions and stages of program implementation.

Villages	Total	Geography			
		Hilly	Chachar Plains	Upper Asom Valley	Brahmaputra Plains
Total No of Villages	11	3	3	3	2
No of Villages with JJM	9	2	3	2	2
No of handed over Villages	6	1	2	1	2
No of Villages w/ O&M by PHE	3	1	1	1	0
No of Villages w/o JJM	2	1	0	1	0

Table 1: List of Villages covered in Phase 1 of the study

About the Study

The **second phase** of the study involved field visits to schemes from villages piloting NJS in Assam to assess initial adaptation and user comfort with the new digital solution. These were:

- Tezpur District (where the Nal Jal Seva platform was started being used)
 - Barika Chubari Scheme
 - Mazgaon Scheme
 - Devrigaon Scheme
- Kamrup District (where the platform use hadn't yet started, to understand if the collections are being made and how, this was also a combination of a water scheme and a river-based scheme)
 - Nomali Jalah Scheme
 - Kalipahar Scheme
 - Rongmahal Scheme

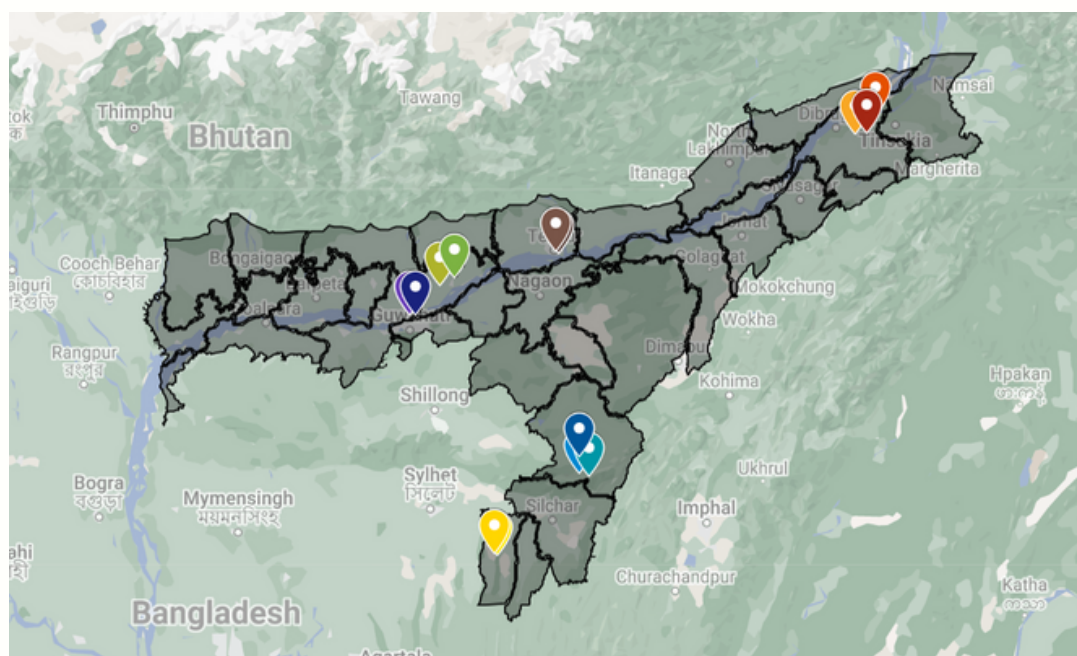


Figure 1: Geographic extent of the sampled villages in Assam

About the Study

Data Collection

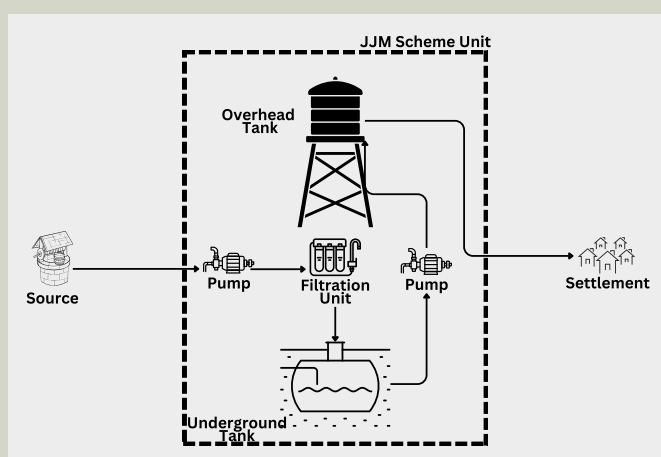
Field **interviews** were conducted with key stakeholders—including the Sarpanch, pump operator, bill collector, VWSC members, and citizens—to understand their experiences, challenges, and motivations in maintaining water supply infrastructure. Additionally, on-site **observations** were carried out to supplement the data collected through interviews.

Data Analysis

The collected data was analysed **thematically** to identify common patterns, themes, and variations across different villages and stakeholders.

JJM Infrastructure

The scheme-level infrastructure of JJM comprises two primary components: the water source and the JJM scheme unit, which encompasses the operational facilities, including pumps, storage tanks, and filtration systems.



Among the 11 schemes examined in the study, significant variation was observed in the infrastructure, influenced by differences in both primary components: the water source and the scheme unit.

Figure 2: Schematic representation of JJM infrastructure in Assam

Variation in Source

There were three types of water sources in the schemes we visited: high-altitude springs, where water flows down to the JJM unit through pipes pushed by gravity; rivers, from which water is drawn using pumps; and groundwater, which is also extracted using pumps.

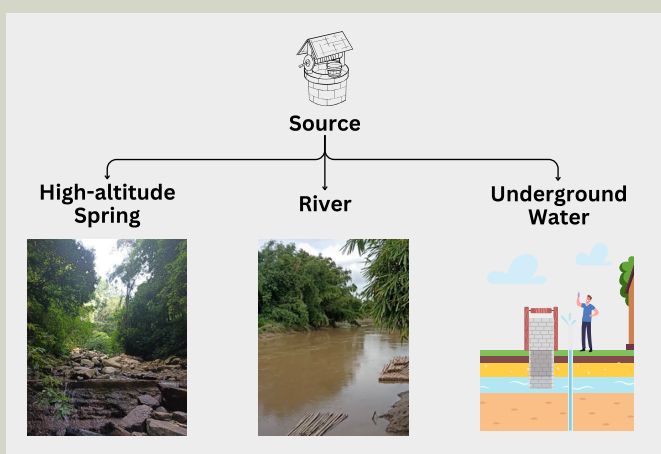


Figure 3: Variability of sources

As the JJM Guidelines dictate— “In tribal/ hilly/ forested areas, option of gravity and/or solar power-based water supply schemes with low O&M expenditure to be explored and preferred. In hills and mountains, springs as a reliable source for drinking water to be explored.” — more than 90% of the schemes in the Hill district of Dima Hasao utilise high-altitude springs as water sources, where water is collected and pushed to the filtration unit with the help of gravity.

JJM Infrastructure

Variation in Scheme Unit

The number of connections in the scheme and the prevailing physical geography of the area dictates the type of scheme unit infrastructure. In the schemes we visited, there were three variations in the scheme unit infrastructure- Normal Scheme, Mini Scheme and Hilly Area Scheme.

If a scheme has more than 100 connections, a normal scheme unit is built. For schemes with fewer than 100 connections, a mini scheme is constructed at less than one-third of the cost of a normal scheme. In the normal scheme, separate sub-units are built: the pump house, underground tank, filtration unit, and overhead tank, each physically independent. In the mini scheme, all these units are stacked within a single building, reducing both construction costs and land requirements. Additionally, in areas with irregular power supply, a diesel generator is included to ensure reliable operation.

In hilly area schemes, a pump house is not required, as water is pushed using gravity. Additionally, it was observed that the filtration unit is powered by solar panels, effectively reducing electricity requirements to zero.

Additionally, with respect to the number of villages that a scheme services, there are two types- Single village Schemes and Multi-Village Schemes.

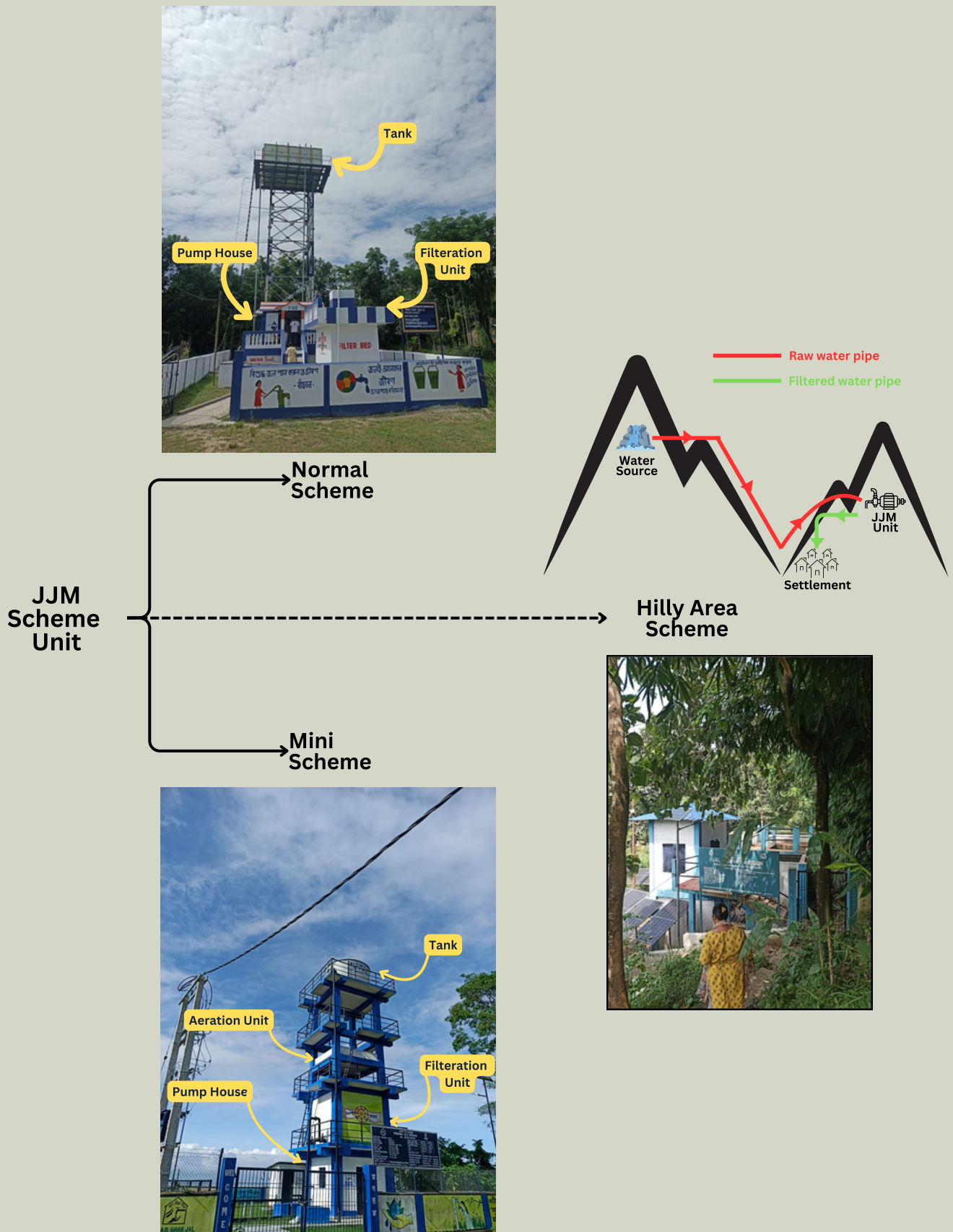


Figure 4: Variability in JJM Infrastructure

The JJM Impact

Although not the primary objective of this study, insights into JJM's impact surfaced organically through stakeholder interactions, shedding light on the stark contrasts in water access and quality between areas served by JJM and those without it. The impact of JJM can be best understood in two ways:

People's Narratives on the Situation Before and After JJM: Stakeholders in villages with JJM shared positive changes in their drinking water experience with the introduction of JJM in their village. Residents noted an improvement in the pure taste of water- *"now it has a pure taste"*, the absence of unpleasant smells, and the absence of any health issues related to water consumption. For example, they remarked that water "digests better now" and that the previous "heaviness" had vanished, indicating enhanced water quality and overall satisfaction with the drinking experience.

Comparison Between Villages With and Without JJM: In villages without JJM, the challenges around water access and quality are evident. For instance, the residents of Nobo Gurubari Village (a non-JJM village) had to set up a small tank that channels water from a nearby spring, with financial support from the District Tribal Council. However, this water was not filtered, leading villagers to describe it as having a "bad taste," "high iron content," and being "not clean." Each household was responsible for manually collecting water from this communal tank and transporting it to their homes. The situation became even more challenging during the summer months, as the local source would dry up, forcing residents to travel to distant sources daily to secure their water needs.



Figure 5: The community water tank in Nobo Gurubari Village

The JJM Impact

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In Habichuk Village, families relied on household-level tube wells for water access, and residents reported significant iron content, causing clothes to yellow during washing and necessitating the use of candle filters for drinking water.



Figure 6: A Candle Water Filter used in Habichuk

In stark contrast, **JJM-enabled villages reported consistent water delivery to households, with residents describing the water as free from unpleasant tastes and odours. They also highlighted notable markers in health outcomes, as "no one fell ill" after JJM's intervention.**

In Assam, the challenge is not the availability of water but the availability of clean water that can be reliably delivered to households. As highlighted by the NITI Aayog's per capita water availability map, Assam has a sufficient water supply. However, before JJM, residents often faced significant difficulties in accessing safe drinking water close to their homes, as indicated by narratives of villagers who had to travel for hours to fetch water and reported issues with water quality, especially during the rainy season.

The JJM Impact

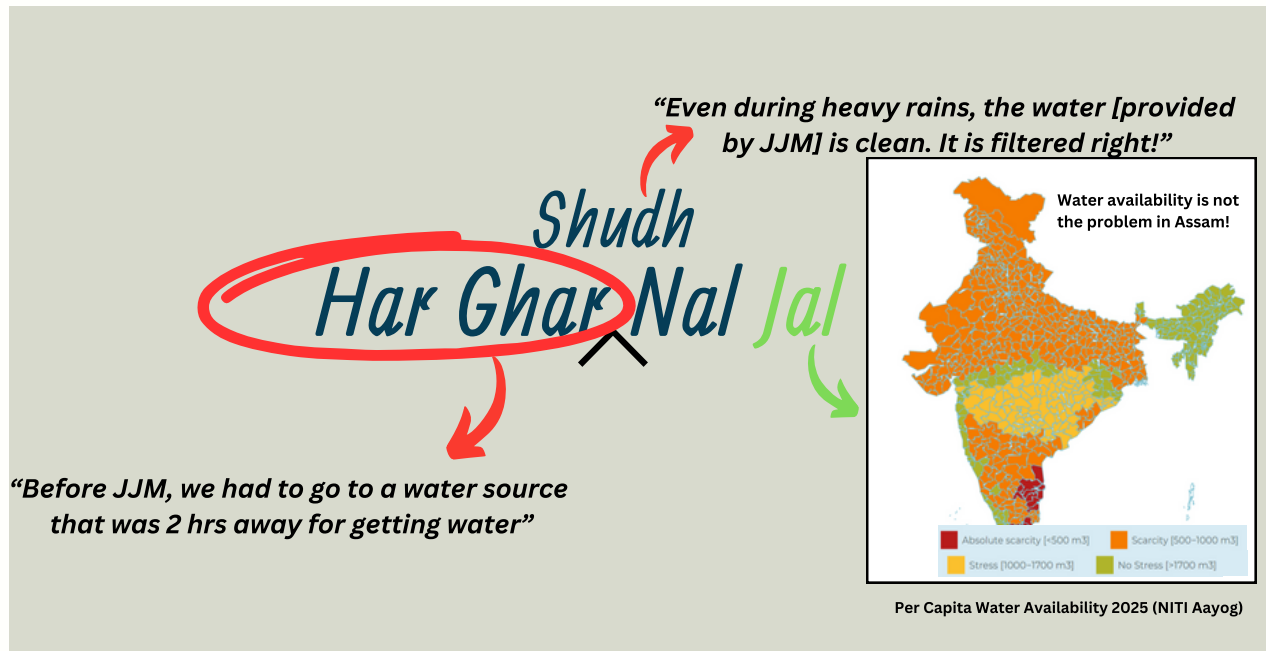


Figure 7: The Impact of JJM, a representation

With JJM, households now experience the convenience of clean, filtered water at their doorstep, as reflected in residents' comments on the improved quality of water, even during heavy rains. This shift underscores the crucial role of JJM in addressing not just water access but the quality and reliability of water delivery, thus enhancing the overall health and well-being of communities across Assam.

Stakeholder Analysis

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Through semi-structured interviews, we have interacted with 3 different stakeholders in this study – Water User Committee (WUC) Members, Sarpanch or Gao Bora, and Jal Mitra.

Water User Committee Member

No of WUC
Members's
Interviewed

8

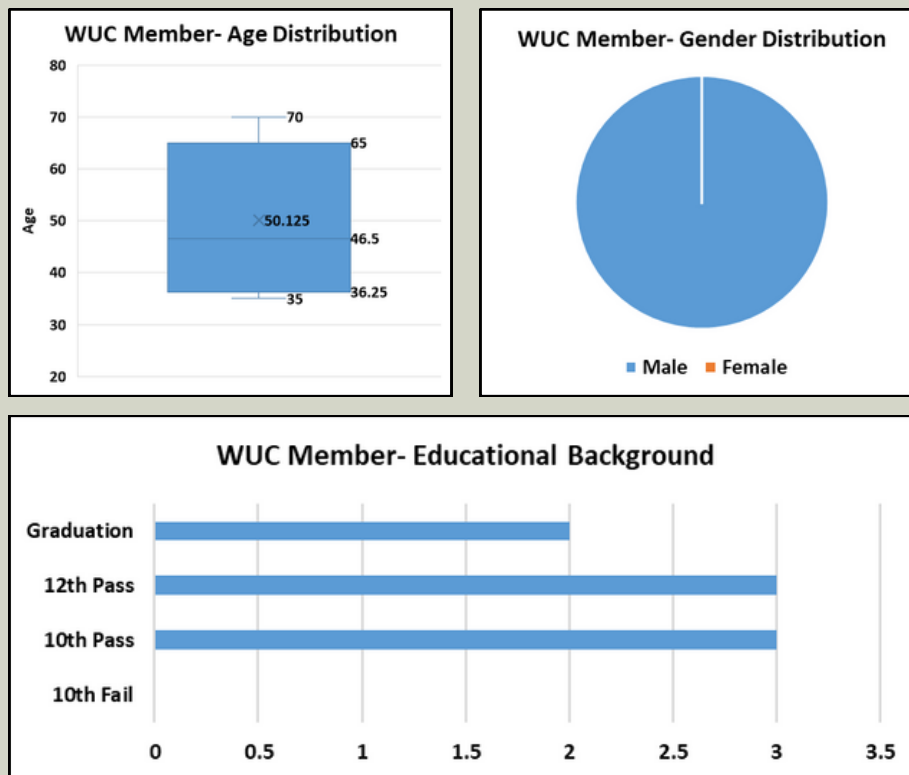


Figure 8: The demographic profile of WUC members interviewed

Under the Jal Jeevan Mission (JJM) guidelines, each scheme is managed by a Water User Committee (WUC), also known as the Village Water and Sanitation Committee (VWSC) or Pani Samiti. This committee, a sub-committee of the Gram Panchayat, is responsible for overseeing the planning, implementation, management, operation, and maintenance of the in-village water supply system.

The WUC typically comprises 10-15 members, including up to 25% elected members of the Gram Panchayat, 50% women members, and representatives from weaker sections of the village, ensuring inclusive community participation.

Stakeholder Analysis

During field interactions in this region, eight WUCs were interviewed. The demographic data reveals notable characteristics of the committee members. The age of WUC members ranges from 35 to 70, with an average age of approximately 50 years, indicating that the committee comprises primarily older adults. The gender distribution shows a significant lack of diversity, as all interviewed members were male, which deviates from JJM's emphasis on inclusive representation.

In terms of educational background, most WUC members have completed up to 10th grade, with a few members reaching 12th grade or graduation level, while others did not pass the 10th grade. This educational profile suggests varying levels of literacy among the members, which may impact the committee's effectiveness in managing and overseeing JJM schemes.

It was also observed that, in this Assam, the ground reality positively differs from Punjab, where a similar field study was conducted in November 2023, where the Gram Panchayat, led by the Sarpanch, generally manages JJM schemes. Here, in Assam, the WUC takes on this responsibility, though actual involvement varies.

During field interactions in the 11 villages visited first as part of sampling, only the President and Secretary of the WUC were present, with no other committee members involved, reflecting minimal engagement from the broader committee. During the second field immersion in Tezpur district—Barika Chubari Scheme, Mazgaon Scheme, Devrigaon Scheme—we could meet all the members of the WUCs.

JJM guidelines mandate the WUC to conduct meetings at least four times a year and maintain accurate records. Nevertheless, except in two villages, WUC meetings are held once a year, further reducing the involvement of all its members.

Stakeholder Analysis

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Jal Mitras

No of Jal Mitras
Interviewed

8

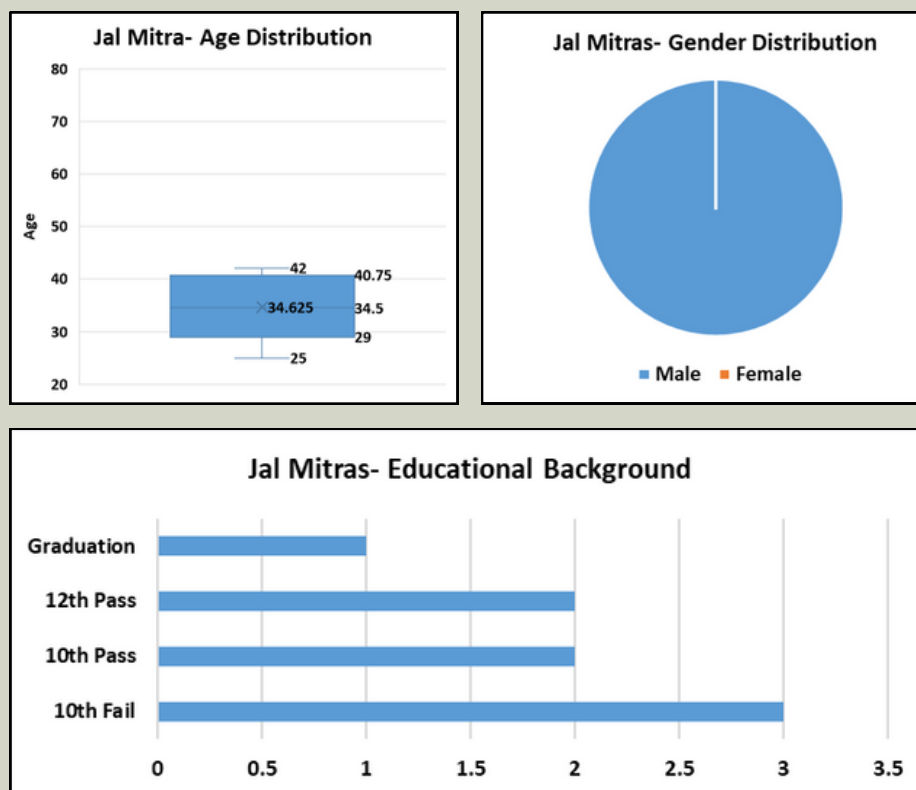


Figure 9: The demographic profile of Jal Mitras interviewed

The Nal Jal Mitra Programme (NJMP) is a strategic initiative under JJM focused on equipping local individuals with essential skills to manage rural water supply systems at the village level. The program aims to build a sustainable workforce of skilled personnel called Nal Jal Mitras. These individuals are trained to handle operations and maintenance (O&M) of in-village water supply infrastructure, encompassing multi-skills such as plumbing, electrical work, and pump operations. This multi-skilled workforce is expected to enhance the long-term functionality of piped water supply systems, ensuring consistent and safe drinking water access in rural communities.

Stakeholder Analysis

Eight Jal Mitras were interviewed as part of this study. The age distribution of these Jal Mitras ranges from 25 to 42 years, with an average age of approximately 35, indicating a younger demographic compared to Water User Committee (WUC) members. This younger profile among Jal Mitras may be influenced by the requirement of a hands-on nature approach to their responsibilities, contrasting with the more administrative and oversight-focused role of WUC members.

The educational background of Jal Mitras shows that most have completed up to the 10th or 12th grade, with only one of them holding graduation, while the majority have not passed the 10th grade. In contrast, WUC members generally have a higher level of education, with many completing at least the 12th grade and several holding a graduation. This distinction may reflect the community's preference for appointing more educated individuals to governance and administrative roles within the WUC, where management skills are more essential. Meanwhile, the Jal Mitra role, focused primarily on hands-on, day-to-day operational tasks, may not demand as high a level of formal education.

Through the study, it was observed that Jal Mitras acted as the first point of contact for citizens, addressing grievances related to water supply issues. Additionally, Jal Mitras serve as the special point of contact (SPOC) for coordination and communication with PHED officials, facilitating the smooth operation of JJM schemes within their designated areas.

It was also noted during field visits that individuals who donate land for JJM infrastructure are given preference for the role of Jal Mitra. This practice appears to encourage community support and involvement in the mission by providing an economic opportunity to land donors and a prospect to serve their communities directly.

Stakeholder Analysis

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Sar Panch / Gao Bora

No of Gao Boras
Interviewed

2

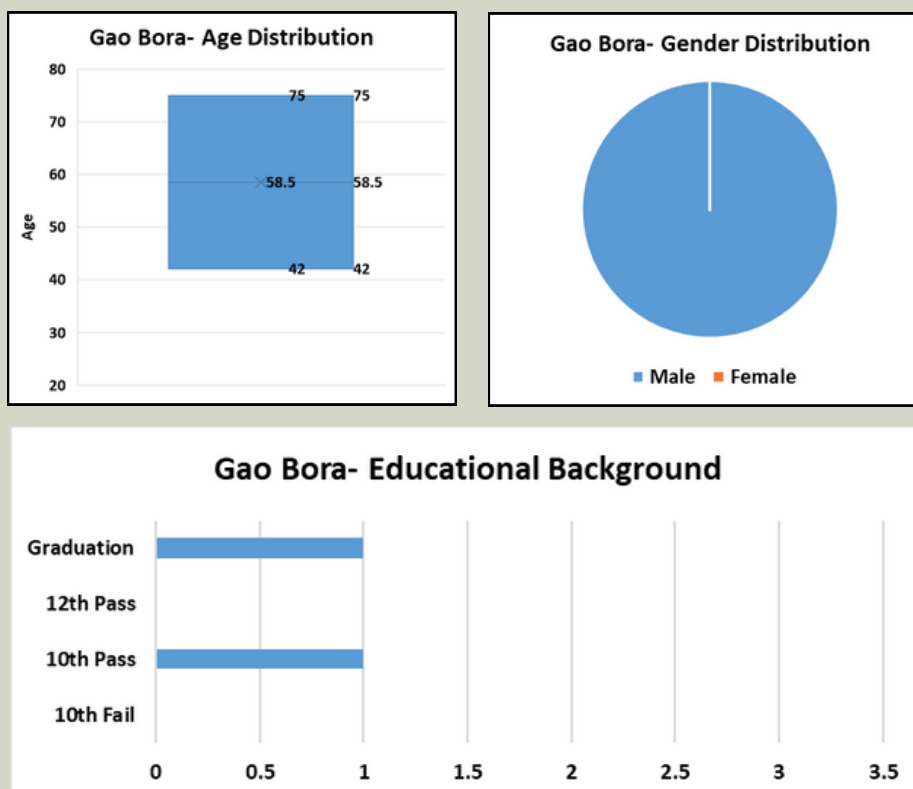


Figure 10: The demographic profile of Gao Boras interviewed

The Sarpanch, as the elected head of the Gram Panchayat, plays a pivotal role in the successful implementation of the JJM mission at the grassroots level. They are responsible for leading the community in planning, executing, and monitoring water supply projects. The Sarpanch ensures active community participation in water management, promotes local ownership of water systems, and drives awareness of water conservation and sanitation. They are also tasked with overseeing the operations and maintenance of water infrastructure, ensuring its sustainability and functionality. Moreover, the Sarpanch coordinates with local stakeholders, including Panchayat Raj Institutions, government agencies, and village-level committees, to ensure smooth project implementation and efficient resource allocation.

Stakeholder Analysis

The Sarpanch plays a critical oversight role in the implementation of the Jal Jeevan Mission (JJM), but in practice, the day-to-day management of water-related matters in the village is largely handled by the Water User Committee (WUC) and the Jal Mitra. This division of roles might explain why we encountered only 2 Sarpanchs out of the 11 villages we visited, as the leadership in these areas is often more ceremonial or focused on broader governance, while local water management tasks are handled by Jal Mitras and WUC office bearers.

Additionally, in tribal areas, the village leadership structure differs from the conventional Gram Panchayat system. In these communities, the term used for the head of the village is Gao Bora (GB), and there is a strong reluctance to associate with the formal Gram Panchayat system. This cultural distinction was highlighted by an assistant engineer from the Public Health Engineering (PHE) Department, Haflong, who cautioned, *"Do not use the word Sarpanch in any of the villages we go to! They do not want to be related to the Gram Panchayat system of the country. We have Tribal Autonomous Districts here. You can address the village chief as Gao Bora or just GB is also fine."* This insight underscores the importance of understanding local customs and governance structures during primary interactions, as it directly affects the acceptance and engagement with the community members.

In the second phase of the study, there were observations pertaining to Coordination Issues. It was reported that the division of responsibilities between Gram Panchayats and Water User Committees (WUCs) remains unclear, leading to operational inefficiencies. This lack of clarity often results in delays in decision-making and inadequate support for routine maintenance and collections

Section Officers (SOs)

During the second field immersion, we interacted with six section officers from the Public Health and Engineering Department (PHED) in Assam. Two of them were from Tezpur district, three of them from Goalpara, and one from Kamrup district. Section Officers play a critical role in Assam's rural water supply system.

- **Managing Water Schemes:** Overseeing the functioning of local water supply schemes, ensuring operational efficiency, and addressing on-ground issues.
- **Billing & Collections:** Currently, they are the primary users of Nal Jal Seva (NJS) for billing, as WUCs have yet to fully adopt digital tools. They manually input collection details from WUC registers.
- **Bridging Technology & Community:** Acting as intermediaries between PHED, WUCs, Jal Mitras supporting the transition from manual to digital processes.

They have to mostly act as the on-ground problem solvers handling technical, administrative, and financial queries related to water scheme operations, including listening to challenges like pipeline breakages, operational costs, and revenue collection from the WUCs and identifying ways to resolve them.

During the conversations, all the Section Officers highlighted the need for structured, in-person training and capacity building for both themselves and WUCs to ensure effective adoption of digital platforms.

Stakeholder Synergies

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The findings from the second phase of the study and the capacity-building workshop highlights the need for stakeholder synergies, community engagement, improving operations, and strengthening coordination.

- **Enhance Community Sensitization:** Regular IEC sessions should educate communities on the importance of water tariffs, their role in sustaining operations and maintenance (O&M) costs, and the benefits of digital adoption. Strengthening financial transparency and sharing success stories can help rebuild trust in water schemes and encourage greater community ownership. Additionally, recognition programs or small incentives for active VWSC members can foster engagement and motivate sustained participation.
- **Strengthen Communication and Coordination:** The division of responsibilities between Gram Panchayats and Water User Committees (WUCs) is currently unclear, leading to operational inefficiencies and impeding effective scheme implementation. Strengthening information exchange among PHED, VWSCs, and other stakeholders is critical. At the same time, introducing conflict resolution mechanisms to address interpersonal disputes in multi-village schemes is also important.
- **Scheme Implementation and Monitoring:** To improve service reliability, proactive repair and maintenance practices must be institutionalized to minimize machine downtimes and ensure a steady water supply. Strengthening the engagement of ASHA workers, NHM representatives, and local leaders in implementation and monitoring can enhance community participation and long-term sustainability. Additionally, empowering FTK women groups with structured training and defined roles will improve data visibility and local ownership.

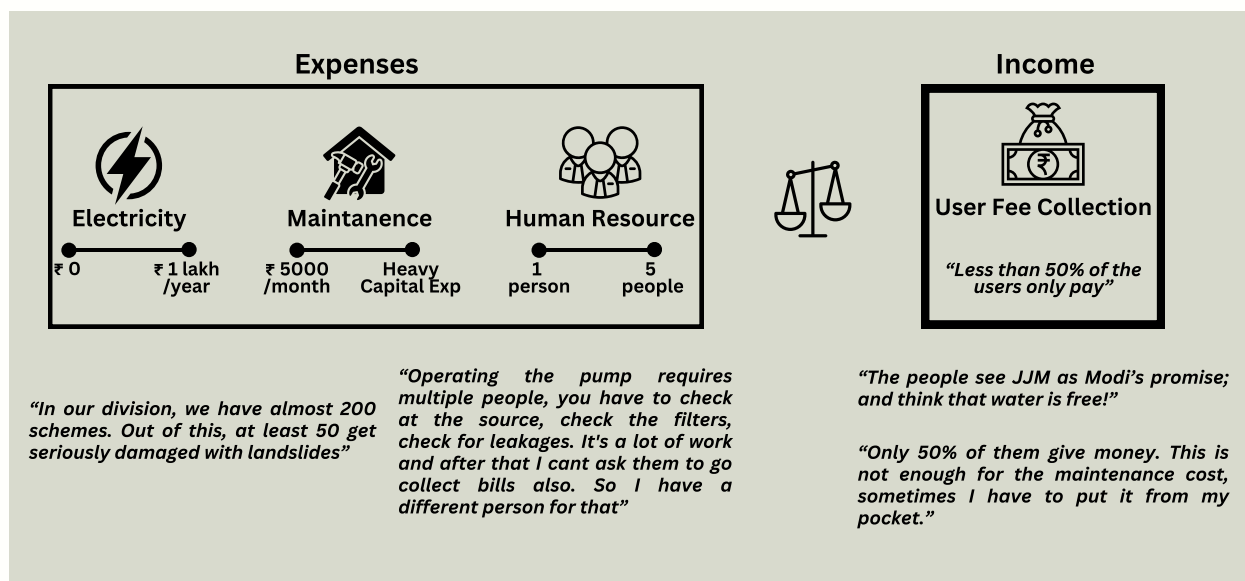


Figure 12 Schematic analysis financial sustainability

The financial sustainability of the Jal Jeevan Mission (JJM) faces several challenges, influenced by varying regional requirements and the need for ongoing maintenance. Electricity expenses range from zero in hilly areas utilizing gravity-fed systems and solar power to as high as ₹1 lakh per year in other regions reliant on electric pumps. The electricity bills in these areas are covered by Panchayats through grants from the 15th Finance Commission, while the salaries for Jal Mitras, responsible for operational tasks, are funded by the Assam government. This support structure effectively reduces the direct financial burden on village schemes, limiting their primary responsibility to cover maintenance costs.

However, in hilly areas, frequent landslides add a substantial layer of financial strain. For example, in Haflong, a Public Health Engineering (PHE) employee reported that out of 200 JJM schemes, around 50 suffer serious damage each year due to landslides, necessitating extensive capital expenditure for repairs. This recurring damage not only increases maintenance costs significantly but also places an additional burden on the resources needed to maintain uninterrupted water supply services.

Financial Sustainability

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Similar challenges were noted in phase 2 of the study at the Rongmahal Scheme in Kamrup District, a multi-village river-based scheme transporting water over 4 km to a hilltop. The scheme suffers from frequent pipeline breakages and operational disruptions caused by floods and landslides. Such incidents demand robust and consistent maintenance efforts, which often require significant financial outlays that are difficult to sustain without adequate user contributions or external funding.

Despite these efforts to cover basic operational costs through government support, the low user fee collection aggravates the situation, with many villages reporting that only less than 50% of users contribute with fees. This shortfall affects the maintenance procedures, as noted by local operators who sometimes have to supplement expenses from their own pockets, raising concerns about the long-term financial viability of JJM, especially in regions where environmental factors necessitate frequent, costly interventions. Without enhanced user contributions or alternative funding sources, sustaining consistent and quality water delivery through JJM remains a considerable financial challenge.

In the second phase of the study, inconsistencies in payments to Jal Mitras and WUC members were highlighted as problems that undermine morale and accountability. This calls for clear and structured guidelines on fund allocation and disbursement by Gram Panchayats to ensure timely and predictable compensation for key stakeholders.

To address revenue generation challenges, the introduction of dynamic QR codes was suggested as a promising solution. Integrating digital payment systems with Nal Jal Seva (NJS) can streamline user contributions, improve transparency in fund management, and foster greater trust and accountability among community members.

User Digital Readiness

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The digital readiness of users involved in the Jal Jeevan Mission (JJM) was assessed as part of the interview schedule to understand their capacity to utilize digital tools, especially mobile devices, in the context of water resource management. The survey results indicate a high level of smartphone ownership, with 94.4% of users having a personal smartphone. This high penetration rate can act as a solid foundation for introducing digital solutions.

The survey further evaluated users' digital literacy by assessing their ability to perform various tasks on mobile phones, which are essential for effectively using digital tools.

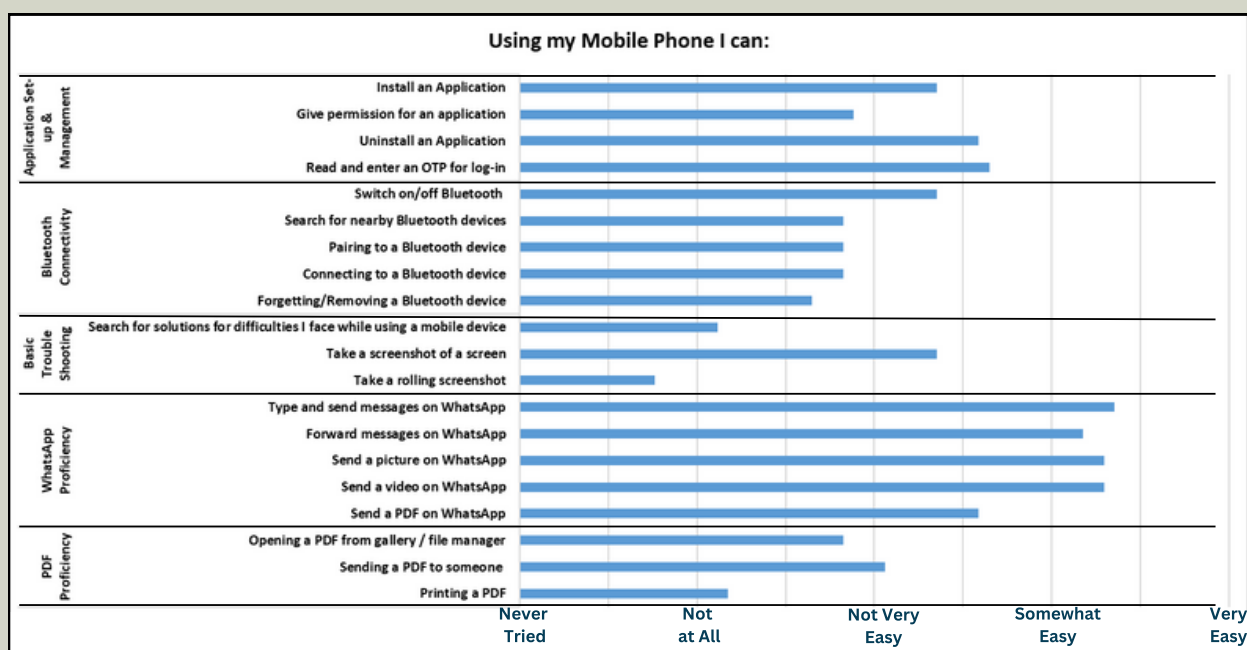


Figure 13: Mobile phone proficiency of respondents

Key findings include:

1. **Application Management:** Most users reported moderate to high ease in installing, giving permissions, and uninstalling applications. However, a small subset found it challenging to read and enter OTP (One-Time Passwords) for login, which may be a barrier to initialising a digital platform account.
2. **Bluetooth Connectivity:** Tasks like turning Bluetooth on and off, pairing, and searching for Bluetooth devices showed mixed responses. While some users found these functions relatively easy, others encountered difficulties, suggesting a need for more training if Bluetooth-based printing devices are to be used for collection bill printing as practised in Punjab.
3. **Basic Trouble Shooting:** Taking screenshots was reported as easy for most users, though a few had not tried this function. However, the survey revealed varied capabilities in basic troubleshooting skills among users. While many were comfortable with basic smartphone functions, troubleshooting tasks such as searching for solutions online, resolving connectivity issues, and managing app-specific problems proved challenging for some.
4. **WhatsApp:** Forwarding messages, images, and videos on WhatsApp was generally reported as very easy, which indicates comfort with WhatsApp indicating that it could be utilised as an ideal channel for basic communication and file-sharing functions—useful for reporting issues or receiving updates.
5. **PDF and File Management:** Opening, sharing, and printing PDFs, essential for accessing and sharing reports, varied among users. While many found opening and sending PDFs straightforward, printing posed a greater challenge, indicating a potential need for additional support or alternative documentation options.

These findings reveal that while users are largely comfortable with basic smartphone functions and communication applications, some specific tasks, such as secure access (OTP management), Bluetooth connectivity, and PDF handling, may require further guidance and training. This level of digital readiness highlights both the potential and the gaps in leveraging mobile-based digital solutions for community engagement and efficient water resource management in Assam's JJM initiatives.

The second phase of the study provided additional insights into the digital readiness of stakeholders, highlighting both opportunities and challenges in leveraging technology for improved water resource management under the Jal Jeevan Mission (JJM). During the visit, while conversing with the WUC members across Tezpur and Kamrup districts, they sounded optimistic about adopting technology and platforms like the Nal Jal Seva (NJS) platform. While talking to one of the WUC members to understand if they would be happy to learn a digital platform for collections, he remarked in Hindi “agar platform se humara profit (read as benefit) hoga to hum Nal Jal platform se kaam karna sikhenge”. Their sentiment was clear- if it benefits our community, we are willing to learn. The capacity building workshop organised by PHED and eGov following to the visits highlighted further observations. The training aimed to equip participants with the necessary knowledge and skills to leverage digital tools for water supply management under the Jal Jeevan Mission (JJM).

- **Workshop Outcomes:** The capacity-building workshop held in December 2024 revealed that while participants demonstrated a quick grasp of digital concepts, challenges such as limited smartphone access and unreliable internet connectivity in rural areas remain significant barriers to adoption. Additionally, manual processes are often perceived as more reliable than digital tools, especially in regions with poor connectivity.
- **WhatsApp Familiarity:** WUC members showed a high level of comfort with WhatsApp, particularly for communication, issue reporting, and file sharing. This familiarity positions WhatsApp as an ideal entry point for digital engagement and basic operational communication.
- **QR Code and App Usage Challenges:** The study found inconsistent usage of QR codes for accessing scheme details and grievance redressal, as well as low adoption of the Jal Mitra app. These challenges point to a need for hands-on training to enhance digital literacy and promote tool adoption.

These findings underscore the importance of aligning digital solutions with user capacities and regional constraints. A strategic combination of user-friendly platforms, training, and IEC efforts will be critical in enhancing digital readiness and ensuring the success of JJM’s technology-driven initiatives.

Product Recommendations

Based on stakeholder feedback and digital readiness insights, a digital platform for managing JJM water supply should prioritise accessibility, ease of use, and engagement features tailored to user needs. Here are the core recommendations for platform features:

Integrating a WhatsApp Channel

To address accessibility concerns highlighted in the user digital readiness survey, integration of a WhatsApp-based channel is recommended. The survey revealed that users are generally familiar with essential smartphone functions, especially communication via WhatsApp, where tasks like sending and forwarding messages, images, and videos were widely reported as easy. Leveraging this familiarity, a WhatsApp channel can serve as an effective medium for users to carry out their daily JJM-related activities, significantly reducing change management efforts. By utilising a platform that users already understand and frequently use, JJM can ensure better engagement and smooth digital adoption for water supply management, making the transition to a digital platform easier and more accessible for all stakeholders.

A Dedicated Citizen Interface

In developing the citizen user interface for JJM, it's crucial to address the findings from our interviews with community members. Notably, all interviewed citizens expressed a willingness to pay for water services, provided certain expectations were met. For the question, *"In your opinion, under what circumstances is it fair to be charged for water?"* the citizens enumerated the following expectations:

- Regular and on-time water supply
- Clean water
- Adequate Quantity
- Good pressure
- Proper maintenance of infrastructure
- The connection should be inside the house boundary

Product Recommendations

To meet these requirements, the citizen interface should include features that answer these specific demands:

- **Real-time Notifications:** Informing users when the water supply is activated at the facility would enhance reliability and allow users to plan accordingly
- **FTK Test Information:** Displaying information on FTK (Field Test Kit) test results, including dates and quality indicators, would provide transparency regarding water cleanliness
- **Maintenance Activity Information:** Displaying dated information about maintenance activities such as filtration tank cleaning, chlorination, and general tank cleaning. This transparency would empower citizens to monitor the regularity and thoroughness of maintenance actions that directly impact water quality.
- **Project and Contact Information:** A page detailing the JJM project specifics, with contact details for Jal Mitras (JMs), Water User Committee (WUC) members, and Public Health Engineering (PHE) representatives, will foster transparency and accountability.
- **Public Grievance Redressal (PGR):** A system for citizens to submit grievances and receive updates on resolution progress, addressing maintenance and service quality concerns directly.

Nal Jal Seva can evolve into a comprehensive platform that covers all WUC operations, including billing, expense tracking, and consumer grievance redressal. This comprehensive design would create an interface that truly responds to the community's voiced needs, supporting user satisfaction and engagement with JJM's water supply services.

Product Recommendations

FTK User Interface

During the field study, none of the FTK (Field Test Kit) volunteers were present, and other stakeholders reported a lack of regular water quality testing in the area. To address this gap, a dedicated user interface for FTK volunteers could be developed, enabling them to record test results and receive automated reminders for conducting tests on a predefined schedule. This system would help ensure consistent monitoring and improve accountability in water quality assessment.

Furthermore, to motivate FTK volunteers and encourage regular testing, it is essential to provide incentives—either financial compensation or formal recognition for their contributions. Such support would enhance volunteer engagement and contribute to the sustainability of routine water quality testing under JJM.

Scope for Integration with Other Digital Platforms

Integrating existing digital platforms within the Jal Jeevan Mission (JJM) can significantly enhance operational efficiency, data flow, and financial transparency. In the case of Assam, platforms such as JJM Brain, Jal Kosh, and the SO Supervisor App offer specialized functionalities that, when connected with Nal Jal Seva (NJS), can create a cohesive digital or a Digital Public Infrastructure (DPI) ecosystem for managing water supply schemes. Furthermore, collaborating with eGramSwaraj, a financial management platform under the Ministry of Panchayati Raj, could enhance tracking of fund allocation and usage by Gram Panchayats, ensuring compliance with guidelines and greater accountability. By sharing between these platforms, JJM can create a centralized repository of operational, financial, and maintenance data, reducing redundancy and ensuring consistency.

Product Recommendations

A Digital Infrastructure for Water Management

So far, this report has explored various water supply schemes, the stakeholders involved, and a platform like Nal Jal Seva that can enhance water revenue collection and operational efficiency, contributing to the long-term viability of these schemes. Assam, being tech savvy already, is thinking of implementing a ‘one stakeholder, one app strategy’ to integrate different systems to create a comprehensive water supply network. However, many states lack such digital infrastructure, requiring gradual investments in integrated platforms to improve monitoring, coordination, and decision-making. Ultimately, these measures will strengthen JJM’s ability to achieve its mission of sustainable and efficient water management.

Something like a DPI for Water can be thought of to improve the management of water supply schemes by enabling real-time data sharing between institutions. It can introduce a federated registry system, where government agencies, utilities, and local bodies maintain control over their water-related data—such as supply levels, demand, quality, and usage—while making it accessible through standardized APIs. This ensures seamless coordination between different entities responsible for water distribution, billing, infrastructure maintenance, and service monitoring.

By integrating real-time data it can allow utilities to track water availability, detect inefficiencies, and manage billing and grievances efficiently. Additionally, predictive analytics and AI-driven insights can help authorities anticipate shortages, regulate distribution, and improve service delivery. The system can ensure greater transparency, efficiency, and sustainability in managing water supply schemes at state and local levels.

Program Recommendations

Strengthen Handover Processes

Timely handover of newly constructed schemes, such as the Nomali Jalah Scheme, to Gram Panchayats and Water User Committees (WUCs) is essential for ensuring their efficient operation and sustainability. Delays in the handover process often lead to a lack of clarity in roles and responsibilities, hindering the overall effectiveness of water supply schemes. To address this, structured handover processes must be implemented to streamline the transition of ownership and responsibilities.

These handovers present an ideal opportunity to integrate digital tools like Nal Jal Seva (NJS) from the outset. Embedding NJS as the default platform during the transition phase allows for immediate adoption of efficient billing, collections, and maintenance tracking practices. This proactive approach ensures that digital systems are operational from the beginning, reducing reliance on manual methods and improving transparency in scheme management.

Promote Financial Sustainability

Ensuring the financial sustainability of Jal Jeevan Mission (JJM) schemes is critical to maintaining their long-term effectiveness. Clear and structured guidelines for fund allocation and utilization by Gram Panchayats must be established to support Water User Committees (WUCs) in their operational responsibilities. Timely and consistent payments to Jal Mitras and WUC members are essential to maintain morale, accountability, and smooth functioning of water supply schemes.

Program Recommendations

Enhance Training and Capacity Building

Building the capacity of stakeholders is essential to the successful implementation and management of Jal Jeevan Mission (JJM) schemes. Comprehensive and hands-on training programs should be designed for Section Officers, Jal Mitras, and Water User Committees (WUCs) to enhance their familiarity with digital tools such as Nal Jal Seva (NJS) and the Jal Mitra App. These training sessions should be practical, enabling participants to address real-world challenges and apply their learning effectively.

A cascading training model can be adopted, where trained Public Health Engineering Department (PHED) officials mentor local WUC members. This approach ensures sustained knowledge transfer and equips local stakeholders to manage schemes independently over time. To address region-specific challenges, follow-up workshops at the district level can provide tailored support and reinforce the skills acquired during initial training.

Providing real-time troubleshooting support and periodic refresher courses will help stakeholders overcome ongoing challenges and adapt to evolving technologies. Recognizing participants' achievements, such as through certification programs, can further motivate engagement and active participation. These efforts will ensure that all stakeholders are well-equipped to leverage digital platforms and contribute to the efficient management and sustainability of JJM schemes.

Program Recommendations

Community Engagement and IEC

Community engagement is a cornerstone for the success and sustainability of the Jal Jeevan Mission (JJM). Targeted Information, Education, and Communication (IEC) campaigns should be organized to raise awareness about the importance of water tariffs and their role in sustaining operations and maintenance (O&M) activities. Educating communities about these aspects can foster a sense of ownership and encourage active participation in scheme management.

Practical demonstrations and relatable examples should be incorporated into IEC sessions to simplify complex concepts and connect with diverse audiences effectively. Showcasing transparent financial systems and success stories from other regions can help rebuild trust in the schemes and emphasize their long-term benefits. Recognizing community contributions and incentivizing active involvement, such as through small rewards for engaged WUC members, can further strengthen local participation.

WhatsApp can be leveraged as a key communication tool, given its widespread use and familiarity among WUC members. The platform can be used to share real-time updates, report issues, and facilitate engagement between stakeholders and communities. Additionally, raising awareness about QR codes linked to platforms like JJM Brain for monitoring scheme performance, checking water quality, and lodging grievances can enhance transparency and empower users.

Conclusion

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The findings of this study highlight the critical role of **digitalisation** in enhancing rural water service delivery and ensuring long-term sustainability. While JJM has significantly improved water availability and quality, challenges related to **financial sustainability**, **maintenance**, and **user participation** remain key obstacles. Addressing these requires a holistic approach that combines **digital solutions** and **community-driven initiatives**.

The study underscores the **readiness of users to transition to digital platforms**, with high smartphone penetration and familiarity with **WhatsApp** serving as a strong foundation for digital adoption. By implementing **citizen-centric digital interfaces** and **structured grievance redressal mechanisms**, JJM can foster transparency, accountability, and greater user engagement.

However, technology alone cannot resolve all challenges. The success of JJM and its potential as a national model depends on **well-defined governance structures**, **clear financial accountability**, and **strong local participation**. Strengthening **handover processes**, **capacity-building programs**, and **financial sustainability** strategies will be essential to bridging existing gaps.

In conclusion, a **digitally enabled, community-driven** water management system is vital to sustaining JJM's impact. Assam's experience serves as an important case for **scaling digital solutions in public service delivery**, ensuring that essential services remain **efficient, accessible**, and **resilient** in the long run.

What is WATER for you?

What comes to your mind when you hear the word water?

God

Thirst

Mother

Clean

Life
Jaan
Jeevan

Pure

Necessity



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