Government of India
Ministry of Housing and Urban Affairs

Atal Mission for Rejuvenation and Urban Transformation 2.0

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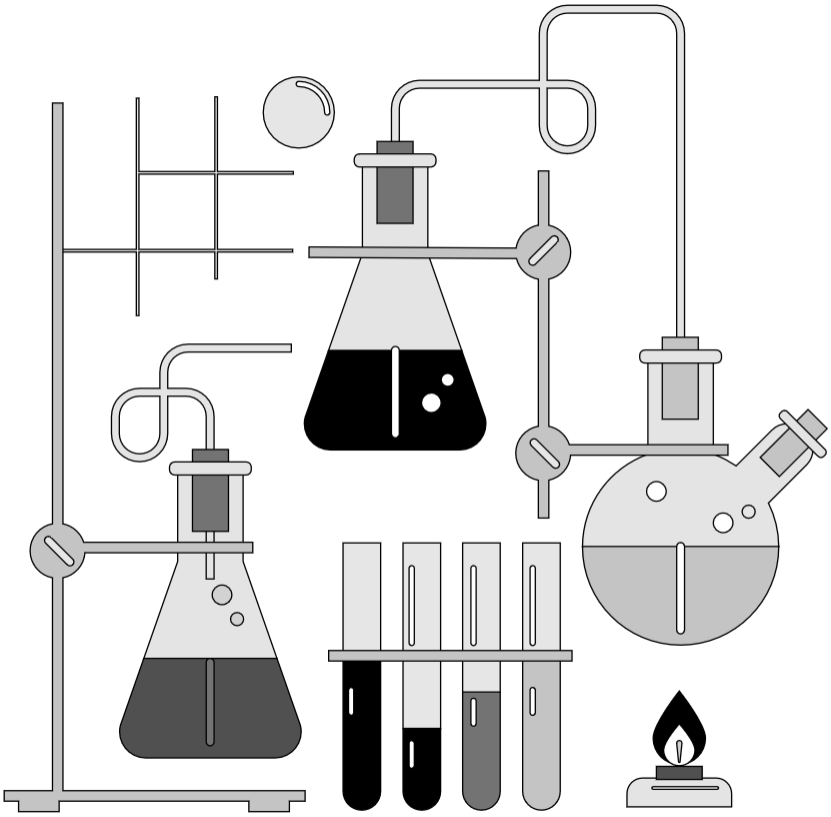
Strengthening Water Quality Monitoring in Cities through Community Participation:

Advisory for States and Cities 2024



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1. Background

Water stands as the centre of sustainable development, pivotal for socio-economic progress, thriving ecosystems, and the survival of humanity. Water security remains a pressing concern encompassing issues related to both quantity and quality in India. Contamination of surface water sources and depletion of groundwater reserves continue to become a significant challenge threatening long term sustainability. This is further exacerbated by climate change, rising temperature, thereby impacting the quality of surface water through increased eutrophication and increase in conductivity of groundwater. For India, the situation is precarious given our reliance on limited sources of surface water and groundwater.

According to report published by World Economic Forum[1], the cost of environmental degradation in India is estimated to be INR 3.75 trillion ($80 billion) a year. The health costs relating to water pollution are alone estimated at about INR 470-610 billion ($6.7-8.7 billion per year) – most associated with diarrheal mortality and morbidity of children under five and other population morbidities. Apart from the economic cost, lack of water, sanitation, and hygiene results in the loss of 400,000 lives per year in India.

The report titled 'Composite Water Management Index,' published by NITI Aayog in June 2018, indicates that India is facing the most severe water crisis in its history, with nearly 600 million people experiencing high to extreme water stress. Additionally, the report reveals that India ranks 120th out of 122 countries on the water quality index, with approximately 70% of the country's water being contaminated[2]. Despite increased access to clean drinking water in urban areas of India over the past few decades, the quality of the supplied water remains a significant concern.[3]

1.1 Need for Water Quality Monitoring

In urban areas of India, the quality of drinking water is a concern, with cities frequently facing water contamination issues. Contamination of water sources can be attributed to several factors, including naturally occurring minerals (e.g., arsenic, iron, chromium), land use practices (e.g., pesticides, fertilizers), industrial processes that dispose of toxic wastes, depletion and degradation of groundwater resources, disposal of untreated wastewater (e.g., microbes), stormwater runoff (e.g., oil, grease), and inadequate maintenance of water supply distribution pipelines.

According to the National Urban Sanitation Policy (NUSP) by MoHUA, the inadequate discharge of untreated domestic and municipal wastewater has led to the contamination of 75 percent of surface water sources across India, contributing to the spread of waterborne diseases in urban

[1] https://www.weforum.org/agenda/2019/10/water-pollution-in-india-data-tech-solution/#:~:text=Apart%20from%20the%20economic%20cost,result%20of%20water%2Drelated%20diseases.

[2] Niti Aayog, 2019. Composite Water Management Index. Retrieved from https://social.niti.gov.in/uploads/sample/water_index_report2.pdf

[3]

areas. Public water supply agencies are required to treat water to ensure its safety for human consumption. While the addition of chemicals for water treatment is a common and accepted practice, any residual amounts of these chemicals, their contaminants, or by-products can pose serious health risks if not adequately monitored.

Water quality monitoring stands as the cornerstone in safeguarding our most precious resource – water. The World Health Organization (WHO) defines "safe drinking water" as water that poses no significant health risk throughout its consumption over a lifetime[4]. Despite commendable strides in expanding water supply coverage in urban centres under various National Mission of Ministry of Housing and Urban Affairs, the safety of water by the time it reaches consumers still encounters several challenges.

In this context, fortifying the monitoring of water quality at various stages of water supply becomes crucial. By prioritizing water quality monitoring under AMRUT 2.0 mission, the goal is not only to meet regulatory standards specified under IS 10500-2012[5] but also to address the broader goals of ensuring access to clean and safe drinking water for all and strengthening the vision for "Drink from Tap"[6]. This, in tandem with complementing initiatives, helps to foster healthier communities and a more sustainable future.

1.2 Measures under AMRUT 2.0

The Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0), inaugurated by Hon'ble Prime Minister on 1 October 2021, envisions the creation of "Aatma Nirbhar Bharat" by prioritizing the goal of rendering cities "water secure". The mission is committed to providing functional water tap connections and access to **safe drinking** water to every household, making a significant step in increasing water accessibility and sustainability.

Clause 2.2 of the opeartional guidelines for AMRUT 2.0[7] specifies that community participation, particularly women-led self-help groups (SHGs), are integral to water demand management, water quality testing, and water infrastructure operations.

The following programs are being currently run at MoHUA to strengthen the community participation, particularly women, in water management.

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4 As per WHO Guidelines for Drinking Water Quality, 2022, "Safe drinking-water, as defined by the Guidelines, does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages." (https://iris.who.int/bitstream/handle/10665/352532/9789240045064-eng.pdf?sequence=1).

5 Indian Standard: Drinking Water Specification (Second Revision), Bureau of Indian Standards 2012.

6 https://mohua.gov.in/upload/uploadfiles/files/Part-A-Manual-Engineering-Planning-Design-and-Implementation(1).pdf

https://mohua.gov.in/upload/uploadfiles/files/Part-B-Manual-Operation-and-Maintenance(3).pdf

https://mohua.gov.in/upload/uploadfiles/files/Part-C-Manual-Management(3).pdf

7 https://mohua.gov.in/upload/uploadfiles/files/AMRUT-Operational-Guidelines.pdf

- AMRUT Mitra scheme - To concretize the points made in the operational guidelines, a scheme called "AMRUT MITRA" is launched to build the capacities of women and women-led initiatives in testing water quality, monitor and engage in water and related sectors like water body rejuvenation etc.
- Registration of water quality testing labs on Urban -WQ-MIS portal- A pilot run was conducted with states and union territories to test their willingness and ease in registering water quality testing labs on a common platform. Haryana, Uttar Pradesh, Maharashtra, Madhya Pradesh, Tamil Nadu, Odisha, and Delhi UT participated in this pilot run.

2. Introduction

This advisory, titled “Strengthening Water Quality Monitoring in Cities through Community Participation,” aims to support meaningful community engagement in water infrastructure, with a particular focus on women and youth. The advisory serves as a foundational guide to enhance the assessment of drinking water quality at various levels of water supply and highlights the crucial role of citizens—especially women—in ensuring the safety of drinking water within households. It supports the objectives of AMRUT 2.0 by emphasizing the involvement of community groups in advancing India's water security mission. Furthermore, engaging community members, especially women and youth, will provide valuable, real-time feedback on project progress, fostering a collaborative and resilient approach to urban water quality management.

2.1 Objectives

The primary goal of this advisory is to strengthen the institutional capacity for citywide monitoring of drinking water quality in urban areas. Additionally, the advisory aims to support the following objectives:

- Monitoring of clean water through every tap connection by increasing the number of household-level drinking water sample collections for testing of water quality parameters
- Developing incentive-based partnerships with women SHGs for water quality testing
- Enhance data gathering and forecasting capabilities for contributing to a sustainable and water-secure future.
- Fostering collaboration: Promoting partnerships between community groups, local authorities, and water utilities to establish effective monitoring systems and share data.
- Ensuring data accuracy: Emphasizing adherence to standardized procedures to maintain the reliability and accuracy of water quality data collected by community participants.
- Enhancing awareness: Raising awareness among residents about the importance of water quality and the role they can play in ensuring safe and clean drinking water for all.

- Strengthen the implementation and expand the scope of the AMRUT Mitra program under AMRUT 2.0

Water utilities and Urban Local Bodies (ULBs) are responsible for the provision of safe drinking water to citizens, thus one of the key focuses of AMRUT 2.0 is to develop their institutional capacity to set up and enhance water quality monitoring systems.

In coordination with ULB monitoring activities, active participation of the community (particularly women) provides a unique opportunity to strengthen water quality monitoring through a twin-pronged approach, combining the resources and capacities of both water professionals (public and private) and community members.

3. Opportunities for a collective approach to water quality monitoring under AMRUT 2.0

MoHUA's initiative on Gender Equality and Social Inclusion[8] emphasises community engagement under AMRUT 2.0. Cities and drinking water service providers can entrust the responsibility of monitoring to eligible community members like SHG members, youth, civil society organisations for collection of water samples to extend the network of sampling points. This can enhance data collection opportunities, both in terms of increasing the breadth of sampling points and supporting ULB by workload-sharing on water quality monitoring.

Additionally, while water quality monitoring by ULBs can occur at source, treatment, and distribution locations, monitoring at the citizen level can offer the distinct advantage of providing water quality data at the household level[9] as well, allowing for an understanding of water safety directly at the beneficiary/consumer end. Some of the benefits are:

- Empowering SHGs: Leveraging the initiative to actively involve women in water quality monitoring activities, thereby promoting gender equality and women's participation in decision-making processes related to water management.
- Community engagement: Utilizing the initiative to engage marginalized communities, including women, in water quality monitoring efforts, ensuring their voices are heard and their needs addressed.
- Capacity building: Implementing training programs that specifically target women and other marginalized groups, equipping them with the necessary skills and knowledge to effectively participate in water quality monitoring activities.

8 Gender Equality and Social Inclusion (GESI) Training Module for AMRUT 2.0, Ministry of Housing and Urban Affairs (June 2023).

9 This section is very important and need to be placed in the main text and therefore shifted above.

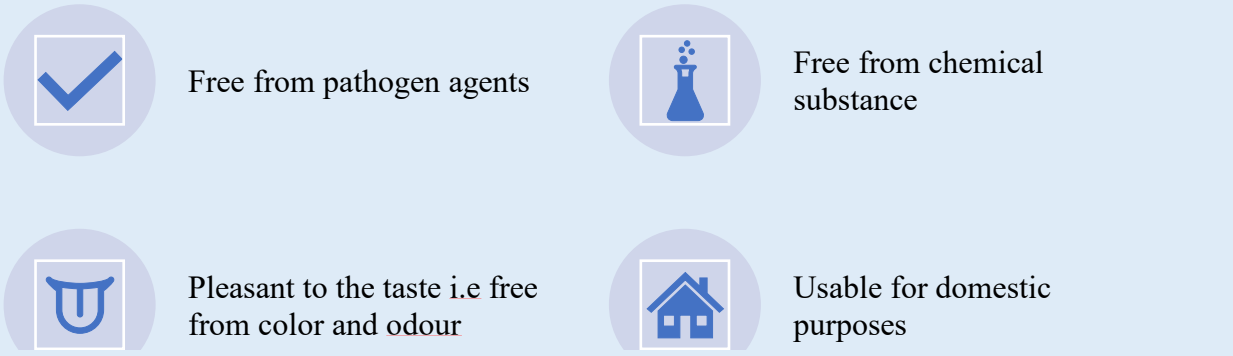
- Advocacy and awareness: Utilizing the initiative to raise awareness about the importance of water quality and the role that communities, including women, can play in monitoring and ensuring access to safe drinking water.
- Partnerships and collaboration: Encouraging partnerships between government agencies, civil society organizations, and community groups to collectively monitor water quality, ensuring a more comprehensive and inclusive approach.

Moreover, community participation can also foster a sense of shared responsibility for ensuring the right to water quality. This approach aims to empower communities and can also be a powerful avenue to raise awareness and education through communication initiatives.

Box 1: Water Quality Testing

Water quality describes as ***the condition of the water, including chemical, physical, and biological characteristics, usually with respect to its suitability for a particular purpose such as drinking or bathing.***

Safe and wholesome water is-



Source: CPHEEO Manual on Water Supply and Treatment Systems (Drink from Tap), 2024, Part B: Operation and Maintenance, Chapter 8: Drinking Water Quality Monitoring and Surveillance

Due to the prevalent practice of storing water in ground-level sumps as a response to intermittent water supply system in the cities, such sumps can become contaminated. Therefore, it is the responsibility of ULBs of monitoring water quality parameters on quarterly basis for approximately 5% of household sumps within a District Metered Area (DMA) targeting consumer sumps with significant leaks or those facing complaints about contamination. Trained community members such as women SHGs can help in identifying such households and help ULBs in repair or replace underground tanks to ensure watertightness. Engaging local community members in onsite water quality testing could accelerate both the testing process and grievance redressal efforts.

Actions for consideration

Given the prospects, within the framework of AMRUT 2.0, community engagement may be integrated into four pivotal domains where citizens can effectively complement the city-wide

monitoring of water quality and the broader objective of ensuring universal access to safe drinking water. These areas include:

- Augmenting existing resources available at ULB to extend the reach of water sampling and testing.
- Creating cross validation opportunity for water quality checking, both at the source and consumer level, and thereby gathering data and reporting for corrective actions
- Actively involving citizens in Information, Education, and Communication (IEC) activities.
- Advocacy and Policy Engagement: Primary considerations under each of these key areas are set out in the following sub-sections.

3.1 Augmenting resources available at the ULB level to widen the reach of water sampling and testing.

One of the overarching objectives is to create a comprehensive water quality database under AMRUT 2.0 that can demonstrate and validate the functional efficacy of treatment and distribution system in effectively maintaining the quality of water from source to consumer end.

By training additional resources from the community, this can augment the existing workforce resources at the ULB level for conducting water quality testing at a wider scale and reach, compared to what could be conducted based on existing resources alone.

To allow for this augmentation of workforce resources, while assuring quality and the sustainability of this arrangement, institutional mechanisms must be strengthened so that community participation can integrate effectively with the ULB's existing water quality management processes. Additionally, high-quality training in essential skills for water sample collection and testing is critical to the success of this approach. The significance of these prerequisites for achieving success are discussed below.

3.1.1 Strengthening institutional mechanisms to allow effective integration of community participation into ULB processes.

ULBs may have existing monitoring frameworks, strategies, and processes, including:

- Operational monitoring in the water source/catchment, through treatment processes, and through distribution systems to ensure processes and activities are functioning effectively to produce safe drinking water.
- Verification of drinking water quality, which consists of:
  - drinking water quality monitoring in the distribution system to verify the quality of treated water as supplied to the consumer; and
  - consumer satisfaction monitoring to address consumer comments and complaints.

- Validation monitoring for new treatment processes and barriers
- Incident and emergency response monitoring[10].

All these elements collectively contribute to ongoing system management and should lead to planned improvements, adjustments, and interventions in the overall water supply system.

Also, for the community-collected data to be used effectively within the overall water quality management system, new institutional mechanisms may be needed to enable integration of additional data from a more decentralized network than what ULBs may be typically set up to accommodate. This would include updating the overall monitoring strategy to ensure key entry points are included for community-collected data. Additionally, processes of hiring, deployment of field technicians to collect samples, and management of water quality data will need to be reviewed and updated.

Two types of monitoring that are most suitable for supplementing through community participation are verification monitoring and operational monitoring.

i. Verification monitoring: It involves testing the water supplied to consumers to determine compliance with water quality targets identified in regional or national guidelines or standards and specified in the water safety plan (WSP) and any customer contracts with respect to finished product requirements.

ii. Operational monitoring has a different purpose: It determines whether individual control measures are working, whereas verification monitoring determines whether the collection of control measures combined within a WSP have been effective[11].

Verification monitoring also involves different parameters that are generally monitored at lower frequencies. The parameters typically include E. coli as an indicator of microbial quality and health-related chemicals. ULBs should consider which monitoring activities are best supplemented by community participation and how these fits into their overall WSP.

Water quality parameters and monitoring frequency:

The frequency of monitoring should be proportionate to the likelihood and consequences of loss of control of a given aspect of a water management system. In any system, it will be impossible to monitor all hazards and apply all controls, therefore, it is important to prioritise scarce resources by ranking hazards. Simple risk assessment matrices can be used for this to calculate a priority score for each identified hazard. A team with knowledge and expertise in water safety and the system in question should be brought together to do a hazard analysis of the system. An example of a hazard assessment of a catchment or large storage reservoir is shown in the table

10 Australian Drinking Water Guidelines 6, 2011 (Version 3.8 Updated September 2022): Chapter 9 (Overview of monitoring).

11 Water Safety in Distribution Systems, World Health Organization (2014).

below[12]. Based on this assessment, a similar hazard assessment can be taken for a distribution system to determine likely risks of contamination that could enter the system after treatment at the plant.

Table 1 Example of hazard assessment for a catchment

Hazard	Hazardous event, source/cause	Likelihood	Severity	Risk rating
Microbial **Turbidity** **Colour**	Animals in catchment (native and feral animals)	5	2	Medium
Microbial **Physical** **Turbidity** **Colour**	Storms in catchments	5	3	High
Turbidity **Colour** **Taste and Odour**	Bushfire in catchment	2	5	Very high
Microbial **Chemical (toxins)** **Taste and Odour**	Algal bloom	2	4	High
Microbial **Turbidity** **Colour** **Chemical**	Human access	5	2	Medium
Microbial **Turbidity**	Reservoir short circuiting	4	4	Very high

12 Water Safety Plans: Managing drinking-water quality from catchment to consumer, World Health Organization (2005).

Hazard	Hazardous event, source/cause	Likelihood	Severity	Risk rating
Colour				

Following assessment of initial risks, control measures should be put in place and the risks reassessed to identify residual risks. Cities should use these assessments to inform their WSPs, including a monitoring program, then decide which components of the overall program could be supplemented by community participation (such as verification monitoring at the tap, or at water sources located near communities).

Verification monitoring is typically less frequent than for operational monitoring. An example suite of testing parameters for verification parameters at customers' taps is shown in Table 2.

Table 2 Example of parameters for verification monitoring at customers' taps

Chemical	Physicochemical	Microbiological
Chlorine	pH	Total coliforms
Arsenic	Temperature	*E. coli* (or thermotolerant coliforms)
Fluoride	Turbidity	Heterotrophic plate count bacteria
Hardness	Conductivity	*Legionella pneumophila* (infreqent, if deemed an at-risk system)
HAAs[13]	Alkalinity	*Naegleria fowleri* (infreqent, if deemed an at- risk system)
Nitrate	Total dissolved solids	
Selenium	Colour	
THMs[14]		
Metals		

The Bureau of Indian Standards (BIS) sets forth the quality requirements for drinking water, outlined in IS 10500:2012 and subsequent amendments, along with IS 3025:2019 – Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater, Organoleptic and

13 HAAs: halogenated acetic acids

14 THMs: trihalomethanes

Physical Parameters (Table 1), General Parameters Concerning Substances Undesirable in Excessive Amounts (Table 2), Bacteriological Quality of Drinking Water (Table 6), Parameters Concerning Toxic Substances (Table 3), Parameters Concerning Radioactive Substances (Table 4), and parameters pertaining to Pesticide Residues Limits (Table 5) of IS 10500:2012.

Additionally, the Central Pollution Control Board sets out frequency and parameters to be tested for analysis of surface water and groundwater source[15]. CPHEEO recommends that the water quality sampling should be carried out daily for a city having population more than 1,00,000 (estimated as per the base year of 2021 for current scenario, and through next Census as and when available) so that the entire city is covered within a month[16][17].

3.1.2 Providing quality training for participants

Drinking water quality monitoring entails laboratory-based and field-testing methods, ensuring that the water supplied to communities adheres to safety standards[18]. In this process, sampling is the first critical step, as the quality of samples is directly linked to the reliability and accuracy of results, including how representative the samples are of long-term water quality trends.

Therefore, it is critical to adhere to standard procedures for maintaining the quality of samples and accuracy of testing. It is crucial for cities and authorities to provide appropriate training to community members to maintain consistency and quality of data.

The training will focus on following attributes:

- Appreciation and understanding of water quality from the perspective of sampling frequency and sampling methodology; sample transportation, storage, and testing methodology.
- Data recording – process for sample identification and referencing, process for raw water and treated water quality data analysis and recording.
- Empanelling laboratories and process for empanelment of laboratories undertaking the water quality testing[19]

15 CPCB Guidelines on Water Quality Monitoring.

16 CPHEEO Manual Part B - Operation and Maintenance Drinking Water Quality Monitoring and Surveillance, Dec 2023 Edition, Annexure 8.7: Suggested Minimum Annual Frequency of Sanitary Inspections.

17 CPHEEO Manual Part B - Operation and Maintenance Second Edition - Revised and Updated, March, 2024 Edition, Section 8.4.3.3 Water Quality Sampling at Balancing Reservoirs and DMA/Distribution Network.

18 Indian Standard: Drinking Water Specification (Second Revision), Bureau of Indian Standards 2012.

19 CPHEEO Manual on Water Supply and Treatment Systems (Drink From Tap) Part A: Engineering - Planning, Design and Implementation Fourth Edition - Revised And Updated, Dec 2023, Section 7.6 (Establishing Testing Mechanism).

- Authentic reporting – standard operating procedures (SOPs) for data reporting, analysing the trends and reporting anomalies, supported by a risk management framework and an action plan[20] for water quality improvement.

Key aspects of training will include, at a minimum, the following.

Sampling techniques and equipment

Training to the community will include sampling equipment preparation, sample collection, preservation, temperature and field measurements, transport samples to the laboratory and labelling of samples etc. Cities should refer to Bureau of Indian Standards, i.e., IS-3025/1622 – 2019, IS-10500:2012 and/or CPHEEO Manual 2024, Chapter 8 on Drinking Water Quality Monitoring and Surveillance[21] for detailed information on sampling and testing procedures.

Controlled records

Controlled records are crucial to the reliability of the overall dataset and thus ULBs should provide sample collectors with standard templates and training in their appropriate usage. CPHEEO recommends that a "State-Level Digital Water Quality Management Information System (WQMIS) should be developed which will be further integrated into National Water Quality Database". Therefore, it is important that a template for data collection may be prepared for the water quality data collected and reported in accordance with Section 8.9 Water Quality Management Information System (WQMIS) provided in the Part B Manual[22].

Suggested Training Program Components and Requirements

- Training must be conducted by Chief Chemist/ Chief Water Analyst or enlisted institutes for trainings on water quality.
- Capacity building and training of various stakeholders especially women, so that they can perform their assigned WQMS dues effectively and efficiently.
- IEC materials like pamphlets and educational material to be prepared in local languages.
- Training, capacity building activities, exposure visits, etc. to be planned regularly to keep building the capability of laboratory personnel and new SHG members.
- Distribution of the kits to be linked to training of stakeholders.

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20 CPHEEO Manual on Water Supply and Treatment Systems (Drink From Tap) Part A: Engineering - Planning, Design and Implementation Fourth Edition - Revised And Updated, March, 2024, 7.10.1 (Preparation and Implementation of Water Safety Plan).

21 CPHEEO Manual Part B - Operation and Maintenance, Chapter 8, Drinking Water Quality Monitoring and Surveillance.

22 CPHEEO Manual Part B - Operation and Maintenance Second Edition - Revised and Updated, March, 2024 Edition.

- Monthly community meetings on a dedicated day, can be scheduled for regular updates on issues and challenges faced by SHG members.
- PHE/ ULBs /DDWS/NULM departments to play the role of a facilitator.
- Community/ public to be made aware of safe and unsafe water sources, harms of drinking contaminated water and importance of tap water.
- To sensitize public on water quality issues, maps indicating ward-wise ground water quality /water reservoirs to be put up on display in ULB buildings, block and district offices.

Suggested components for the training

- What is defined as water quality?
- What are the water quality parameters?
- Impact on Health
- Introduction to National Standards
- Importance and need for water quality monitoring.
- Process for Collecting Sampling and Water Quality Testing Techniques
- Logistics for Engaging SHGs & Monitoring of WQ system

3.2 Data collection, validation and reporting for corrective actions.

The overall goal of monitoring should be to protect public health, striving to minimize the threat of contaminated water supply by verifying and validating data collected both by the ULB and SHG members and subsequently applying corrective actions. To ensure that water quality monitoring is a continuous activity and not a one-off task, data collection and monitoring will become part of the ULBs' ongoing water quality management and reporting system. The data gathered from monitoring results can then be used to assess the effectiveness of treatment and other barriers and preventive measures.

3.2.1 Data management systems

For a robust water quality management system, it is important to have a strong database and system for collection, analysis and storage of water quality data records that are maintained by municipal laboratories. This should be enabled by the provision of sample registration forms readily available at the laboratories or at collection centres. In the case where online facilities are available, the sample collector should choose the laboratory where the sample needs to be tested and generate the automated reference number which will be used as the label. The results of the water quality analyse, whether these are recorded using a sample registration form or through an online system, will then be linked to the respective reference number for storage. The parameters to be prioritised are:

a. Turbidity
b. Conductivity/TDS
c. pH
d. E. coli/Thermotolerant coliforms
e. Free/residual chlorine (this will also indicate the status of contamination due to wastewater)

Note: Please refer CPHEEO Manual, part B operation and maintenance, chapter 8 on drinking water quality monitoring and surveillance, section 8.5.3.3 for details.

Additionally, States can develop a centralized repository so that authorities gain an understanding of the overall water quality scenario in each city, enabling more informed decision-making, timely interventions, and the formulation of targeted policies. This unified approach will not only improve the efficiency of water quality monitoring but also facilitates a cohesive and coordinated effort in maintaining and enhancing the safety of drinking water on a broader scale.

3.2.2 Corrective actions

Where monitoring results show a deviation from target criteria as specified under IS 10500:2012[23], corrective actions should be made. In some cases, such as significant exceedances of target criteria (e.g., due to event-driven contamination or a system failure) it will be important to communicate the risk to consumers. There are also a range number of agencies, including health and environment protection authorities, and other government, non-government and community associations that may require communication plans, including emergency response plans and other monitoring and reporting. Manual on Water Supply and Treatment Systems (Drink From Tap) Part B: Operation and Maintenance Second Edition. Revised and Updated, Sections 8.4 and 8.5 March 2024 states that surveillance, collating and summarizing data, reporting, disseminating the findings and taking remedial action are essential elements of a successful surveillance programme[24].

3.2.3 Engagement of community

The areas where community participation can play a role for data gathering and reporting purposes include:

- Engagement in gathering data on water quality at household level and feedback to validate qualitative progress of water supply projects under AMRUT and AMRUT 2.0

23 Indian Standard: Drinking Water Specification (Second Revision), Bureau of Indian Standards IS10500:2012.

24 CPHEEO, 2024. Manual on Water Supply and Treatment Systems. Central Public Health and Environmental Engineering Organisation, New Delhi.

- Sanitary surveillance of surface water sources further enhances the process of monitoring drinking water quality at household level, allowing for valuable insights, adjustments, and acknowledgment of the contributions made by the community members during data collection initiatives. Refer to the Water Sampling and Surveillance section in the CPHEEO Manual, 2024[25].
- For details on how to engage women in water management and related projects please refer AMRUT Mitra program guidance issued by MoHUA, 2024

3.3 Public awareness and IEC activities

CPHEEO[26] states that "community awareness is an essential component of the monitoring and surveillance framework. The primary beneficiary's community can play a critical role in surveillance activity". Establishing transparent communication channels between water management authorities and community members builds trust, and the members selected as part of the WQMIS for water quality testing can play a pivotal role in establishing the trust and transparency. Equally, raising awareness among the public ensures that community members are informed about their own responsibilities in consideration to water protection (including domestic plumbing issues).

Additionally, informing the community about the existing government-approved water quality testing laboratories may strengthen networks in monitoring and empowering community members to contribute to the health and safety of their own water. Local community members can be engaged in spreading information and IEC activities, like basic water safety literacy, and informing other citizens about accessible testing facilities, further spreading the active participation in monitoring.

Testing agencies

To support this, States, cities, and accredited/empanelled private/public labs can[27] Compile a comprehensive list of facilities encompassing all water quality testing facilities. Cities must display information on water quality testing facilities including those operated by local governments, municipalities, private labs, labs at Water Treatment Plants (WTPs), as well as those located beyond city limits (such as sub-divisional labs, district labs, state labs, or mobile labs of the state government)

i) Public Information Campaigns:

25 Ibid.

26 CPHEEO Manual Part B - Operation and Maintenance Second Edition - Revised and Updated, March, 2024 Edition, Section 8.7.2 Community Awareness.

27 CPHEEO Manual on Water Supply and Treatment Systems (Drink From Tap) Part A: Engineering - Planning, Design and Implementation Fourth Edition - Revised And Updated, March, 2024, Section 7.6 Establishing Testing Mechanism

- **Initiative**: Launch comprehensive public information campaigns through various media channels (TV, radio, newspapers, social media) to inform citizens about the availability and importance of water quality testing facilities.
- **Content**: Provide information on how these facilities operate, the types of tests conducted, and the significance of regular water quality monitoring.

ii) Community Workshops and Seminars:

- **Initiative:** Organize workshops and seminars at the community level to educate the public about water quality issues and the role of testing facilities.
- **Content**: Include demonstrations of water testing procedures, discussions on common water contaminants, and guidance on how to interpret test results.

iii) Educational Programs in Schools and Colleges:

- **Initiative**: Implement educational programs in schools and colleges to raise awareness among students about the importance of water quality and testing facilities.
- **Content**: Include interactive activities, laboratory visits, and projects related to water quality monitoring**.**

iv) **Information on water quality testing facilities for public awareness:**

- provide transparent information on the location of the laboratories, working hours, and services offered by these labs. Make the information readily available in the local vernacular language through official websites, public announcements, and community notice boards for maximum accessibility.

v) Online Portals and Mobile Apps:

- **Initiative**: Develop user-friendly online portals and mobile apps where citizens can access information about water quality testing facilities, schedule tests, and view test results.
- **Content**: Ensure the platforms provide detailed information on the location of testing facilities, services offered, and contact details.

vi) Public Notices and Signages:

- **Initiative**: Place public notices and informative signages in strategic locations such as community centres, parks, and public transport hubs.
- **Content**: Highlight the locations of nearby water quality testing facilities and provide quick-response (QR) codes for more information.

vii)Engagement with Local Organizations:

- **Initiative**: Collaborate with local non-governmental organizations (NGOs), SHGs and community groups, and resident welfare associations to disseminate information about water quality testing.

- **Content**: Use these networks to reach a broader audience and facilitate community-driven awareness programs.

Display Informtaion / publish water quality related information for public: Display information about water quality on notice boards or opt for digital display of water quality. This can include water quality at the sources, number households tested from with ward wise information, water quality parameter and tested results.

i) Regular Updates and Reports:

- **Initiative**: Publish regular updates and reports on water quality status and the activities of testing facilities.
- **Content**: Distribute these updates through newsletters, local media, and government websites to keep the public informed and engaged.

By disseminating this information effectively, cities aim to promote public awareness and encourage residents to utilize these testing facilities for assessing the quality of their water.

4. Way forward

The success of the approach set out in this advisory depends on the sustainability of the arrangements (including financial, logistical, and fair labour considerations) that underpin it. Suggestions to reduce risks and maximise opportunities for effective collaboration through this model, are set out below. These are intended to ensure that engagement of community members, whether as individuals supporting water quality data collection or community as a whole can be sustained over the long term to benefit ULB operations and the overarching goal of improving public health.

- Establish incentive-based partnerships with community members, such as women SHGs, youths, etc. Those actively engaged in community initiatives should be compensated based on established wages set for trained workforce, ensuring fair remuneration for their valuable contributions.
- Safety instructions and personal protective equipment must be provided by the ULBs/service-providing agency to community participants.
- Prescribe specific formats and protocols for maintaining records in the context of water quality monitoring is essential. Refer to Annexure 8.1 Record Keeping for Water Samples in CPHEEO Part B of Water Manual[28].
- The quality parameters of the treated water shall be displayed at the plant for public viewing.

28 CPHEEO Manual Part B - Operation and Maintenance Second Edition - Revised And Updated, March 2024 Edition.

- The Water Treatment and Water Supply Projects delivered under AMRUT Program shall include feature of displaying the treated water quality parameters for public viewing.
- Run regular training sessions for sample collectors for proficiency and consistency in the monitoring process. This approach not only maintains the skill level of existing members but also facilitates the inclusion of new members into the sampling process.
- Training should be provided by laboratory technicians from government-affiliated laboratories or training institutes.

Community participation in water quality monitoring represents a significant opportunity for the advancement of drinking water quality management in urban areas. With the inclusion of provisions in AMRUT 2.0 to actively engage communities in monitoring processes, a collective commitment to safeguarding public health and the environment is fostered. Empowering citizens to actively contribute to water quality assessments not only enhances the efficiency of monitoring initiatives but also nurtures a sense of ownership and responsibility within the community. As AMRUT 2.0 embarks on its journey toward sustainable water management, the combined dedication of communities, local authorities, and relevant stakeholders becomes foundational for constructing water secure cities.

5. Good Practices – Women engagement in water sector

The following section presents some of the notable good practices in states pertaining to engagement of women in water sector.

5.1 Jalasathi, Odisha

Partnering Women SHGs in Water Supply Management with performance linked incentive programme. Jal Sathi initiative started in 2019 by Water Corporation of Odisha (WATCO) under Housing & Urban Development Department, Odisha.

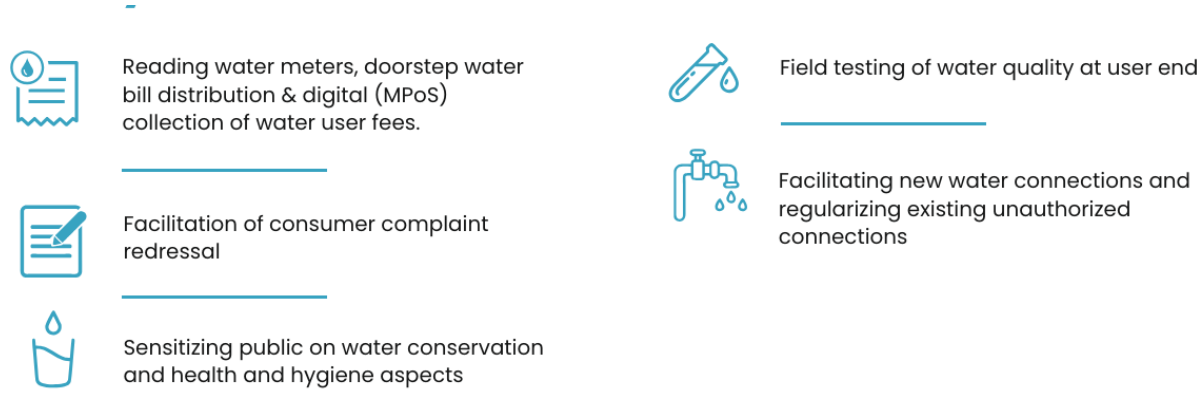

Figure 1: contribution by Women SHG

Impact

- Achievement of 100% house connections

- Customer friendly water supply services at the doorstep
- Improved customers connect leading to customer trust, confidence and satisfaction.
- Direct feedback from the consumer on water supply issues
- Improved awareness on desirable behaviours linked to water conservation & water supply services.
- Elimination of unauthorized connections

5.2 Kudumbashree – Kerela

Kudumbashree is the poverty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala. Kudumbashree was set up in 1997 following the recommendations of a three-member Task Force appointed by the State government. Its formation was in the context of the devolution of powers to the Panchayat Raj Institutions (PRIs) in Kerala, and the Peoples' Plan Campaign, which attempted to draw up the Ninth Plan of the local governments from below through the PRIs.

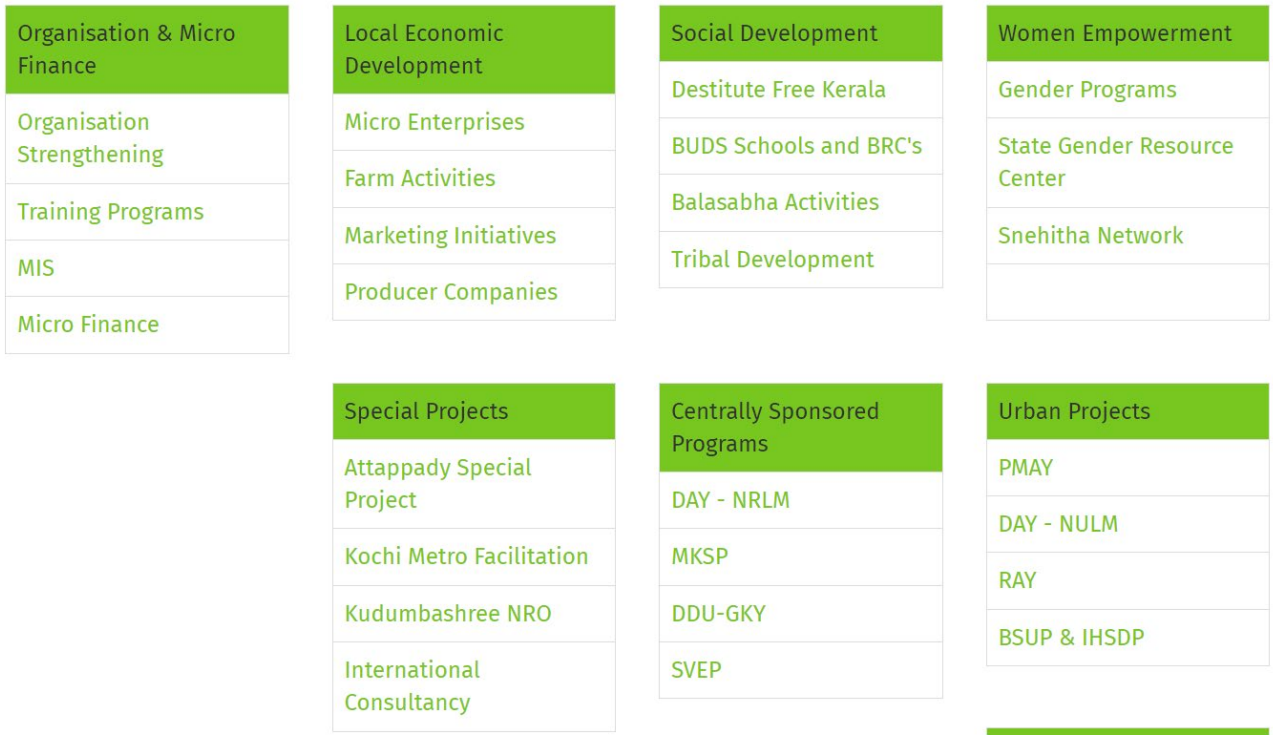

Figure 2: Key activities undertaken for involvement of SHGs

Impact

- Capacity building of beneficiaries