





National Conference on

"Drinking Water Quality- Issues and Challenges"

December 30, 2022 Joka Kolkata



Dr. Syama Prasad Mookerjee National Institute of Water and Sanitation Joka, Kolkata

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 Apex Institute of international repute in the country on Water, Sanitation and Hygiene (WASH)





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Introduction



Honorable Prime Minister, Shri Narendra Modi inaugurated the Dr. Syama Prasad Mookerjee Nation Institute of Water and Sanitation (SPM-NIWAS), Joka, Kolkata on 30th December 2022 at 12.50 PM via video conferencing. The inauguration of SPM-NIWAS was followed by a one day national conference on 'Drinking Water Quality– Issues & Challenges' organized by DDWS and supported by UNICEF, INREM Foundation & WaterAid.

SPM-NIWAS have been envisioning providing an ecosystem for identifying innovative technologies in the WASH Services in a holistic manner. The premier institute would help to bridge the knowledge and capacity building gap in the field of water and sanitation services.

The event witnessed a high level participation from the Ministry of Jal Shakti, Department of Drinking Water and Sanitation, as Honorable Union Minister, Shri. Gajendra Singh Shekhawat, Minister of Jal Shakti, Miss Vini Mahajan, Secretary, Department of Drinking Water and Sanitation (DDWS) and Mr. Vikas Sheel, Additional Secretary & Mission Director, Jal Jeevan Mission.



Background

Dr. Syama Prasad Mookerjee – National Institute of Water and Sanitation (SPM – NIWAS) which has been developed at Joka, Diamond Harbour Road, Kolkata at an estimated cost of around Rs 100 Crore. The Institute will serve as an apex body in the country on water, sanitation and hygiene (WASH) in the country, serving as a hub of information and knowledge for Central, State and local governments.

Through this apex institute on Water and Sanitation, the Department of Drinking Water and Sanitation (DDWS) aims to bridge the knowledge and capacity building gap in the field of public health engineering, sanitation & hygiene, through short, medium & long-term courses which are not just related to engineering but also cover aspects of management, health, accounting, law and public policies.

Proceedings

The conference started with opening remarks by Mr. Vikas Sheel, Additional Secretary and Mission Director, Jal Jeevan Mission. He gave a brief of overarching objectives - Water quality and detailed status on Water Quality indicators within the wider perspective of National Jal Jeevan Mission. The session followed by presentation on three identified thematic areas by 03 states respectively as Tamil Nadu, West Bengal and Maharashtra. Further the inauguration ceremony happened virtually by Honorable Prime Minister, Shri Narendra Modi inaugurated the Dr. Syama Prasad Mookerjee Nation Institute of Water and Sanitation (SPM-NIWAS), followed by his remarks. During the expert session, Michael Kremer, Nobel laureate, addressed the conference remotely through video conference focused on identifying the gaps and finding solutions for assured service delivery of water and sanitation services.

Moving ahead of the inauguration ceremony, the group activity started as per 03 groups mapped with respective states with focus on identifying key challenges, its reasons and way forward. UNICEF, INREM Foundation and WaterAid facilitated the group activity followed by presentations from representatives of each group.



On this important occasion, addressing the keynote session by Honorable Union Minister, Ministry of Jal Shakti, Shri. Gajendra Singh Shekhawat chaired the national conference and said that the institute will certainly take the lead in developing futuristic technologies and solutions for India in the field of water and sanitation.

Ms. Vini Mahajan, Secretary, Jal Jeevan Mission, Government of India said that, government is providing the Institutional Support for both Invention and Innovation and SPM-NIWAS is a pioneer institution towards creating for a strong ecosystem supporting, she said every effort is being taken to support innovation in the country.

Mr. Pradeep Singh, Director SPM-NIWAS concluded the session with vote of thanks to esteemed dignitaries and all the participants from the state with appraisal for technical supported provided by UNICEF, INREM Foundation, WaterAid & organizations Rural WASH Partners Forum (RWPF) within DDWS.

Opening Session & Presentation by AS&MD, NJJM

The presentation (attached as Annexure 1) was considered as per the power point presentation shared by Mr. Vikas Sheel, mentioned about Overarching objectives - Water quality. As we are moving towards 'Drink directly from tap', a holistic approach for ensuring access to safe water is much needed. Improved water quality surveillance to detect contamination at various levels such as: at source, distribution system and Household level followed by corrective measures with prompt remedial action should be emphasized. Bacteriological contamination and disinfection was another part of the discussion where it was mentioned that; disinfection must have residual disinfection effect so, disinfection process for piped water supply schemes should be standardized across the state & UTs through developing a Standard Operating Procedure (SOP) may be conceptualized. In the current time frame, numbers of habitations largely affected are Arsenic & Fluoride with maximum number of habitations in Punjab and Rajasthan respectively. Towards the end of the presentation; Mr. Vikas Sheel clarified that the agenda of the conference is structured to identify key gaps and challenges of the states through presentation and developing a road map for ensuring water quality through commitments crafted through group activities.



State Presentations

The national conference at SPM-NIWAS on, "Drinking water quality issues & challenges", in the presence of Principal Secretaries from states, Additional Chief Secretaries & Mission Directors from the State & UTs. The representatives from states of Tamil Nadu, West Bengal and Maharashtra presented their respective state challenges on water quality with emphasis on finding appropriate solutions. State-wide presentation on identification of challenges and solutions on water problems to be achieved in the coming year and completed for making the National Jal Jeevan Mission great success. (*State presentations attached as annexure-2*)

i. Tamil Nadu:

The state presentation by Mr. V. Dakshinamoorthy, MD, JJM, Tamil Nadu was considered as per the power point presentation on identified theme as, <u>"Bacteriological contamination & Disinfection issues and solutions"</u>. The presentation captured about methods used for chlorination mainly by Chlorine Gas & Bleaching powder followed by corrective measures for residual chlorine with different appropriate procedures. The major challenges presented by the state as Issues in water sample collection and reporting system on WQMIS portal. It was mentioned that all parameters simultaneous updation should be allowed in WQMIS portal for a particular source or delivery point. At present only district level approval of sample results are allowed. State level approval needed for updated sample results for any correction. Contamination report for multiple parameters may be included. Sharing of Data in public domain is required to take remedial action at gross root level.

ii. West Bengal

The state presentation by Dr Animesh Bhattacharya – Engineer in Chief, PHED, West Bengal was considered as per the power point presentation on identified theme as: <u>"Chemical Contamination"</u>. The presentation captures chemical contamination status for Arsenic, Fluoride & Nitrate. It was mentioned that a large population was earlier affected by chemical contamination especially due to contaminated shallow tubewell sources. For Nitrate contamination, Mr. Bhattacharya presented that there is a decreasing trend of groundwater nitrate concentration which corresponds with the overall reduced N-fertilizer usage



during the study period. Discussing about the emerging contaminants – persistent organic pollutants (POPs), it was mentioned that Polynuclear Aromatic Hydrocarbons (PAHs) like Naphtahalene, Phenanthrene, Fluoranthene, Anthracene were detected and showed concentration higher than permissible limit in parts of WB.

iii. Maharashtra

The state presentation Maharashtra - Dr Hrishikesh Yashod, MD, JJM, Maharashtra was considered as per the power point presentation on identified theme as: "Water Quality Monitoring & Surveillance".

The presentation included detailed lab infrastructure created at different levels at District and sub-divisional labs for testing. The major challenges presented by Dr. Hrishikesh states that system integration is required with greater coordination as DDWS has two systems (IMIS, WQMIS), Two mobile apps (Har Ghar Jal & WQMIS) State have parallel MIS & mobile app. He also emphasized on two important areas to be discussed for solutions as:

Inadequate capacities: Less manpower due to vacancies/ higher sample load for testing/faster procurement procedures for consumables.

Capacity building of district, block & GP level personnel.

Inauguration Ceremony

Honorable Prime Minister, Shri Narendra Modi inaugurated the Dr. Syama Prasad Mookerjee Nation Institute of Water and Sanitation (NIWAS), via video conferencing from Ahmedabad in Gujarat. The inaugural session was followed by a <u>video</u> (<u>https://youtu.be/C19kC3sBFXg</u>) created by the Department of Drinking Water and Sanitation (DDWS) followed by an address by the Honorable Prime Minister.

Expert Session

Mr. Michael Kremer, Nobel laureate addressed the conference remotely through video conference focused on identifying the gaps and find solutions for assured service delivery of water and sanitation services. While addressing the conference



& says if we can provide biological contamination free water, a large number of child deaths can be avoided annually.

Group Activity

The group activity followed a structure developed to ensure participation of the states with focus on desired objective of the activity. Group discussions were organized based on the following criteria:

Group 1 on Bacteriological Contamination & Disinfection issues and Solutions

(Tamil Nadu, Karnataka, Haryana, Arunachal Pradesh, Nagaland, Mizoram, Manipur, Meghalaya, Himachal Pradesh, J & K, Uttarakhand, Tripura, Ladakh, A&N Puduchery, Goa) facilitated by UNICEF

Group 2 on Chemical contamination issues and solutions

(West Bengal, Assam, Punjab, Rajasthan, Gujarat, Dadra & Nagar Haveli) facilitated by INREM Foundation

Group 3 on Water Quality Monitoring and Surveillance (Maharashtra, Telangana, Uttar Pradesh, Odisha, Bihar, West Bengal, Chhattisgarh, Andhra Pradesh, Kerala, Jharkhand) facilitated by Water Aid

Group 1 Challenge and Suggestions:

Apart from the sewage stagnation and seepage near the source and the agricultural runoff and cattle waste near the source, the deforestation and change in land use patterns also pose a major challenge for bacterial contamination.

The legal framework for safeguarding sources such as Catchment areas and rivers need to be strengthened. Bore pits are to be constructed for power pump sources to avoid water stagnation and contamination.

Excessive groundwater drawdown can be mitigated by arranging the flow metre to detect excessive drawal.

The following are the solutions for contamination during transportation, which includes leaks and bursts in multi-village schemes: Clear water main, leaks in the distribution main, Seepage of contaminated water into the pipeline joints and mixing of sewage during development works



The water supply should be turned off right away.

Scouring the existing water in the pipeline.

Cleaning of sumps

Super-chlorination (8 gm per 1000 litres of bleaching powder)

Testing of bacteriological samples after chlorination to ensure potable supply

Regular monitoring of water quality through SHGs

The following are the solutions for Contamination at delivery points, such as Utilising water from pit taps, Seepage of used water into ground at drawl points and Bathing and Cleaning activities at the water drawl points

Construction of cement platform at water drawl points to avoid seepage and stagnation of water.

Ensuring 0.2PPM /0.2mg per litre of residual chlorine at delivery points.

Sanitary survey to be conducted on the usage of water.

Illegal connections to be removed.

Climate change impacts are also considered a major challenge as flash floods, cloud bursts, and cyclones damage water supply infrastructure and thereby cause water contamination. Increased water temperatures will cause excess algae growth, which will reduce drinking water quality.

All the storage tanks will be filled before the natural calamity and water supply will be effected through tanker lorries, etc.,

Genset to be arranged

Immediate restoration of water supply infrastructure with proper disinfection

Alternate source of water supply.

Additionally, following are the solutions discussed on Capacity building and Long-Term Remedial Measures



Awareness generation among the Stakeholders / Community at large and women and children in particular to be focused

Community based water quality surveillance program. (Training of SHGs & Water quality testing by SHGs periodically.)

Grey water management to avoid stagnation of water.

Group 2 Challenges and Suggestions:

The main challenges and suggestions coming out of this discussion were:

O&M issues of Water treatment plants and of the water supply system broadly was one big issue discussed. States put forward that there should be a Fund for O&M supported by JJM to cover the major costs of maintenance. This can be supplemented by State funds, Panchayat support and community contribution

Where the dependence is on local groundwater supply affected with fluoride or arsenic, or other chemical contaminant, it is not feasible always and also not needed (and expensive) to supply 55 lpcd of treated water. In this case, different suggestions were made:

Punjab, which is looking at an approach of supporting individual Household level purification

Tamil Nadu, which has been using the same pipeline system for alternate days of drinking quality water and local water for other purposes.

Procurement of promising technology with new innovations is not possible now. It was suggested to have a policy and SoP that makes it possible to pilot and scale such technologies. The JJM chairs could be part of this verification process

Emerging contaminants are a problem in different states - Uranium in Punjab, Manganese in Assam, Malaoxon (PoP) in West Bengal - these need to be addressed with sample based testing from labs

A combination of technology O&M issues, Behavioural challenges from community and data reporting problems, are leading to WQ issues post functionality. This needs to be addressed, since slippage rates would otherwise be very high. Sustained behavioural campaign and increasing demand of better WQ from the community is one way of addressing this challenge.



Group 3 Challenges and Suggestions:

Challenges-

No synchronisation of data between WQ-MIS and JJM-MIS

Issues in availability of data at the district level which hinders proper monitoring by district authorities

Challenges faced by community level persons in updating data in WQMIS – language, need for a smart phone, OTP

Assessors as part of the NABL accreditation process have varied interpretations of the requirements.

Target numbers of water sources for testing are huge

Wide range of honorarium to persons involved in water quality testing/ sample collection/ both, varies from state to state

No clear SOP on remedial measures post discovery of contaminant in water samples

Suggestions-

Rationalisation of number of sources to be tested Periodic orientation of staff responsible for WQMIS/ JJMMIS and quick trouble shooting windows. Synchronisation of WQMIS and JJM-MIS

App in vernacular language and use of QR code for each source for better and quicker data entry

Use of alternative facilities like science labs of collages or mobile labs

Use of FTK should be rationalised (for HH tests and awareness purposes only)

Involvement of community institutions like- SHGs / Jal Bandhu should be explored by all States

States to create their SOP's inclusive of responsibilities and time-frames to respond to the discovery of contaminants through testing.



JJM to work with NABL to provide clarity on requirements to reduce the scope for interpretation by assessors.

Group presentation are attached as Annexure - 3.

Key-note address by Honorable Union Minister for Jal Shakti, Shri Gajendra Singh Shekhawat

The concluding session of the conference was followed by a brief summary presented by Mr. Vikas Sheel, Additional Secretary and Mission Director, Jal Jeevan Mission. He also spoke about the Swachh Jal se Suraksha (SJSS) campaign which was started on 2nd October 2022. He emphasized that during the SJSS campaign, water samples from all PWS sources will have to be tested either in laboratory/ Field Testing Kits and remedial action is to be initiated wherever contamination is reported. He specified that the mission's main goal is 'to assure water service delivery' so that the move towards "Drink directly from tap" becomes reality. The concluding session was chaired by the Union Minister for Jal Shakti, Shri Gajendra Singh Shekhawat. The Union Minister reiterated the Prime Minister's vision of cooperative federalism and stated that under Swachh Bharat Mission, Namami Gange, Jal Jeevan Mission, the combined efforts are being recognized around the globe. Shri Shekhawat said "If we work together, we will surely achieve water security and assured service delivery of Water, Sanitation and Hygiene (WASH) services. PHE departments should be ready for a new challenge and expectations of people after supplying water at home." The Union Minister concluded with a call of nation building where such basic services like water and sanitation are assured to all citizens. He said "In this effort, the role of SPM-NIWAS will be crucial and all State Governments and local bodies must utilize the facilities at the institute for capacity building and training of field officials".

Closing remarks by Secretary, DDWS, Ms. Vini Mahajan

She urged States to focus on water service delivery. She said that, government is providing Institutional Support for both Invention and Innovation and SPM-NIWAS is a pioneer institution towards creating a strong ecosystem supporting, she said every effort is being taken to support innovation in the country-concluded with a vote of thanks. She asked participating States to list issues in



water service delivery, discuss and come out with an action plan for said effective implementation of the programme. She emphasizes that testing of water quality on a regular basis and reporting of the same in a transparent & timely manner along with remedial actions is necessary to ensure a good quality water to every household.

Vote of Thanks by Director, SPM-NIWAS, Mr. Pradeep Singh

He thanked all the participants from the state and also apprised the technical supported provided by UNICEF, INREM Foundation, WaterAid & organizations Rural WASH Partners Forum (RWPF) within DDWS. He mentioned special thanks to Honorable Union Minister for Jal Shakti, Secretary, JJM, AS&MD, JJM for leading and guiding this event to success. He also thanked Secretaries, PHED from states, Mission Directors, Chief Engineers and other representatives who had joined the event from various parts of the country.

Demonstrated Models

In addition to the conference, DDWS had set-up demonstration models sanitation and miniature models at the Institute towards awareness generation and capacity building through visual depiction. These models include Eco-San Toilet; Septic Tank; Tiger Toilet; Twin Pit Toilet; NADEP Composting Pit; Vermicomposting Tank; Siltation Chamber; Magic Pit; Soak Pit; Water Stabilization Pond (WSP); and Constructed Wetland. In addition to these models, displays of the SBM(G) phase I to Phase II journey, ODF Plus components, Solid and Liquid Waste Management, GOBARdhan, SBM(G) Phase II Capacity Building and ODF Sustainability posters have also been exhibited at the Institute.

Action Points:

The conference concludes with a call for action to strengthen water quality monitoring and surveillance systems. Focusing on efforts to achieve objectives under National Jal Jeevan Mission, and roles for different stakeholders envisaged for collaborative effort was also discussed.

i. SPM-NIWAS

- Developing training annual training calendar for L1 & L2 level of training to be organized.



ii. Rural WASH Partner's Forum (RWPF)

- State & UTs Leads: Respective state lead for the State & UTs, should consult with States to identify key challenges and provision adequate support with resource leveraged from Rural WASH Partner's Forum.
- Water Quality Techniques |INREM foundation: Facilitate with State Leads and State representatives to identify and document best practices on Disinfection/Chlorination.

iii. Respective states/UTs:

- Conceptualize and develop Standard operating procedures (SOP) for disinfection processes for piped water supply schemes should be standardized across the state & UTs.
- States to list issues in water service delivery discuss and come out with an action plan for effective implementation of the programme.



Annexures

Annexure 1. Presentation by AS&MD-NJJM

Annexure 2. State Presentations (03): Issues and Challenges

Annexure 3. Group Presentations (03): Solutions



Media Gallery











National Conference on Water Quality – Issues & Challenges

Kolkata 30 December, 2022





 Theme-I – Bacteriological Contamination & Disinfection - Issues and Solutions

Lead State - Tamil Nadu Sector Partner - UNICEF

Theme-II – Chemical Contamination - Issues and Solutions
Lead State – West Bengal Sector Partner – INREM

Theme -III – WQM&S Activities- Issues and Solutions
Lead State – Maharashtra Sector Partner – Water Aid

Water quality – Overarching objectives



• Move towards "Drink directly from tap"

• Service delivery as per BIS 10:500 norms on a long-term sustainable basis

- Water quality surveillance to detect any contamination
 - In source
 - In distribution system
 - At Household level
- Prompt remedial action

Bacteriological contamination and disinfection



 Proper and regular disinfection must be ensured all rural water supply schemes.

- The disinfection must have residual disinfection effect -
 - For protection against bacteriological contamination and
 - To prevent re-growth of pathogens in distribution system till the point of delivery for consumption

 Disinfection process for piped water supply schemes should be standardized across the State and a Standard Operating Procedure (SOP) may be conceptualized for this. **Chemical Contamination- Quality-affected habitations**



- Identification and reporting of QA Habitations.
- Potable water supply in Arsenic/ Fluoride-affected habitations immediately through short term measures – community level/ household level
- Functionality status of the CWPPs must be assessed periodically – till such time as PWS is not implemented
- Implementation of schemes with alternative safe sources in a time bound manner – surface/ ground.



Chemical Contamination- Quality-affected habitations

- Focus should shift from habitations to sources
 - Geo-tagging of sources can offer valuable information and solutions

- For all reported contaminated sources
 - Plans should be prepared and implemented for reclaiming the source.
 - Wherever reclamation is not possible and supply alternative safe source has been arranged –
 - Such sources should be marked as abandoned
 - 'not fit for drinking/cooking purpose' signages should be displayed
 - IEC should be done



Status of Arsenic affected habitations

State	Nos of Habitations	Covered with short-term Measures	Remaining habitations
Punjab	448	382	66

Status of Fluoride-affected habitations

State	Nos of Habitations	Covered with short-term Measures	Remaining habitations
Rajasthan	172	153	19

Status of Quality-affected habitations other than Arsenic/ Fluoride-affected



S. No.	State	Total no. of Other QA Habs	No. of habs with >50% & <100% HHs have tap water connections	No. of habs with 100% HHs have tap water connections
1.	Ar. Pradesh	149	27	73
2.	Assam	10,010	717	839
3.	Bihar	449	24	352
4.	Chhattisgarh	9	-	4
5.	Jharkhand	57	19	4
6.	Kerala	87	14	3
7.	Lakshadweep	10	-	-
8.	Madhya Pradesh	4	1	1
9.	Maharashtra	42	-	41
10.	Odisha	1,812	103	167
11.	Punjab	130	1	127
12.	Rajasthan	10,236	182	274
13.	Tripura	656	225	12
14.	Uttar Pradesh	370	29	29
15.	Uttarakhand	3	1	
16.	West Bengal	24	2	-
	Total	24,048	1,345	1,926

- Availability of alternative safe sources must be reviewed.
- If alternative safe sources are available, the habitation may be marked as "not quality affected"
- Geo-tagging can provide clarity

Water Quality Monitoring and Surveillance Activities



- Testing of drinking water sources
 - Once in year for chemical and physical parameters and
 - Twice in a year for bacteriological parameters (pre and post monsoon).
- Water quality testing using FTKs at schools/ anganwadi centres at least once every month.
- Villages, with water borne reported in last 3 years, may be identified as high-risk villages – hot spots/ vulnerability mapping
- At least one NABL accredited laboratory in every district

Water Quality Monitoring and Surveillance Activities



- Identification and training of women from local community to test quality of drinking water for chemical/ bacteriological contamination using FTKs/ H2S vials
 - At least 2 women if village population < 1000</p>
 - Atleast 5 women if village population >= 1000
- Ensure availability of FTKs/ H2S vials for water quality testing at village/ panchayat level.
- Handheld digital water testing devices may be explored as an alternative to FTKs
- Prompt remedial action be taken if water source found contaminated.



Parameters	for	FTK	testing	at	GP	level
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S.No.	Parameters for FTK testing	remarks
1.	pH value .	Common Parameters
2.	Turbidity	
3.	Chloride	a hard and a second
4.	Total alkalinity	
5.	Total hardness	
6.	Bacteriological contamination by H2S vial	
7.	Residual chlorine	
8.	Nitrate	
9.	Iron	Area specific parameter
10.	Arsenic (by separate Arsenic kit)	Area specific parameter
11	Fluoride	Area specific parameter
12.	Nitrite	Area spacific parameter
13.	Phosphate	Area specific parameter

Shared with States through letter no. WQ-11021/1/2020-WQ-DDWS dated 01.10.2020



Cumulative progress under WQM&S activities (2022-23)

Activity	Progress status (in %age)
Overall water quality testing in villages	59.56%
Water quality testing in villages through labs	49.87%
Water quality testing in villages using FTK	34.31%
Water quality testing in villages – Bacteriological (post-monsoon)	29.87%
Water quality testing in villages at household level	20.74%
Water quality testing in schools	14.59%
Water quality testing in Anganwadi centres	13.93%
Women trained* in villages for water quality testing using FTKs	49.02%
State/ Regional/ District level lab accreditation status	64.81% (453 labs out of 699 labs)

*At least 2 women in villages with population < 1000 else minimum 5.



Swachh Jal Se Suraksha Campaign

Swachh Jal se Suraksha campaign was launched from 02.10.2022 to 26.01.2023 to ensure quality of drinking water, with special focus on Water Quality monitoring and surveillance activities. Targets under SJSS campaign are as follows:

- Testing of water for quality against the targets as per JJM norms.
- Sources to be tested (either through labs or FTKs)
 - At least 1 test for chemicals (Ref. period 01.04.22 to 26.01.23)
 - 1 test for bacteriological contamination (post monsoon)
 - For PWS villages All PWS sources
 - For non-PWS villages All Drinking water sources
 - Especially those reported as Arsenic/Fluoride affected as on 01.04.2019
- Water quality testing in Schools and Anganwadi centres
- Water quality testing in at least 3 households with FHTCs in each village
- Training of women (as per JJS norms) in each village for FTKs/H₂S vials
- Remedial action taken for contaminated samples
- Geo tagging of PWS Assets

Testing in Villages - Chemical parameters (2022-23)



State-wise %age of Villages tested for chemical parameters

0-25%	25-50%	50-75%	75-90%	90-100%
DNH and DD	Meghalaya	Arunachal Pradesh	Mizoram	Nagaland
West Bengal	Rajasthan	Puducherry	Chhattisgarh	Gujarat
	Maharashtra	Uttar Pradesh	Jammu & Kashmir	Karnataka
	Assam	Jharkhand	Odisha	Tamil Nadu
	Haryana	Sikkim	Kerala	Lakshadweep
	A&N Islands	Goa	Ladakh	
	Madhya Pradesh	Telangana	Manipur	
		Bihar	Himachal Pradesh	
		Tripura	Andhra Pradesh	
		Uttarakhand		
		Punjab		

National Progress: 59%

Testing in Villages - Chemical parameters (01.10.2022 – 30.12.2022)



State-wise %age of Villages tested for chemical parameters out of residual targets as on 01.10.2022

0-5%	5-15%	15-25%	25-50%	50-75%	75-100%
DNH and DD Maharashtra		Rajasthan	Jharkhand	Odisha	Gujarat
West Bengal		Uttar Pradesh	Puducherry	Manipur	Karnataka
Sikkim		Meghalaya	Bihar	Himachal Pradesh	Tamil Nadu
Goa		Ar. Pradesh	Jammu & Kashmir	Nagaland	Lakshadweep
A&N Islands		Madhya Pradesh	Uttarakhand	Andhra Pradesh	
		Assam	Haryana		
		Mizoram	Ladakh		
			Chhattisgarh		
			Kerala		
			Punjab		
			Telangana		
			Tripura		

National Progress: 29%

Testing in Villages - Bacteriological (Post-Monsoon) (01.10.2022 – 30.12.2022)



S	State-wise %age of Villages tested for Bacteriological (Post-Monsoon)							
0-5%	5-15%	15-25%	25-50%	50-75%	75-100%			
A&N Islands	Puducherry	Meghalaya	Chhattisgarh	Karnataka	Himachal Pradesh			
DNH and DD	Uttar Pradesh	Madhya Pradesh	Tripura	Kerala	Andhra Pradesh			
Sikkim	Rajasthan	Punjab	Maharashtra	Ladakh	Tamil Nadu			
West Bengal	Jharkhand	Assam	Uttarakhand	Gujarat	Lakshadweep			
Goa		Ar. Pradesh	Telangana					
Bihar			Manipur					
			Mizoram					
			Nagaland					
			Jammu & Kashmir					
			Haryana					
			Odisha					

National Progress: 30%

Testing in Schools (01.10.2022 – 30.12.2022)



State-wise %age of Schools tested out of residual targets as on 01.10.2022						
0-2% 2-15%		2-15%	15-50%	50-75%	75-100%	
	DNH and DD	Madhya Pradesh	Punjab	Karnataka		
	Puducherry	Meghalaya	Haryana	Andhra Pradesh		
	Sikkim	Mizoram	Ladakh	Tamil Nadu		
	West Bengal Maharashtra		Manipur	Lakshadweep		
	Goa	Chhattisgarh	Telangana			
	Jharkhand	Jammu & Kashmir	Himachal Pradesh			
	A&N Islands	Tripura	Odisha			
	Rajasthan	Uttarakhand	Nagaland			
Bihar Arunachal Pradesh		Arunachal Pradesh				
	Uttar Pradesh	Gujarat				
	Kerala					
	Assam					

National Progress: 14%

Testing in Anganwadi Centres (01.10.2022 – 30.12.2022)



State-wise %age of Anganwadi Centres tested out of residual targets as on 01.10.2022

0-2%	2-15%		15-50%	50-75%	75-100
DNH and DD	Kerala	Gujarat	Telangana	Andhra Pradesh	
Goa	Madhya Pradesh	Arunachal Pradesh	Nagaland	Karnataka	
Puducherry	Assam	Uttarakhand	Himachal Pradesh	Lakshadweep	
West Bengal	Meghalaya	Manipur	Odisha	Tamil Nadu	
Sikkim	Mizoram	Haryana			
Bihar	Chhattisgarh	Punjab			
Uttar Pradesh	Maharashtra				
A&N Islands	Jammu & Kashmir				
Rajasthan	Tripura				
Jharkhand	Ladakh				

National Progress: 13%

Testing at Household level (01.10.2022 – 30.12.2022)



State-wise %age of Villages tested at Household level out of residual targets as on 01.10.2022

0-2%	2-15%	15-50%	50-75%	75-100
A&N Islands	Uttar Pradesh	Manipur		
DNH and DD	Mizoram	Haryana		
Sikkim	Maharashtra	Tripura		
West Bengal	Kerala	Karnataka		
Puducherry	Arunachal Pradesh	Telangana		
Lakshadweep	Uttarakhand	Gujarat		
Odisha	Meghalaya	Nagaland		
Rajasthan	Assam	Himachal Pradesh		
Jharkhand	Bihar	Andhra Pradesh		
Madhya Pradesh	Jammu & Kashmir	Tamil Nadu		
Chhattisgarh	Punjab	Ladakh		

National Progress: 8%
Training of women for water quality testing using FTKs (Overall)



State-wise %age of Villages wherein women trained 0-25% 25-50% 50-75% 75-90% 90-100% DNH and DD Kerala Uttarakhand A&N Islands Haryana **Karnataka** Lakshadweep Punjab Gujarat Assam **Bihar** Maharashtra **Arunachal Pradesh** Uttar Pradesh Jharkhand Meghalaya Chhattisgarh Tripura Sikkim Goa Andhra Pradesh Nagaland West Bengal Mizoram Manipur **Himachal Pradesh** Tamil Nadu Telangana Odisha Puducherry Rajasthan Ladakh Jammu & Kashmir Madhya Pradesh

National Progress: 49%

Training of women for water quality testing using FTKs (01.10.2022 – 30.12.2022)



State-wise %age of Villages wherein women trained out of residual targets as on 01.10.2022

0-2%		2-15%	15-50%	50-75%	75-100
DNH and DD	Puducherry	West Bengal	Chhattisgarh	Gujarat	Nagaland
Lakshadweep	Manipur	Maharashtra	Andhra Pradesh	Haryana	Himachal Pradesh
Bihar	Jharkhand	Assam	Ladakh	Uttar Pradesh	Karnataka
Goa	Odisha	Jammu & Kashmir			
Telangana	Meghalaya	Tamil Nadu			
Kerala	Madhya Pradesh	Punjab			
A&N Islands	Rajasthan				
Tripura	Arunachal Pradesh				
Sikkim	Uttarakhand				
Mizoram					

National Progress: 22%

Accreditation/ Recognition of water testing laboratories



Accredited State/ Regional/ District level laboratories				Recognized Sub-division/ Block/ Mobile level		
0-50%	50-75%	75-90%	90-100%	lal	boratories	
Tripura	Chhattisgarh	n Gujarat	Madhya	0-30%	30-60%	60-100%
Jammu & Kashmir	Rajasthan	Kerala	Tamil Nadu	Chhattisgarh	Haryana	Uttarakhand
Jharkhand	Karnataka	Assam	Uttarakhand	Jharkhand	Punjab	Iripura
Uttar Pradesh	Odisha		West Bengal	Odisha	Karnataka	Kerala
Bihar			Haryana	Jammu & Kashmir	Assam	West Bengal
Meghalaya			Andhra Pradesh	Lakshadweep,	Maharashtra	Gujarat
Mizoram			Himachal Pradesh	Andhra Pradesh,	Goa	Himachal Pradesh
Telangana			Manipur	Rajasthan, Uttar		riddesh
A&N Islands			Nagaland	Pradesh, Bihar,		
Ar. Pradesh,			Punjab	Meghalaya,		Madhya
Goa, Ladakh, Puducherry, Sikkim			Maharashtra	Telangana, A&N Islands, Arunachal Pradesh, Ladakh		Pradesh



Key outcomes envisaged

- Identification of gaps and options
- Road map for ensuring water quality
- Commitments
 - Treatment and disinfection systems chlorination endline
 - SOPs for water quality surveillance and remedial action
 - Reforms/actions for testing as per norms
 - Capacities
 - Logistics
 - Reporting
- Move towards "Drink directly from tap"



Thank You







Jal Jeevan Mission Tamil Nadu

National Conference on Water Quality – Issues and Challenges

 Theme – T : Bacteriological contamination & Disinfection issues and Solutions

 O
 Fore Noon Session

30th December, 2022

Biological Contamination and water related Diseases



Presence of **Total coliform**



Presence of E coli



- Presence of MS2 phage (indicator of viral contamination)
 - Presence of Cryptosporidium (protozoa)



Presence of Giardia (protozoa)

Diseases

- Diarrhea
- Cholera
- Typhoid
- Hepatitis
- Malaria

How to control Bacteriological contamination ?



Predominantly used method in Tamil Nadu: Chlorination

Chlorine Gas

Bleaching powder

Used in Treatment Plants (Surface Water)

Liquid Chlorine stored in gas cylinders at (-)34.6 C

Dissolved in raw water as pre - chlorination

Dissolved in filtered water as **post - chlorination**

4 gm / 1000 litre Bleaching powder dissolved locally / in - line chlorination

Bleaching powder mixture is let in to the Over head tank

0.2PPM /0.2mg per litre of residual chlorine at delivery point

Biological contamination - Permissible limit after disinfection

- **E. coli thermotolerant coliform bacteria -** shall not be detectable in any 100 ml sample
- Coliforms shall not be detectable in any 100 ml sample
- MS2 phage (indicator of viral contamination) shall be absent in 1 litre water
- Cryptosporidium (Protozoa) shall be absent in 10 litre of water
- Giardia (Protozoa) shall be absent in 10 litre of water





Main Water quality issues

1. Contamination at Source

- Sewage stagnation near source
- ✤ Agricultural run off
- Cattle waste near source





2. Contamination at Transmission

- Leaks and bursts in Multi Village Schemes Clear water main
- Leaks in distribution main
- Seepage of contaminated water into the pipeline joints
- Mixing of sewage during development works



3. Contamination at delivery points

- Utilising water from pit taps
- Seepage & stagnation of used water into ground at water drawl points
- Bathing and Cleaning activities carried out at the water drawl points







4. Impact of Climate Change on water quality

- Flash floods, cloud bursts, cyclones damage water supply infrastructure and thereby water contamination.
- Increased water temperatures will cause excess algae growth, which will reduce drinking water quality.





1. Issues in Water sample collection

- Each habitation has multiple piped water supply (PWS) sources.
- Hence, source geo tagging in sample collection may be provided in the WQMIS portal.

2. Issues in reporting system

- All parameters simultaneous updation should be allowed in WQMIS portal for a particular source or delivery point.
- At present only district level approval of sample results are allowed. State level approval needed for updated sample results for any correction.
- Contamination report for Multiple parameters may be included
- ♦ Sharing of Data in public domain To take remedial action at gross root level.



Thank You

Chemical Contamination: Issues and Key Challenges

National Conference on 'Drinking Water Quality – Issues & Challenges' December 30, 2022





Chemical Contaminants







Arsenic Contamination - Exposure





- The map delineates the regional-scale occurrence of elevated groundwater As (≥10 µg/L) based on field-observations of ~3 million groundwater sources (IMIS & CGWB) across India.
- Previous studies in 2011 estimated ~70 million groundwater dependent population in India is suggested to be at risk of As poisoning through direct and indirect consumption of arsenic-contaminated shallow tubewell waters.
- Based on the 2015 projected population data, the total population exposed in areas having high groundwater As concentrations (≥10 µg/L) in India has been estimated to be ~ 90 million. West Bengal (28 million), Bihar (21 million), Uttar Pradesh (15 million), Assam (8.6 million), and Punjab (7 million) are the worst-affected



Fluoride Contamination - Exposure



- 12,801 geo-referenced groundwater fluoride observations were taken from from the IMIS & Central Ground Water Board (CGWB) of India surveys for the years 2015 (CGWB 2015) and 2017 (CGWB 2017) across the country.
- A model has been developed incorporating the detailed tectonic properties of the study area along with other intrinsic geomorphologic and hydrologic factors and exogenous proxies of climate and human interventions.
- Based on the RF model prediction and the projected population for the year 2020 of the study area, nearly 257 million people is estimated to be exposed to the risk of groundwater fluoride > 1.5 mg/L





Nitrate Contamination - Exposure





- Groundwater nitrate concentration from ~3 million drinking water wells spread across 7038 administrative blocks between 2010 and 2017 (IMIS) in India revealed that an average 8% of the studied blocks were found affected by elevated groundwater nitrate (> 45 mg/L).
- Based on the 2011 census it has been estimated that the population vulnerable to high groundwater nitrate exposure is ~71 million. The correlation tests indicated that the spatial distribution of groundwater nitrate was significantly associated with agricultural N-fertilizer usage.
- There is a decreasing trend of groundwater nitrate concentration which corresponds with the overall reduced N-fertilizer usage during the study period.



Emerging Contaminants- Persistent Organic Pollutants (POPs)



- In one of the studies in parts of West Bengal, 40 pesticides have been detected in groundwater and 39 in river water and distribution (%) is higher in river water than groundwater.
- Malathion, Alachlor, Atrazine, Diazinon and Lindane were found to be in excess quantity than the permissible levels of WHO/USEPA.
- Malaoxon, a derivative of malathion was detected in different stages of the treatment plant. As a matter of fact, the concentration of malaxon was found to increase with the number of treatment units employed and the concentration got significantly high after chlorination.
- The Malaoxon has 68 times higher capability of inhibiting acetyl cholinesterase activity (AChE) in neuro transmitting cells. LD50 values for malaoxon lie in the range of 100–220 mg/kg of body weight.
- Polynuclear Aromatic Hydrocarbons (PAHs) like Naphtahalene, Phenanthrene, Fluoranthene, Anthracene were detected and showed concentration higher than permissible limit.



Challenges in implementation of Mitigation Measures

- Use of surface water is the only long term solution where there is no safe and sustainable water bearing aquifer, which entails high O&M cost.
- In absence of prior knowledge of hydrogeology of the area, sinking of shallow depth tubewells are generally preferred, inviting all kinds of chemical and bacteriological contaminants.
- Adoption of advanced technologies through normal tendering process often becomes a challenge.
- Availability of patented media in the market
- Innovative technologies those are claimed to be more efficient have little or no field data to prove its efficacy.
- There is little scope of performance evaluation of the installed technology in absence of responsibility of O&M in the contract, for a sufficient period.
- Complexities involved in O&M of larger capacity plants are are deterrent to involvement of community.





- CWPPs are comparatively more compact and found to be efficient. Involvement of community for O&M is feasible. However CWPPs are allowed under JJM only as an interim solution.
- SOP for management and disposal of sludge needs to be developed to avoid recontamination of ground water.



- Strict monitoring and surveillance of water quality is extremely important for ensuring potable water.
- Desalination using RO system, where reject water is as high as 60-70%, is not a viable solution for removal of salinity.
- Rain water harvesting is often touted as an alternate option, however, providing providing house to house connection with 55 lpcd of water is a challenge.

Thank You!





WATER QUALITY MONITORING & SURVEILLANCE

Issues and Solutions

National Conference on Water Quality – Issues & Challenges

Date: 30.12.2022 Venue: Kolkata Prepared By: State Water and Sanitation Mission, Maharashtra

WATER QUALITY MONITORING & SURVEILLANCE

Introduction

- □ First dedicated drinking water Quality laboratories started in 1998 under Hydrology project.
- □ It was with limited no of laboratories & limited to research oriented WQ testing for observation wells
- □ Network of District & Sub-div level labs was extended under NRDWP in 2011
- Also, Uniform water Quality monitoring & surveillance protocol started in 2011 (chemical & bacteriological testing)
- □ Revised water quality framework in 2021 under JJM

Guidelines

Testing frequency

A strategie As per	As per		Sample collection by dedicated person from public drinking water sources		
Activity	Guidelines State Policy		Chemical Testing (Once in a year)	Bacteriological Testing (Twice)	
chemical Testing	Once in a year	Post Monsoon	Samples submitted with sample id generated on V	VQMIS to nearby District/ Sub div. lab for testing	
Bacteriological testing	Twice in a year	Pre and Post Monsoon	Samples are tested for basic	c water quality parameters	
Sanitation survey	Twice in a year	Apr. and Oct.	Results entered on W	Z QMIS using same ID	
FTK testing	Once in a month	Throughout the year	Contaminated samples are reported	to village & referral Lab	

Testing Process

2

WATER QUALITY MONITORING & SURVEILLANCE - Maharashtra Scenario



Sr. No	Level	No. of Lab's	
1	State	1*	
2	Regional	6	
3	District	28	
4	Sub-Divisional	143 + 5*	
	Total	177 + 6*	
* Labs are under establishment			

- Every rural district has one District and 4/5 sub-division level
 Laboratories.
- Every lab tests 6 physical, 9 chemical & 2 Bacteriological
 Parameters
- District / Regional and State level Lab also act as referral laboratories
- NABL Accreditation 85 /177 Labs. All District (34) + Sub-div
 labs (51). Another 92 SDL in progress
- □ Regional level laboratories have permanent manpower,
 - District & Sub-division level labs have contractual manpower

WATER QUALITY MONITORING & SURVEILLANCE – Maharashtra & Other States **Scenario**

- Average 6.3 Lakh samples tested every year, nearly 2.5 lakh Chemical and nearly 4 lakh Bacteriological samples tested every year.
- 95% selected women's for FTK testing are trained.
- Samples are collected by Jalsurakshak and sent to lab.
- IEC campaign for water quality • testing and FTK testing are conducted.





Sundi, Maharashtra, India

23/12/22 01:58 PM GMT +05:30

Lat 15.928838° Long 74.372988°

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गावातील पाच प्रशिक्षीत महिलांनी फिल्ड टेस्ट किट द्वारे जैविक तपासणी करा व आपल्या गावाचे आरोग्य तपासा

तालंखाना अमल महोत्या

कल्लावधी	वेत्ववेकी	
बेविक तपालगी मुले को बते पटक साहिती लेतान	जिवागु, जसे E.Coll, Collorn	
आसर	हाजरूम, स्टींगरा, रॉस्ट्रो, सिसीड्री इं	
ध्वधुनी त्रधववीचना	জীৱৰ দুৰ্দি (জীৱিৰল চাম্মীলভীয়েয়ে) বা যাম্য কয়. মাহ দাহী মহালগৰ মালী ৰাজ্য, মাৰ্গী চৰুজুৰ, নাহ ৰুহুৰ ম্যা:	

फिल्ड टेस्ट किट द्वारे जैविक तपासणी करण्याची पध्वती-

WATER QUALITY MONITORING & SURVEILLANCE - Issues & Challenges System Integration - Coordination

- No. of scheme sources on IMIS/WQMIS are not matching *Rationalisation of Sources needed*
- Field locations are not matching on IMIS/WQMIS
- DDWS has two systems(IMIS, WQMIS), Two mobile apps(Har Ghar Jal & WQMIS) State have parallel MIS
 & mobile app
- DDWS has shifted from IMIS to WQMIS
- Many States also have established system for sample collection & WQ testing data (MRSAC)before the WQMIS. (Maharashtra, West Bengal, Haryana)
- Testing results online entry & WQMIS portal data updating issue (Maharashtra, Andhra Pradesh)
- □ Seamless data transmission issues- *Sharing of API Proposed*.
- WQMIS issues -Login ID get deactivated if not used for 1 month and again have to activated, WQMIS do not reflect sanitation surveys reports, village/ district wise data not available for monitoring -only sample ID wise .

Inadequate Capacities

- Less manpower due to vacancies- Outsourcing challenged in courts, Private partcipation explored.
- □ Higher Sample load for testing- Rationalisation of number of Sources
- □ Faster Procurement of consumables- Testing Equipments in JJM started

Capacity building of district, block & GP level personal.

- □ GP level dedicated staff in shortage proposal to enable SHG for WQMS also
- Inadequate Renumeration to staff at village level performance benchmark and funding options needed
- □ Recording of FTK testing data evaluation.

WATER QUALITY MONITORING & SURVEILLANCE











Jal Jeevan Mission Tamil Nadu

National Conference on Water Quality – Issues, Challenges and Solutions

 Theme – I : Bacteriological contamination & Disinfection issues and Solutions

 O
 After Noon Session

30th December, 2022

1. Contamination at Source

Reasons

- Sewage stagnation/seepage near source
- Agricultural run off
- Cattle waste near source
- Deforestation / change in land use pattern
- Excessive ground water drawal

Before



Solutions

- Bore pits to be constructed for power pump sources to avoid water stagnation and contamination.
- Provision of sanitary sealing arrangements around the source.
- Legal framework for protecting the sources like Catchment areas, rivers.
- Flow meter arrangement to check excessive drawal


2. Contamination at Transmission

Issues

- Leaks and bursts in Multi Village Schemes
 Clear water main
- Leaks in distribution main
- Seepage of contaminated water into the pipeline joints
- Mixing of sewage during development works

Before



Solutions

- Water supply should be stopped immediately;
- Scouring the existing water in pipeline;
- Cleaning of sumps
- Super chlorination (8 gm per 1000 litre of bleaching powder)
- Retesting of bacteriological samples after chlorination to ensure potable supply.
- Regular monitoring of water quality through SHGs.

After





3. Contamination at delivery points

Issues

- ✤ Utilising water from pit taps
- Seepage of used water into ground at drawl points
- Bathing and Cleaning activities at the water drawl points

Before





Solutions

- Construction of cement platform at water drawl points to avoid seepage and stagnation of water.
- Ensuring 0.2PPM /0.2mg per litre of residual chlorine at delivery points.
- Sanitary survey to be conducted on the usage of water.
- Illegal connections to be removed.

After





4. Impact of Climate Change on water quality

Issues

- Flash floods, cloud bursts, cyclones damage water supply infrastructure and thereby water contamination.
- Increased water temperatures will cause excess algae growth, which will reduce drinking water quality.

Before



Solutions

- All the storage tanks will be filled before the natural calamity and water supply will be effected through tanker lorries, etc.,
- Genset to be arranged
- Immediate restoration of water supply infrastructure with proper disinfection
- Alternate source of water supply.

After



Capacity building and Long Term Remedial Measures

- Awareness generation among the Stakeholders / Community at large and women and children in particular to be focused.
- Community based water quality surveillance programme. (Training of SHGs
 & Water quality testing by SHGs periodically.)
- Grey water management to avoid stagnation of water.

Capacity building and Long Term Remedial Measures

Target Group	Source (BW, OW, HP, Mini PP)	Distribution (OHT, PF, HSC)	House Hold
PHED Officials	Protection, Maintenance and Water Audit (MVS)	Protection Maintenance and Water Audit (MVS)	
Local Body Officials	Protection and Maintenance (SVS)	Protection, Maintenance and Water Audit (SVS)	Creation of awareness on Health Hygiene Practices and water related diseases
VWSC		Maintenance and Water Audit	Creation of awareness on Health Hygiene Practices and water related diseases
Women Self Help Groups			Creation of awareness on Health Hygiene Practices, water related diseases & FTK testing
Primary Health Centre			Creation of awareness on Health Hygiene Practices and water related diseases
School Teachers			Creation of awareness on Health Hygiene Practices and water related disease



Thank You

Group 2 Presentation

Chemical Contamination issues and Solutions

Coordinated by INREM December 30, Kolkata



Top 3 Challenges

O&M Finance



55 lpcd difficult in some WQ affected areas



Emerging contaminants

Reason	Challenge	Solution
Inline treatment technologies are difficult at the scale of Water supply	55 lpcd becomes difficult in some contamination affected areas	 Household water treatment agreed with Punjab Tamil Nadu eg. supplying alternate days with different WO

Reason	Challenge	Solution
Process to choose beyond recommended	Procuring new patented innovations is	Mapping of new innovations
technologies is unclear	tough under current rules	SoP to test and scale new innovations

Reason	Challenge	Solution
Water consumption is also from Private sources > 5 times of public sources	People might be drinking contaminated water even after Functionality	IEC to shift community towards main water source

Reason	Challenge	Solution
Persistence of emerging	Emerging	Expanding
contaminants and even	contaminants	testing on
amplification eg	might be	sample basis to
Malaoxon (PoP) with	causing health	emerging
Chlorination in WB, Mn in	problems	contaminants
Assam and U in Punjab		

Reason	Challenge	Solution
O&M costs are too high for community or	Sustainability of infrastructure with O&M costs	WQ Kosh such as Punjab,
Panchayat support	is difficult	With JJM contribution for O&M + GP and Community





Top 3 Solutions



O&M Support from JJM



Dual water supply



SoP for new Solutions

Highest Priority for 2023







Group Work - 3 WQ Monitoring & Surveillance

WATER QUALITY MONITORING & SURVEILLANCE

Issues and Solutions

National Conference on Water Quality – Issues & Challenges

Participating states - Jharkhand, Assam, Kerala, UP, Telangana, Bihar, Orissa, Madhya Pradesh, Andhra Pradesh, WB, Sikkim, Lakshadweep & Maharashtra

Synchronisation of Data Trouble Shooting on WQMIS

- District wise data not available to Monitoring authorities
- Synchronisation between JJMIS & WQMIS
- Number of Sources rationalisation reqd.
- A comprehensive Workshop Online for users for WQMIS/ JJMIS
- Quick Trouble Shooting facility
- Hindi facility on these apps for field users

Lab Reach / Network

- Use of Engineering / Technical Colleges -use their facilities
- Use of Mobile Labs models need to be explored by States
- Create QR Codes for each Source for quicker data entry
- Use of FTK be rationalised for HH only? , focus on awareness through FTK

NABL Recognition

 Assessor variation is a problem for various parameters - an advisory from the accreditation body will be usefull

Incentives/ Honararium

• Wide Range - from free to a max of 100 per test. States to finalise the range - focus on data updation also.

SOP on Remedial Action

• Almost all states lack a well articulated SOP for testing to remedial action with clear responsibility/ timeframes- *States to design requisite framework*

Involvment of Communities WQMS

- Jal Surakshaks/ Jal Bandhu by GP are present in various forms
- SHG involvment to be explored by States -Kudumbashree