Smart Water Management for Community Benefits

By

SIGMA Foundation

INDIA

Background...

- India is committed to provide piped water to the premises of every rural HH by 2024 under Jal Jeevan Mission. Current coverage is around 20% and 130 million HHs need to be covered

- 40% of its area is likely to face water crisis by 2030 and per capita availability will reach 1140 **m^3**, close to the crisis level of 1000 **m^3** , if no measures are taken for source sustainability

- The problems can be better managed using SWM, application of which is weak in rural India. The large water supply project adopts SWM at the WTPs but not so much for managing supply at the consumer end in rural areas, for which there is an urgent need

- The **'local public utility'** for water supply in rural area is the local govt. known as ***Gram Panchayats* (GP),** which is a weak organization and faces many barriers in adopting SWM

- SIGMA Foundation works to transform the rural water supply management to be efficient using **"Real-Time"** data for water supply services. The focus is to **use technology (Mobile telephony/IOT/ AI) for small scale WSS in remote rural areas** which is very challenging from **organizational, technical, financial and social** point of view

Current Application of Smart Monitoring of Rural PWSS

- SIGMA started its journey in SWM by developing a real-time monitoring system of In-village Water Supply System of Gujarat, a large state of India with 90% house connections

- There are around 16,000 PWSS across vast and sparsely populated rural areas and monitoring performance of the same is very challenging using conventional method. The system developed captures status of key performance indicators daily, monthly and annually for analysis. It is being tested on a pilot scale for replication in near future

- The data captured is analysed and displayed in a dashboard for the supervising officials to use the evidences for decision support

- The process is now partly dependent on manual data uploading and the same will be replaced by IOT based automated data capturing

- The barriers in adoption of SWM in rural areas are to be overcome with more simplified approach and capacity building of the Gram Panchayats/ Water Committees/ Community

Three Fold Resilience for "E" Readiness of Gram Panchayats

❖ Transformation of the *GPs* for digital readiness will require building capabilities in three dimensions for attaining (a) **Efficiency** (b) **Adaptability**, and (c) **Transformability**

(a) Efficiency: To have service level benchmarking and service orientation to achieve the following:

(i) Deliver safe drinking water with equity and satisfaction against service benchmark,
(ii) Least loss of water and energy for pumping
(iii) Financial sustainability,
(iv) O&M practices as per protocol
(v) A sound system of monitoring using digital tools and consumer engagement with use of mobile phones

Three Fold Resilience for "E" Readiness of Gram Panchayats

(b) Resilience: There are many small ground water based PWSS, which face unsustainability and shortage of water in summer. SIGMA is in the process of developing a community based aquifer monitoring system the main elements of which are: (1) monitoring of groundwater levels in Observation Wells, (2) monitoring of pumping rates of wells, (3) wireless transfer of those data in real time to a control centre, (4) a real time model of the aquifer assimilating the data, and (5) control over the maximum seasonal pumping volumes of wells;

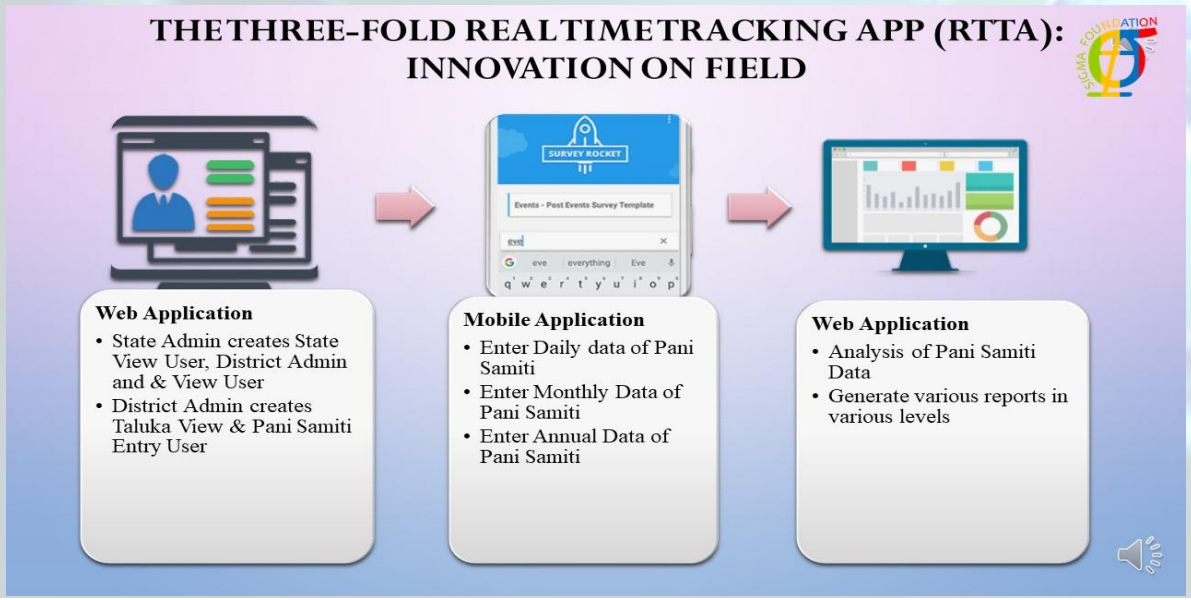
(c) Transformability: Adopting new technology and smart management practice along with moving from tube well with hand pump to PWSS will require organizational transformation as well as transformation of the system of community engagement:

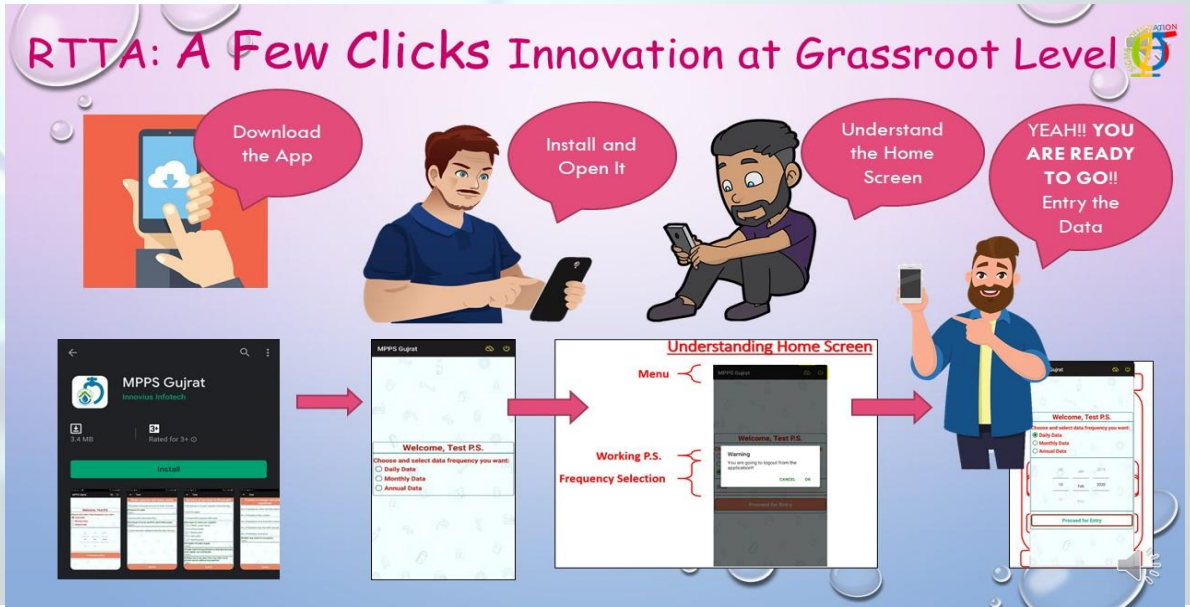
i. Changing attitude of the GP to adopt technology and evidence based decision making
ii. More rigorous O&M and safety measures for sustained supply
iii. Putting in customer care centre for improving service delivery
iv. Transparency in functioning including revenue management for better accountability

SIGMA is working to introduce these changes on a pilot scale

E- Readiness of the Consumers and Service Provider for Data Analysis

- The consumers needs orientation on service level and to monitor the same as well as convey the shortfalls using Mobile App to strengthen reactive and proactive O&M
- The management of data for decision support require processing of data by a SWM service provider (private or govt. deptt.) from higher level for analysis and decision support
- **Customer Care Centre (CCC):** CCC is to be established in each GP for managing consumer grievances and communication to and from customers (HHs) and to maintain a service desk. It is a challenging task but with the support of ADB and PHED West Bengal the same is being done in Bankura district by SIGMA Foundation





Water Quality Data Analysis and Modelling

- Reports of water quality tests conducted in laboratories are available in the govt website. SIGMA provides data analytics services to help decision making for mitigating the risk

- Improving lab performance for reliability and efficiency is another dimension of works of SIGMA. Smart management of sample collection and dissemination of geo-tagged test results is being developed for putting in place a "Smart Water Quality Testing" System.

- **Adopt Good Lab Practice Model (GLPM):** SIGMA Foundation already introduced such Model in **Assam** and trained lab personnel of **Gujarat** for adopting GLPM.

- SIGMA Foundation is willing to work with suitable partners for sensor based automated water quality monitoring which will work **in rural setting**

- SIGMA has also facilitated preparation of a Water & Sanitation Safety Plan (WSSP) following WHO protocol in a GP of West Bengal for the first time in India with ADB support. There is scope for lot of automation of the processes to operationalize WSSP

Key Features of WBDWSIP

- Modality of Operation
- Security of Water Supply
- Sustaining Source of Water

1.65 million people will be benefitted in 66 water quality affected GPs in 3 districts of West Bengal and will be a big change from intermittent to continuous water supply

Community Engagement in SWM

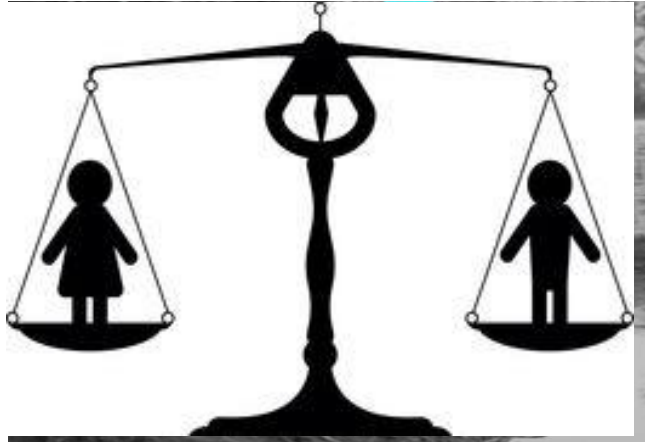
- Adoption of smart water management is for the benefit of the people and, therefore, such management cannot be effective without understanding the people's perspective, their expectations and related cultural and social context

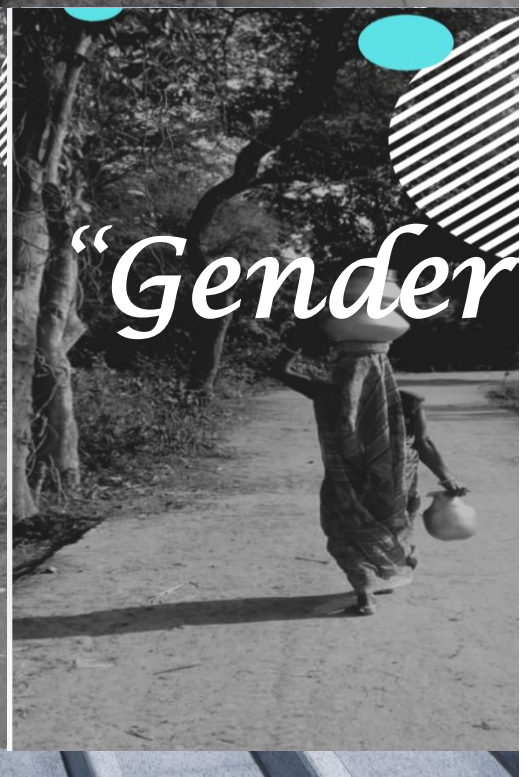
- Strengthening community process for people's participation in water supply management is the responsibility of SIGMA in Bankura district, one of the districts under WBDWSIP

- Understanding the community was the first task for which a survey was conducted using a mobile App., an area of specialization of SIGMA Foundation

- The social, cultural and geographical and geological aspects of the area was studied to design strategy for strengthening community engagement

- The prevailing gender-based practices was critical to understand for involving the women, which helped to design effective engagement of the community

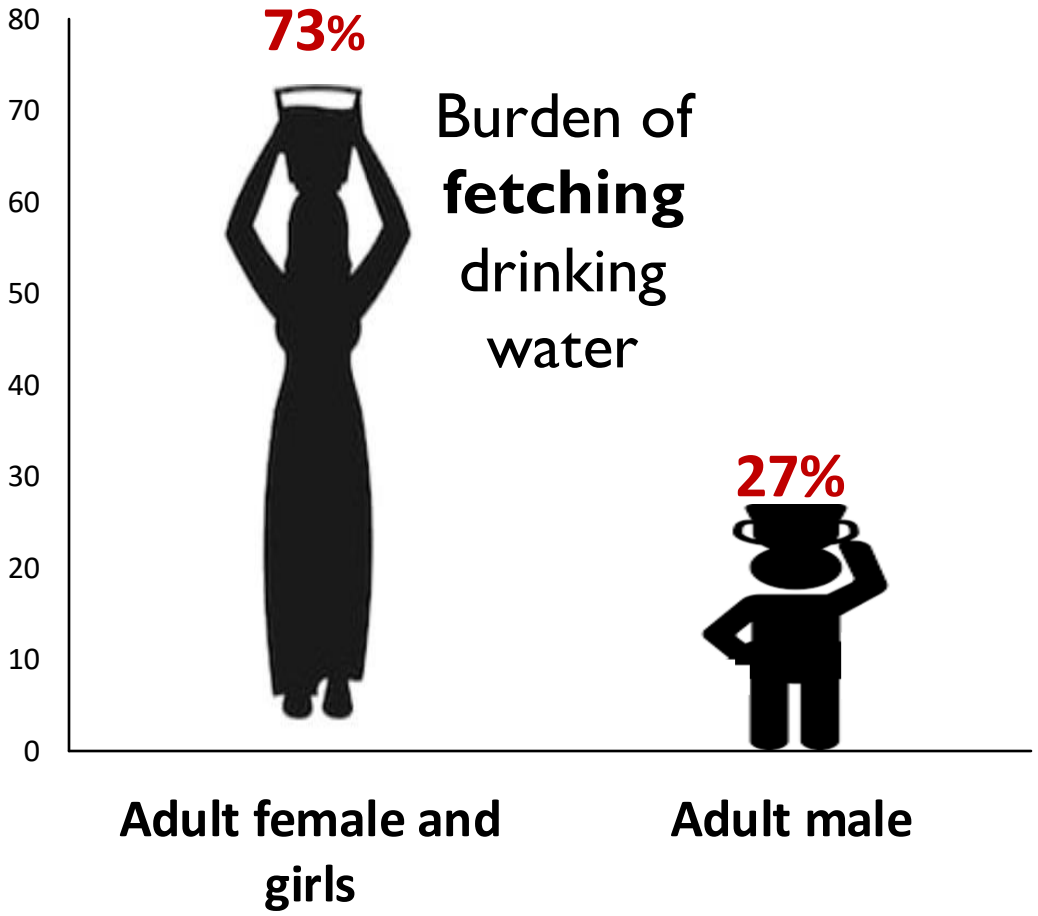




“Gender Equality in Water Sector”

Women & Water

FINDINGS FROM TIME USE SURVEY in Bankura District, West Bengal



Average Number of trips every day – 4

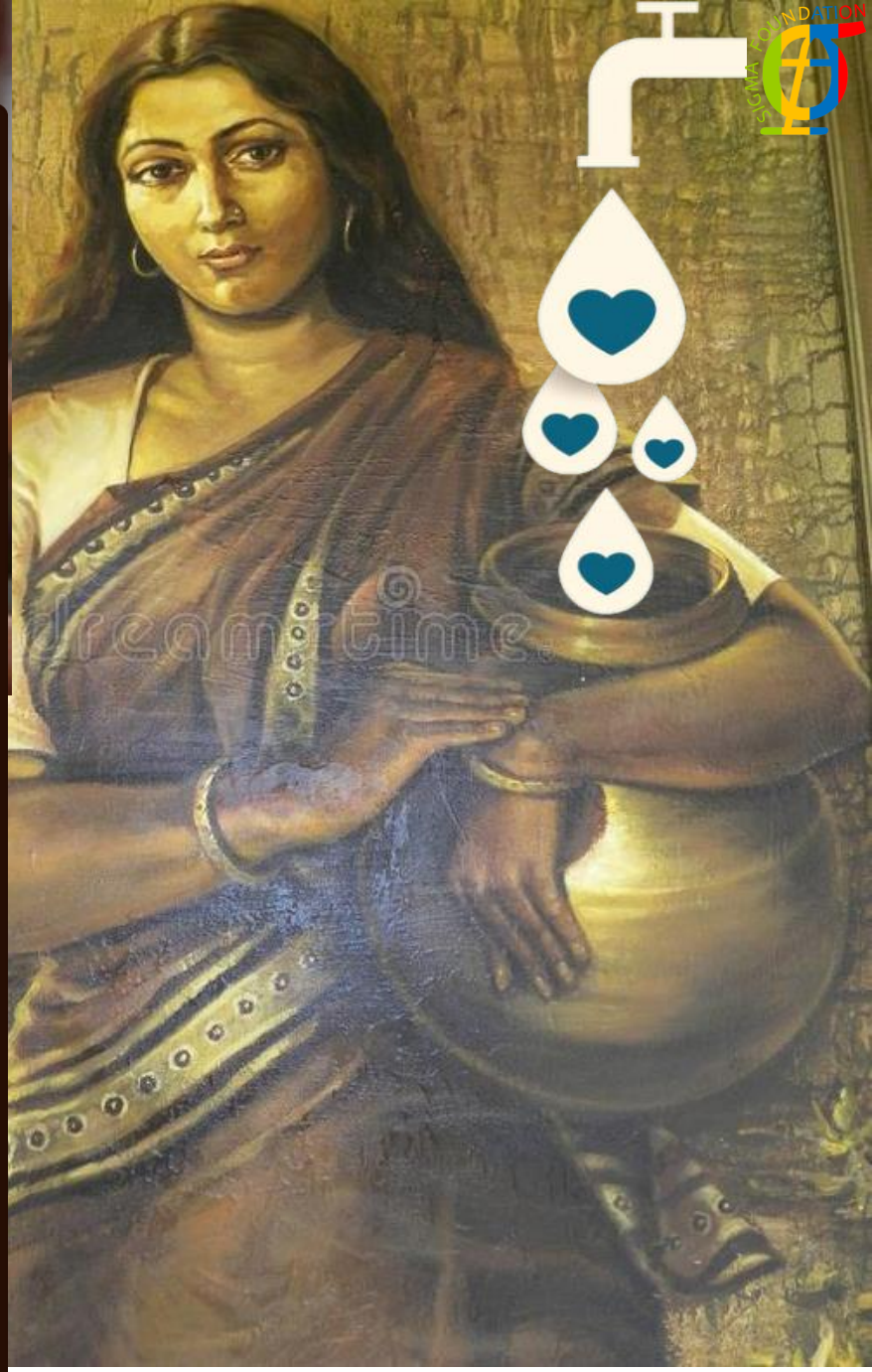
Total time to fetch water 1.5 hour/day

Total time to fetch water in water scarcity villages –2.3 hours /day

Average distance travelled – 685 ft or 209 metres

The Silver Lining

- Involvement of women in a patriarchic society, as is the case in India, has been little although it is the women who has highest stake in water management
- Women, once empowered, have shown great ability to come out of their cell and taking part in water supply management activities with much commitment, their E-readiness will be crucial for SWM



Skill Development of the Women

Community engagement is more effective if women participate in large number

They need to use mobile phone to remain engaged with the service providers

Training them to function as plumber/ fitter/metre reader and connecting them through SWM will improve O&M of the water supply schemes

Reducing Health Risk through

Water & Sanitation Safety Plan (WSSP)

Preparing WSSP for a Local Govt (Gram Panchayat)

The ADB assisted WBDWSIP is not only to provide treated water on a continuous basis but is also in the process of putting in place measures to mitigate all possible risks which affect water quality in the entire value chain from nature to mouth. This requires preparation of Water & Sanitation Safety Plan following WHO protocol. SIGMA Foundation has facilitated the WSSP at the GP level in West Bengal, which is considered to be the **First** WSSP in Rural India. Many of the risk mitigation measures can be effectively managed using SWM, which the project is developing.

WATER & SANITATION SAFETY PLAN FOR BRAHMANDIHA GRAM PANCHAYAT OF BANKURA DISTRICT

by Brahmandiha Gram Panchayat

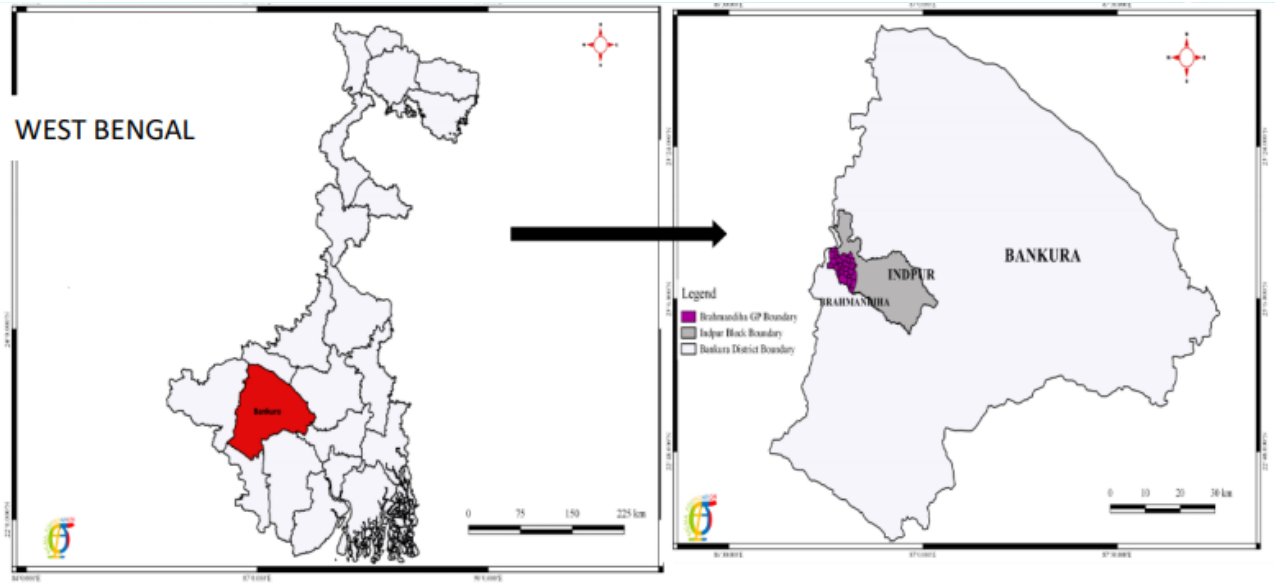
Facilitated by SIGMA Foundation
Supported By Public Health Engineering Department, Govt. of West Bengal & Asian Development Bank

Critical Challenges Identified in Brahmandiha GP

Drought Prone Area

Low potential aquifer

Poor Water Quality



Poor Sanitary Condition

Lack of SWM

Lack of LWM

Various skin diseases found

Preparation & Assessment Phase of Drafting WSSP

- ✓ **Assessment of Existing WASH practices was done by mapping the collected data through primary and secondary research**
- ✓ **Health Risk of all the potential hazards calculated through 'WHO Risk Score Index'.**
- ✓ **Risk was assessed across the value chain of water supply from source to mouth.**
- ✓ Facets of **E - Data Capture**: The survey was done through an **Android-Run Mobile Application** to capture the following:
  - **Sources of water, Water Quality/ management system/ monitoring, abstraction and treatment of water, transportation, collection & storage of water**
  - **Access to toilet and practice of open defecation, system of containment, management of faecal sludge, solid and liquid waste, handwashing practices and cleanliness and menstrual hygiene management**
  - **Status of WASH in households and institutions**
- ✓ **The WSSP was prepared by the GP with involvement of the community and facilitated by SIGMA Foundation and supported by PHED West Bengal and ADB**

Salient Features of the WSSP

- Mitigation of risk of **pathways to Contamination of water sources;**
- Disinfection of source though protocol based chlorination and monitoring chlorine level, sanitary survey;
- **Measures needed to prevent contamination during abstraction and transmission of water;**
- Prevention of **contamination of water during storage and due to prevalence of open defecation;**
- Ensure **safe containment of human excreta** and **faecal sludge management;**
- Safely managed **Solid and Liquid Waste;**
- Ensure **Hygienic Practices** including recommended handwashing technique;
- **Development of Supporting Programs** for behaviour Change Communication, Strengthening Governance;
- **Capacity Building** of the GP functionaries, convergence with other programs and participation of people;
- **Adequate funding, evidence based monitoring and review for updation**

Smart Monitoring of Water Supply and WSSP

- Monitoring of control measures - input parameters and frequency of collection
- Accountability of data collection
- Generating decision support by processing and analysing the data
- Putting in place a sound review mechanism
- Verification of Effectiveness of WSSP: Surveillance of Incidence of Diseases,

Framework of SMART Monitoring to be in place

- Customer Relation Management (CRM)
- Computerised Maintenance Management System (CMMS)
- Billing & Water Accounting System (BWAS)

Data to be considered for reporting through SWM:

- ✓ **Water quality at the sources**
- ✓ **Residual Chlorine Level**
- ✓ **Grievance on source failure/non availability of water/lower flow rate of water/turbid water/pipeline leakage etc.**

SWM for Empowering the GP and the Community

- We view SWM not as mere technology based tool to effectively manage water but as a tool for empowering the local service provider and the community to know and understand various service delivery parameters for improving decision support and efficient resource allocation by the GP and the consumer to watch the service delivery

- SWM provides transparency of functioning and strengthens the accountability of the service provider. It also empowers the community, particularly women, in managing their water supply and brings the consumer closer to the service provider to fit each other's need.

Thank You