



ORIGINAL RESEARCH PAPER

Engineering

MANAGEMENT OF RURAL WATER SUPPLY CHALLENGES IN INDIA UNDER JAL JEEVAN MISSION

KEY WORDS: Functional house tap connection, village water supply committee, water quality management, grey water management, capacity building.

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ABSTRACT

In India, about 900 million people live in rural areas. Providing clean drinking water to such large population is the responsibility of Central and State Governments. For the purpose, many programs were already implemented. To address the problems of rural water supply, a new program named 'Jal Jeevan Mission' was started by Central and State Governments in August 2019. There has been good progress in the mission and people are benefitted. But, more works need to be done. In the research paper, the author high lights real issues in rural water supply situation in India and suggests measures that can be emphasized in ongoing and upcoming programs of Government.

INTRODUCTION AND CONTEXT

In India, much works need to be done to provide clean drinking water supply to population living in rural areas, which is about 900 million and 65% of total population of the country. Keeping that in view, Central Government and state Governments of different states are planning and implementing different programs for providing drinking water supply to rural population. In August 2019, Central Government in collaboration with the state Governments started a new drinking water supply program named 'Jal Jeevan Mission (JJM)' to serve rural areas of the country. The program was meticulously planned to address the issues in rural water supply sector in the country and has given much benefits to rural population. But, more works need to be done to address the problems. Based on work experience in different areas of India, the author of the research paper, has highlighted real issues faced by rural population in India and suggested measures that can be emphasized in ongoing and future programs of Government.

Problems In Rural Water Supply Sector In India Before Jal Jeevan Mission

In India, challenges faced in rural water supply sector and hardships faced by rural population in obtaining domestic water supply are mentioned below:

- i) There is no Government owned and managed piped water supply coverage in many villages. People living in such villages collect water supply from Government installed public stand posts or tube wells with hand pumps, common open wells, village water tanks, irrigation canals, rivers, streams and nallahs, etc. In many villages, water quality of such sources is not good. Due to this, people in these villages are affected by water borne diseases. Quality of life of people in such villages is not good.
- ii) Government water supply in public stand posts or water tanks in villages is available for limited duration. In spite of such facilities, quality of life of people is affected, as they face inconveniences in collecting water from public stand posts or tanks. In many villages, distance of households from public stand posts is more.
- iii) Inadequate quality of water in public stand posts and even in piped water supply schemes. Adequate water quality is not always maintained in public water supply schemes due to poor operation and maintenance. As a result, public water supply is not free from harmful chemical and bacteriological contamination. In some areas, quality of supplied water from ground water source is not good due to presence of harmful chemicals.
- iv) Unreliable public piped water supply to households or to public stand posts. Disruption in such water supply service is common. The reasons of disruptions include unavailability of water at source during lean period, physical damage in any component of water supply systems due to poor quality of construction material or wear and tear, non availability of electricity or fuel to run

pumps, shortage of manpower for operation and maintenance and spare parts of equipment, delayed repair of equipment and physical components, overall shortage of fund to run water supply schemes, etc.

- v) Less Involvement of community in planning and operation and maintenance of water supply schemes. There is low sense of ownership of water supply system assets among community. Also, sensitivity of community on safe water use and hygiene practice is low in many areas.
- vi) Absence of effective system for redressal of public grievances on non availability of adequate drinking water supply. There is no established or set mechanism to solve complaints of villagers on drinking water supply issues. Villagers are dependent on the help of local Government officials and politicians. There is no compulsion of concerned Government or public offices to solve the problems faced by villagers.

Brief Of Jal Jeevan Mission In India

The vision of Jal Jeevan Mission is to provide drinking water supply to every rural household in adequate quantity of prescribed quality on regular and long term basis at affordable service delivery charges leading to improvement in living standards of rural communities.

The broad objectives of the mission are:

- i.) To provide functional house tap connection (FHTC) to every rural household of India.
- ii.) To prioritize provision of FHTCs in quality affected areas, villages in drought prone and desert areas, Sansad Adarsh Gram Yojana (SAGY) villages, etc.
- iii.) To provide functional tap connection to Schools, Anganwadi centres, GP buildings, Health centres, wellness centres and community buildings.
- iv) To monitor functionality of tap connections.
- v) To promote and ensure voluntary ownership among local community by way of contribution in cash, kind or labour.
- vi.) To assist in ensuring sustainability of water supply system, i.e. water source, water supply infrastructure and funds for regular O & M.
- vii.) To empower and develop human resource in the sector to meet demands of workers for construction, plumbing, electrical works, water quality management, water treatment, O & M, etc.
- viii.) To bring awareness on various aspects and significance of safe drinking water and involvement of stakeholders.

The following work components are being implemented under JJM:

- i) Development of village piped water supply infrastructure to provide tap water connection to every rural household. This includes retrofitting of completed and ongoing schemes to provide FHTCs at minimum service level of 55 lpcd.
- ii) Development of reliable drinking water sources or

augmentation of existing sources to provide long-term sustainability of water supply system.

- iii) Wherever needed, construction of works for bulk water transfer, treatment plants and distribution network to cater to every rural household.
- iv) Technological interventions for removal of contaminants, where water quality is an issue.
- v) Grey water management due to increase in water consumption and waste water discharge from households.
- vii.) Support activities such as IEC, HRD, training, development of water quality laboratories, water quality testing & surveillance, R&D, capacity building of communities, etc.

Summary progress of works in Jal Jeevan Mission as on Feb. 2022 is as below:

- i) Increase in coverage of house connections in rural households from 17% in August 2019 to 47% in February 2022. Increase in tap water connection of 3.23 Crores in August 2019 to 9.06 Crores in Feb. 2022.
- ii) 100% coverage of rural households by tap water connections in the states of Goa, Andaman and Nicobar Islands, Telangana, Dadra Nagar Haveli and Daman Diu, Puducherry and Haryana.
- iii) Substantial increase in coverage of water connections in priority areas and quality affected habitations.
- iv) Substantial increase in coverage of tap connections in schools and Anganwadi centers.

Strategy Adopted In Jal Jeevan Mission

The strategy adopted under JJM includes performing the following major activities:

- i.) Updating and firming of baseline data of household tap connections by all states and union territories.
- ii) Provide FHTC in every household. To Achieve this, rural water supply infrastructure created over the years are dovetailed, retrofitted and renovated.
- iii) In villages with sufficient groundwater availability of prescribed quality within the village boundary, the same local water source will be used.
- iv) In tribal, hilly and forested areas, option of spring, gravity and solar power-based water supply schemes with low O&M expenditure is to be explored and preferred.
- v) In hot and cold deserts, innovative approaches and possibility of technology intervention will be explored.
- vi) In villages with sufficient groundwater availability, but with quality issues, in situ suitable treatment technology may be explored.
- vii) In villages falling in drought-prone areas, conjunctive use of multiple sources of water can be explored such as ponds, lakes, rivers, groundwater, supply from long distance, rainwater harvesting and artificial recharge.
- viii) In villages with water quality issues and non availability of suitable surface water sources in nearby areas, transfer of bulk water from long distance may be more appropriate. Further, in drought prone and desert areas, where it is not possible to have water supply through conjunctive use, similar approach to transfer bulk water from long distance may be adopted.
- ix) In water quality affected habitations, especially with Arsenic and Fluoride contaminants, potable water has to be ensured on priority. In such areas, as a purely interim measure, Community Water Purification Plants (CWPPs) may be taken up to provide 8 to 10 liter per capita per day (lpcd) potable water to meet drinking and cooking need of every household.
- x) In States with water-scarcity and areas lying in rain shadow region with inadequate rainfall, it is necessary to plan for regional water supply schemes covering both urban and rural areas by sourcing water from a perennial surface source.
- xi) Even though JJM envisages to provide FHTCs to every household, in areas having harsh climatic conditions, such

as high altitude cold deserts, areas facing extreme terrain challenges, sparsely populated hot deserts, etc., it might not be feasible to provide FHTC to every rural household. In such areas, innovative solution to the problem needs to be explored to provide up to 8 to 10 lpcd potable water for drinking and cooking purposes. There can be other arrangements for supplying water for rest of domestic water needs.

- xii) In peri-urban areas and big villages in water scarce areas, in order to save the precious fresh water, it is encouraged to plan new water supply scheme with dual piped water supply system. In such system, one pipe network will be for supply of fresh water, while the other pipe network will be for supply of suitably treated grey or waste water.
- xiii) Innovative technology is to be explored to ensure equitable distribution of water.
- xiv) For recharging of ground water, dedicated bore well recharge structures, rain water harvesting measures, rejuvenation of existing water bodies, etc. need to be taken up in convergence with other Government schemes such as MGNREGS, IWMP, Finance Commission grants, State schemes, MPLAD, MLALAD, CSR, etc.
- xv) In order to enhance recharge of aquifers, especially in arid and semi-arid areas, State Government need to strengthen and extend existing canal networks and build canals so as to transfer surplus flood waters from dams and reservoirs to ponds and lakes and other water bodies. Also, works can be taken up to recharge groundwater during monsoon season. For such activities, funds from other Government schemes are to be dovetailed.
- xvi) Village Action Plan (VAP) for every village is prepared based on the type of scheme to be taken up in the village to provide FHTC to every rural household. The VAPs of all villages in a district are aggregated to formulate the District Action Plan (DAP) and State Action Plan (SAP). Further, States have prepared Annual Action Plans detailing yearly targets commensurate with the annual allocations.
- xvii) VAP will be the main document of the village for all water supply and related works, which will have to be approved by Gram Sabha.
- xviii) State Action Plan (SAP) and District Action Plan (DAP) will also include other activities taken up under different schemes and programs to achieve long term water security.
- xix) Water quality monitoring will be undertaken by department through laboratory tests and water quality surveillance will be undertaken by community through Field Test Kits (FTKs) and sanitary inspections.
- xx) Grey water will be treated before it is utilized for agriculture and non-potable uses. The treated grey water can be a reasonable source of revenue for Gram Panchayats and its sub-committee, such as Village Water Supply Committee, User Group, etc. Such revenue can be utilized towards meeting part of O&M expenditure of water supply schemes.

Specific Actions Emphasized Under Jal Jeevan Mission And Other Government Programs

In JJM, a massive effort has been made to improve status of rural water supply in India. In such effort, the following specific actions are suggested to be emphasized under ongoing JJM and other Government programs:

- I) In India, there are still many habitations in India, where good quality drinking water is not available. People living in such habitations are using either unsafe water available water within the village or need to travel long distances to collect safe water. There needs to be an established mechanism to address drinking water supply issues in such villages. The mechanism needs to be developed in such a manner that Gram panchayats or line departments are officially bound to take immediate actions. The mechanism needs to empower villagers to raise their water supply issues to Gram panchayats and line

departments. To take up immediate remedial measures, necessary fund are to be made available under ongoing programs of Government. If necessary, appropriate legislations can be formulated and passed in state legislative assemblies.

- ii) Under ongoing JJM, effort has been made to provide house connections to people by retrofitting of existing water supply schemes. Many of such retrofitted schemes are likely to face maintenance issues and major repair requirements. Therefore, large fund will be necessary. Such fund cannot be collected from villagers. Hence, continuous Government funding will be necessary for large repair works. This will necessitate Government to extend duration of ongoing JJM or take up new programs.
- iii) Community participation in regular operation and maintenance of water supply schemes is much desirable and feasible. But, community members or village water supply committee cannot do major and complicated repair works. Hence, role of Gram panchayats and line departments in performing major repair works are important. There needs to be a sound mechanism for major repair of water supply schemes.
- iv) Campaign in villages on benefits on use of clean drinking water and hygiene practice needs to be continuous. It needs to be mandatory to allocate fund by Gram Panchayats and line departments to engage non Governmental and similar organizations to conduct such campaign program. Also, in all water supply programs of Government, such activities are to be included. Government should encourage non Government organizations, who are willing to campaign on safe drinking water, hygiene and sanitation practices.
- v) For water quality management, community needs to be involved. Training on basics of water quality and water quality measurement by using kits needs to be given to members of village water supply committees, Anganwadi workers, teachers and students of higher classes and educated persons within the community. Such training can be given by line departments of Government and non Governmental organizations.
- (Vi) For development and adoption of innovative technologies for specific water treatment in water quality affected areas and improvement of performance of water supply schemes, provision of fund for collaborations with reputed industries, educational and research institutes, scientists and academicians, must be kept in ongoing and upcoming programs of Government.

Disclaimer:

The findings and conclusions presented in the paper are personal opinion of the author.