



Policy Brief 3

Transitioning Towards Digital and Data-Driven Decision Support System: The Case of JJM in Maharashtra

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Introduction

Focussing on the significance of the Jal Jeevan Mission (JJM) programme within the broader context of rural drinking water provision, Policy Briefs 1 and 2 provide the development of a monitoring mechanism for rural drinking water schemes and identify normative parameters to analyse functionality, respectively. Our study emphasises the effectiveness of the JJM-IMIS in the governance of JJM. Our analysis involved arriving at a comprehensive set of indicators influencing functionality at the household level by integrating indicators from previous studies and the JJM Functionality Report. One key finding of this analysis is that JJM has accumulated a substantial amount of data; however, there is an opportunity to improve the utility and relevance of this data. For instance, the availability of key data on functionality in the JJM-IMIS report and dashboard is essential for effective time-based decision-making. To address this issue, Policy Brief-3 examines the data management system of JJM in Maharashtra to provide insights into the JJM data collection process, explore the possibility of further improving it, and the ways state departments and officials can leverage it for decision-making

Objectives and Questions

The broad objectives of this policy brief are:

- (i) To examine the ground-level implementation, including the organisational structure of JJM in Maharashtra.
- (ii) To understand the data organisation and flow, as well as the data management system of JJM from the village to the state level,
- (iii) Develop a framework for understanding JJM MIS utility and assist in developing a decision support system.

As we delve into the data collection and reporting mechanisms at various levels in the state of Maharashtra, the following questions have guided this study:

- (i) What is the process of data collection, data coalition and data entry at state, district, block and panchayat levels?
- (ii) What are the challenges in JJM's data management process?
- (iii) What is the utility of the data for decision-makers and implementing staff?
- (iv) How can JJM data management system be improved?

Methodology

This study employs a qualitative method to address the research questions. The data collection methods include studying government documents and conducting semi-structured interviews about organisations and data management systems with relevant stakeholders in and outside the government system. The primary data collected is analysed using thematic analysis, as shown in Figure 2. The details about the functionality of tap connections in Policy Brief - 2 are used as a reference to design the study. Figure 1 presents a flow of logical questions whose answers are essential to understanding the needs of the JJM's governance mechanism. As a case study, we will discuss the tap functionality aspect of the JJM in this policy brief. We assumed that answers to the stated questions would provide details of the present system, gaps, requirements, and opportunities to develop it into a data and digital technology-based Decision Support System (DSS).

Figure 2 Graphical representation of methodology Need to Which functionaries What decisions are improve in respective made by each governance of JJM institutions govern the system? functionary in various institution? Is data required for What data is What data is decision-making collected by the collected, available, required to make system, and in accessible, and each decision? which manner? utilised?

Conducted semi-

interviews based on the research

Interviewed functionaries: head of the office

responsible for

data management

Conducted Thematic Analysis

Data and digital

based Decision

Support System

technology.

structured

questions

and officer responsible

Figure 1 Logical framework for understanding the scheme data and decision-

What are the

address the

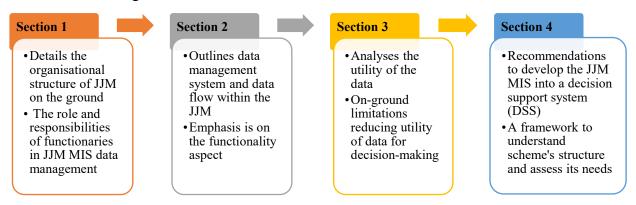
limitations?

alternatives to

Structure of the policy brief

The brief is organised into four

sections; refer to Figure 3Error! Reference source not found..



What issues limit

the utility of data

technology for

governance?

and digital

Studied JJM

operational

Guidelines

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government

Identified kev

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Mapped Institutional

Figure 3 Structure of the policy brief

Section 1: Organisational Structure

The structure of organisations in the JJM programme outlines the decision-making process at various levels. The operational guidelines project JJM as a four-tier institutional mechanism for decision-making and governance. To gain insight into the practical functioning of the institutional mechanisms and data management systems of JJM, we conducted field research in Maharashtra. Integrating insights from field research, JJM operational guidelines, Maharashtra Government Resolutions (GRs) regarding JJM workforce approval and defining members of the State Level Scheme Sanctioning Committee (SLSCC) and District Water and Sanitation Mission (DWSM), along with the organograms available on the organisation's website, Figure 4 offers a comprehensive overview of the on-ground JJM organisational structure.

The operational guidelines of the JJM envision that the decision-making will happen at four tiers. In comparison, the field study revealed that implementing RDWS (Rural Drinking Water Supply) schemes involves five tiers of the state administration, including subdivision or block levels. The institutional design in JJM does not have a formal or assigned role of block-level administration in the decision-making process. However, from the data management perspective, the role of block-level administration is vital as it is responsible for collecting extensive and detailed localised data. For instance, the deputy engineer of RDWS, heading the sub-division office, is responsible for designing and implementing the rural water supply

schemes. Also, all the grievances and design requests from the community reach to the subdivision or block level.

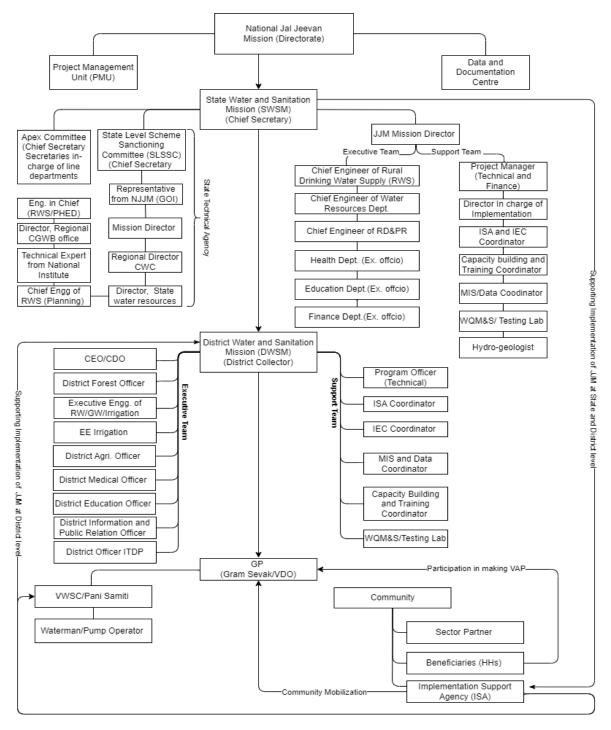


Figure 4 JJM institutional structure based on JJM guidelines

For JJM, being the centrally sponsored programme, centre provides a model institutional structure with overarching roles and responsibilities for each organisation for its governance. The state government then adjusts¹ equivalent designations in the model structure, aligning with the central guidelines. Also, it incorporates additional functionaries to suit local administrative needs through resolutions. These details of JJM's administrative structure

¹ Administrative structure and designations vary from state to state

proved to be essential for planning the field interviews. Thus, for interviews, we selected the head of the offices in each tier and a functionary responsible for data management to understand the data collection, management and its utility in the governance of JJM.

Section 2: Data Management System of the JJM

In an administrative system, the regularly collected data systematically flows through tools like a portal or an app. As the central government designed the portal and apps, it retains the data collected through these platforms. A specific portion of the data is available on the JJM portal as reports. However, in situations when decision-makers at the state level and other lower tiers require specific data to make some decisions, and if the required data is beyond what they can access on the JJM portal, they prefer using Google Sheets or Excel to collect data specifically to make that decision. The data is collected in three separate streams, as shown in Figure 5: by The Groundwater Surveys and Development Agency (GSDA), The Zilla Parishad's Technical team, and The Zilla Parishad's Non-technical team.

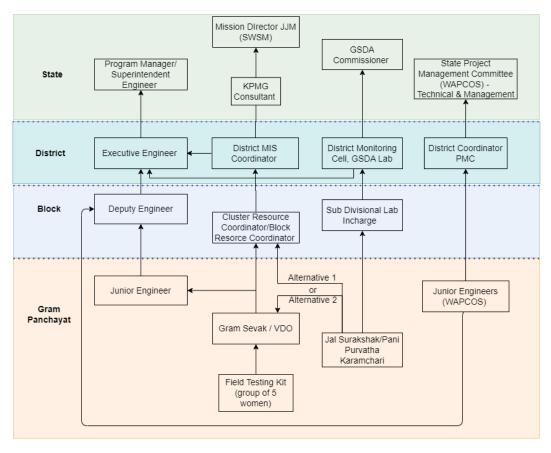


Figure 5 Data flow of the JJM in various tiers for Maharashtra

Data Collection Activities

We identified that the data collection activities in JJM are classified according to the JJM service provision phases^{2,3}, refer to Figure 6. In the planning phase of JJM, financial and project planning for each tier of administration takes place. This planning is done based on the data

² Data collection of Syama Prasad Mookerjee National Institute of Water and Sanitation (SPM-NIWAS) pre-implementation, implementation, and post-implementation expert survey and the annual 'Jal Jeevan Survekshan' are not part of the study's purview.

³ JJM service provision phases are as per JJM operational guidelines; however, activity classification is done by the team.

gathered through action plans for various tiers, providing details about the RDWS situation and requirements in each tier before implementing RDWS schemes in those areas through JJM. Once the project is approved and funds are allocated, the implementation of the RDWS scheme begins. The physical and financial progress is reported on the JJM portal by various agencies and organisations involved in the implementation. The verification and record-keeping of the infrastructure created under the programme and regular water quality monitoring are part of post-implementation activities.

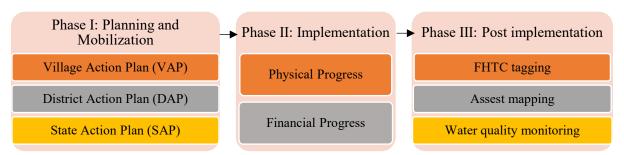


Figure 6 Data collection activity in three phases of JJM service provisioning

Data Entry

Table 1 presents an overview of the data collection points at respective tiers of JJM administration, tools used for data collection and functionaries responsible for data entry. The specifics are documented in the Annexure and are readily accessible for anyone seeking insight into the data collection and entry procedures.⁴

Tier Tool	Village	Block/sub-division	District	Users
Web-Portal	Registration of water sample for testing	Aadhar linking of the beneficiary Village Action plan Registration of water samples for water quality testing Entry of the water quality	Physical and Financial progress of the scheme District Action Plan Verification of the geotagging data updated by JEs and provides approval Verification and updates water quality	VDO, CRC/BRC, MIS Coordinator (ZP, MJP, GSDA)
		test results by the sub- division lab	test results and provides approval	
Арр	-	Geo-tagging of the assets Declaration of Har Ghar Jal village	-	Junior Engineer (Rural Drinking Water Supply, ZP)
Any Other tool than App and Web-Portal	GP provides the data required in hard copy, for example, Aadhar details	CRC-BRC sends data with a signed copy to the district office, even for the data uploaded on a portal	MIS coordinator provides data with a signed copy to state	A 11
	FTK provides a hard copy of the test results to VDO	Block officer provides data in Excel as and when required for special needs	District Office provides data in Excel as and when required for special needs	All

Table 1 Data entry and tool use matrix for JJM

Portal Dashboard and Reports

The central government can access consolidated data collected through the web portal and app. The selective data from the consolidated data is shown on the JJM-IMIS, generally known as

⁴ We could not find the standard data collection procedure for the JJM in the operational guidelines or any other report

the JJM dashboard. The JJM dashboard is classified into eight categories, and the JJM 'reports' category provides data in the table format. Each format is coded in a letter and number, such as 'J12'. Each letter represents a category of data in a specific reporting format. However, not all the reports are available on the public dashboard; for example, the dashboard shows report 'J5' after 'J1', which means some data is either unavailable or inaccessible, or both.

In the field, it was observed that government functionaries typically have access to data similar to those of the general public even after logging in to the portal. There is no provision for additional features on the logins that will enable the government functionary to access and analyse additional data, thereby limiting the effective decision-making within their jurisdiction.

The issue of data unavailability and inaccessibility can be better understood through an anecdote:

The CRC/BRC are responsible for the FHTC tagging, i.e., verifying each beneficiary who has received an FHTC. Initially, in 2019, they just ticked the names of beneficiaries in the portal to verify them. Later, in 2021-22, the beneficiary was tagged by Aadhar verification. To fast-track the work, they required data about the beneficiaries who were tagged and who weren't. However, they could not access the names of beneficiaries tagged with Aadhar or those with pending verification. They could not answer VWSC's questions about the target of providing FHTCs in the village.

Such an example highlights the importance of providing unprocessed consolidated downloadable data to state and lower tiers to assist decision-making. It suggests the need to refine the data collection process and dashboard for governance aspects in JJM. This can be achieved by determining whether the data needed for governance-related key indicators is collected and accessible. The analysis of key indicators identified in Policy Brief 2 for the functionality of FHTC in JJM is shown in Table 2.

The field study reveals that the temporal data on the quantity of water provided, tariff collection, service breakdown frequency, repair duration, O&M expenditure, and details about grievances have not been identified for data entry at any tier in the portal or app. However, some data is available at the gram panchayat level in records but not in the public domain in digital format. Hence, the field study analysis confirms a lack of post-implementation data in the JJM data management system, as noted in Policy Brief 2.

Table 2 Data availability assessment for key functionality indicators

Indicator Category	Sub Indicator	Data Collection	Data Availability
Environmental	Source of water supply	JE (RWS, ZP)	JJM Dashboard – FUA2, FUA 3

	Quantity of Water Supply	Not available	Tap water supply in households (HHs) category village details section – "Service level/ quantity supplied"
Quality of Water Supply		WQMIS and FTK	WQMIS dashboard
	ISA (Implementation support agency)	ZP (Deputy-CEO)	Not available
To alter the col	VWSC Formation	VDO	Village details page in the coverage report
Institutional	Composition of members	VDO	Village details page in the coverage report
	Training of Members	CRC/BRC	JJM Dashboard – D30, D31
	Complaints Redressal	State-level portal	Not Available
	Source of O&M Expenditure	GP (VDO)	Available in GP records
	Percentage of HH paying tariff	GP (VDO)	Available in GP records
Financial	Total O&M fund available against expenditure	GP (VDO)	Available in GP records
	Source of payment to operators	GP (VDO)	Not available
Technical	Frequency of service breakdown	GP (VDO)	Available in GP records
Technical -	The average duration of repairing	GP (VDO)	Not Available

Section 3: Data Utility

After understanding the data collection, availability, and accessibility, it is essential to ascertain whether the data has meaningfully contributed to the intended objectives, summarising its utility in the governance. Here, the purpose is to monitor and govern the schemes using the data generated and collected in the JJM database. JJM-IMIS data is one of the most extensive datasets of a government programme available in the public domain. However, during the study, we found that some challenges prevent the utility of this data from reaching its full potential, specifically for decision-making.

All the data on the dashboard is either instantaneous or cumulative, limiting the use of datasets on the JJM dashboard to understand the status of the activities. Further, the unit-level data for households (HHs), water sources, and water supply schemes is currently unavailable, preventing the complete dataset from being downloaded as needed for analysis. It prevents using the JJM datasets for specific cross-sectional and temporal analysis. The intended purpose of the JJM dashboard, as understood from the study, is to monitor implementation aspects such as physical coverage and financial progress. The unavailability of data about post-implementation issues like operation and maintenance, tariff collection, source sustainability, service level (blank for most of the schemes) and others on the dashboard highlight that the dashboard design should have considered the long-term management and decision-making requirements of schemes in JJM.

The findings from the field also resonate with the learning of JJM-IMIS utility. Government functionaries across different organisations at different tiers reported that the use of JJM IMIS is limited to monitoring the performance, i.e., keeping track of the progress of the JJM activities. Further, many respondents emphasised that the data from JJM-IMIS is mainly used as a reference for regular decision-making. According to functionaries, the decision must reflect the on-field reality. So, the officials initiate a decision-making process based on the

JJM-IMIS data, but the final decision is based on the information collected from multiple locally available data sources. The numbers on the dashboard do not provide insight into the underlying reasons for the performance status of the activities. The present data management system does not fulfill these criteria. Also, JJM-IMIS provides minimal assistance for nonroutine and complex decision-making processes. Many respondents also made an inconclusive remark that JJM-IMIS demands much of their time and resources for far less use in day-to-day work.

Therefore, it is crucial to analyze the needs of the decision-making authority in order to understand their requirements better. It will ensure that the data collected will be helpful in decision-making at various governance tiers. Similarly, to assess data utility for managing tap connections, we need to determine if the data addresses the key questions necessary for decision-making about their functionality. A sample case analysis is provided in Box 1 as an example to assess decision-making requirements, data requirements, and possible limitations.

Box 1 A case of decision-making regarding water service level based on available data

<u>Case</u> – Households should receive the mandated service level of 55 LPCD, but a particular section is dissatisfied with the service level and claimed it to be lesser than 55 LPCD. A Junior Engineer or Deputy Engineer needs to address the issue.

- **Objective:** To resolve the complaint by ensuring a standard service level for every household.
- <u>Data required</u>: Cross-sectional and temporal data about service levels in each FHTC.
- <u>Data available:</u> General service level of village as per design, which is insufficient to be used as a proxy for service level at each FHTC.
- <u>Barrier/Limitations</u>: The unit-wise service data is unavailable as no water meters are placed. So, the engineer will have to conduct a fresh survey to gather the data, which need to be repeated for each complaint in every village.

The above-discussed case has identified the non-installation of water meters as a limitation/barrier in decision-making. However, if rushed to implement that, it may fail if fundamental issues preventing the successful implementation of the water meters are unresolved, viz, electricity availability, internet connection, mishandling by operators. Therefore, various aspects of the issue must be studied to understand the fundamental problem hindering water meter installation. The nodal implementing agency should perform a causal analysis to understand possible causes of water meter installation delays and their relationship with each other. In this analysis, the causes behind each issue and sub-issue responsible for the delay of water meter installation can be broken down based on causal relations until the issues that can be directly addressed or considered as root causes are found. Section III in Annexure provides a sample of such challenge unwinding. Therefore, to increase the chances of successful intervention, efforts must be made to address the issues hindering the water meter installation before its implementation.

Addressing similar complex issues in JJM will become more manageable if we rely on the DSS rather than MIS. The governance of JJM requires a platform for scenario analysis, forecasting models, policy scenario assessment, and response evaluation. A well-designed DSS can

support JJM governance by helping assess data requirements, utilise all the data collected, and optimally use the limited resources available. Therefore, the government should develop a decision support system to ensure effective service delivery by the schemes.

Section 4: Recommendations

In line with the objective of formulating a comprehensive framework to assess JJM MIS utility and facilitate a decision support system development, this policy brief explored ways to study the JJM data management system. The study revealed a gap between the present data management system and the decision-making requirements of the functionaries governing the programme/schemes. Hence, the data insufficiency leads to the reduced utility of the MIS, resulting in partially effective decision-making. As seen in section three, governing various aspects of JJM is a complex task. With the assistance of data and digital technology, decision-making will be more time-efficient and resource-optimal.

In a nutshell, the understanding of the JJM-IMIS system reveals that

- (i) Requirements of decision-making should be considered in the design of the data management system developed for JJM governance,
- (ii) The data management process must ensure optimum use of resources by assessing the utility of the data being collected and collecting only required data,
- (iii) A comprehensive Decision Support System (DSS) must be systematically developed to govern the programme. DSS will assist in addressing the complexity of the decision-making by assisting non-routine decision-making, scenario analysis, and crisis management using data-driven and digital technology-based tools. As DSS is based on governance requirements and the capacity of functionaries, it will aid in a better decision-making system and overcome the existing barriers discussed earlier in the brief. Such DSS will enable the RDW governing functionaries to take targeted action in the governance process at each step. The more mature form of DSS might save resources and help fast-track the achievement of the outcomes of the programme.

Way forward / A Template for Integrating a Process and Structure

The government or government-allied institutions can use the process and structure illustrated in Figure 7 below, as synthesised from our study, to understand the design, capacity and requirement of decision-making for other government programmes/schemes. The learnings emerging out of using this process should help design a pragmatic and appropriate decision support system for government programmes/schemes. As more information and experience emerges from using the following process and structure, it can further be refined.

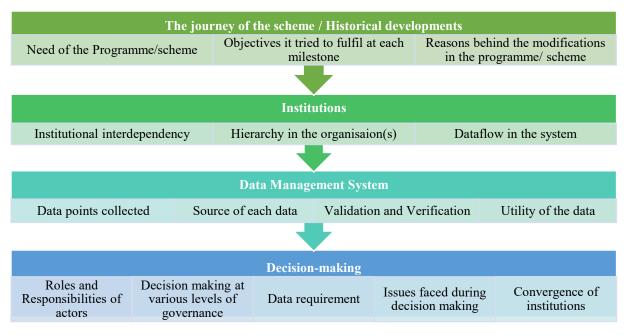


Figure 7 Framework to study and understand a scheme for developing a Decision support system (DSS)

Annexure

I. Data collection process of the JJM in Maharashtra

The primary data was pulled from the Swachh Bharat Mission portal, namely the list of villages' beneficiaries. In Maharashtra, the SBM data was entered by a third-party organisation. It reduced the sudden workload on the system's regular employees. Once the system was streamlined, the first list of HHs with FHTCs was ticked off the list. This process happened at the block level. After the primary data entry, the regular process of data entry began.

• Action plans

For the Village action plan (VAP), the data is provided by the Gramsevak [Village Development officer (VDO)] and sarpanch in the standard format to Circle Resource Coordinator (CRC) or Block Resource Coordinator (BRC). CRC/BRC enters it in the portal for each village. It provides all the essential primary data for the planning and design of the water supply scheme in the village. VAP provided the number of households that need HH tap connection, setting the target for the JJM system. Upon receiving the tap connection, the head of the household needs to provide Aadhar details to VDO so they can tag the HH on the portal. This process is done by CRC/BRC at the block level. The district mission office enters the District Action Plan (DAP) in the portal based on the VAP they receive from the villages. The state prepares the State Action Plan (SAP) using DAP from each district.

• Geo-tagging JJM assets

JEs of the rural water supply engineering department include government JEs and JEs from a private engineering firm, WAPCOS.⁵ They are primarily responsible for scheme design and implementation and geo-tagging the assets using the Field User App (FUA). The Field User App is only used by JEs, who visit villages in their jurisdiction to tag the assets of the water supply scheme along with the information board for each scheme. JE clicks a picture of the asset with five people beside it to record its geolocation in the app. In the earlier version of the app, the data collected in the absence of a mobile network would be saved in the device memory and, when connected to the mobile network, would be synchronised with the cloud. JEs mentioned that the feature is unavailable on the latest version. After the picture is uploaded to the portal, the MIS coordinator in the district ZP office either accepts or rejects the entry. However, the portal needs the facility to provide the reason for rejection to the data collector, and its absence requires a little more effort from the JE and MIS coordinator to correct the data. The rejections also happen at the state level for the district-approved data points.

• Water quality tests

The FTKs are used to conduct water tests at the delivery end and at local water sources such as wells, springs, and hand pumps. FTKs are used to conduct the test with or without help of Jal-Surakshak; depending on the local practice. FTKs share

⁵ Some junior engineers are hired from outsourcing to address high workload of JEs in the JJM

the test results written on a paper to submit to VDO. VDO sends results to CRC for entry into the portal. A similar flow of data is for the Jal-Surakshak, who collects samples from the water supply sources in the village according to the designated plan provided by the higher offices. He takes the sample to either the GP office for online registration or the CRC. He receives a copy of the registration on a handwritten paper slip from the GP and then takes it to the Subdivisional lab for water testing. The lab attendant gives the receipt to Jal-Surakshak and updates it on the portal. After the water is tested, its results are entered by the lab attendant on the portal to be cross-checked and verified by the district WQMIS coordinator. The WQMIS coordinator verifies the results and tags the water source as safe or contaminated. Earlier, an app was used for registering the water sample, which required taking geolocation of the spot of the sample collection, but it is not in use, as told by Jal-Surakshaks during the field visit.

• Physical and Financial progress

The physical and financial progress of the schemes are also entered with each transaction in the portal. The MIS coordinator validates all the finance-related values from the PFMS portal, as the JJM portal does not accept the data tallying with the PFMS portal. The relevant details are part of the district monthly progress report on the portal. Each agency fills out the Monthly Progress report for projects under their jurisdiction. Like Maharashtra Jeevan Pradhikaran (MJP) – Multivillage schemes (MVS), ZP – Single Village Schemes (SVS), and GSDA – Groundwater Recharge Structures. The signed copy of each document is also shared with the state office by mail as an administrative procedure.

II. List of elements suggested by JJM operational guidelines for monitoring:

Sr.	Element		
No.			
1.	Quantity of water drawn from the source every day.		
2.	Level of groundwater		
3.	Overflowing storage tanks		
4.	Basic water quality parameters collected through sensors		
5.	Leakages		
6.	Pressure		
7.	VWSC/Paani Samiti, etc., activity monitoring		
8.	Performance of ISA		
9.	Physical progress		
	Geo-tagging assets		
	Functional, Partially functional, Non-functional		
10.	Financial Progress		
	Expenditure		
11.	Water Quality		
	Surveillance by communities using FTKs		
	FTK utilisation and availability		
	Referral of contaminated samples		

	• Test reports
	Remedial action on positive samples
	• Cross-verification and verification of some samples by state and central labs
	Tests on demand
12.	Frequency of testing
13.	Community sanitary inspection details (Twice a year)
	• Contamination sources (internal and external)
	Remedial actions
	Water quality awareness activities
14.	Testing lab details
	NABL Accreditation
	Human Resource
	 Training
	Annual Maintenance
	Number of samples tested against a target
15.	Laboratory assessment and improvement
16.	Lab ranking
17.	Change management activities
18.	Support activities
19.	Aadhar linked HH
20.	Grievance details
21.	Functionality assessment
	• Source sustainability
	System sustainability
	Scheme convergence
22.	Priority/hotspot area details

III. Example of unwinding or break-down the challenge

Using prepaid water meters to monitor functionality of tap connection

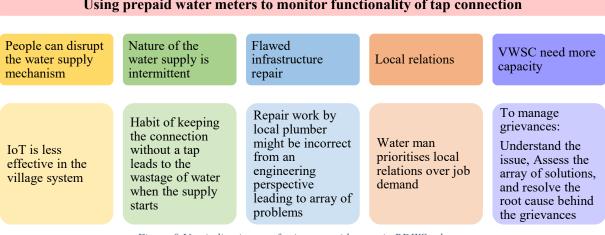


Figure 8 Unwinding issues of using prepaid meter in RDWS schemes