

CHAPTER 1

INTRODUCTION

1.1 SECTOR ORGANIZATION

Water supply and sanitation is treated as a State subject as per the federal Constitution of India and, therefore, the States are vested with the constitutional right on the planning, implementation and cost recovery of water supply and sanitation projects. At the local level, the responsibility is entrusted by legislation to the local bodies like Municipal Corporation, Municipality, Municipal Council, Notified Area Committee/Authority for towns or on a State/Regional basis to specialized agencies. The economic and social programme of the country is formulated through five-year plans.

The Public Health Engineering Department (PHED) is the principal agency at the State level for planning and implementation of water supply and sanitation programmes. In a number of States, statutory Water Supply & Sanitation Boards (WSSBs) have taken over the functions of the PHEDs. The basic objectives for creation of WSSBs have been to bring in the concept of commercialization in the water supply and sanitation sector management and more accountability. Such Boards have been set up in Assam, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Punjab, Uttar Pradesh and Tamil Nadu. The metropolitan cities of Bangalore, Hyderabad and Chennai have separate statutory Boards. The water supply and sanitation services in the cities of Mumbai, Kolkata, Delhi, Ahmedabad, Pune and few other towns are under the Municipal Corporations.

The Ministry of Urban Development & Poverty Alleviation, Government of India formulates policy guidelines in respect of Urban Water Supply & Sanitation Sector and provides technical assistance to the States & Urban Local Bodies (ULBs) wherever needed. The expenditure on water supply and sanitation is met out of block loans and grants disbursed as Plan assistance to the States, and out of loans from financial institutions like Life Insurance Corporation (LIC) and Housing and Urban Development Corporation (HUDCO). The Central Government acts as an intermediary in mobilizing external assistance in the water supply and sanitation sector and routes the assistance via the State plans. It also provides direct grant assistance to some extent for water supply and sanitation programmes in urban areas.

A modest beginning has been made to provide central assistance for provision of safe drinking water supply facilities in towns having population less than 20,000 (as per 1991 census) in the country. Accordingly, a Centrally Sponsored Accelerated Urban Water Supply Programme (AUWSP) has been launched in the country during 1993-94. Under this programme, 50% of the cost is provided by Government of India as grant, 45% by the respective Provincial Government as grant and the balance 5% is mobilized through beneficiary contribution.

The role of the Statutory Bodies (SBs) is by and large confined in some States to mostly construction activities only, while in States like Kerala, Karnataka & Maharashtra the State level body looks after operation, maintenance and cost recovery also. After commissioning of schemes, the SBs usually hand over the projects to the ULBs for Operation & Maintenance, or perform this function also on their behalf. Thus, the pattern varies across different States.

The responsibility of operation, maintenance and revenue collection is generally vested with the elected urban local body. However, in some cases, the specialized agencies such as the State Public Health Engineering Departments, Water Boards etc. are in charge of these functions and formulate the water tariff and implement the same with the approval of the Governments. For instance, in Rajasthan right from planning up to O&M of Water Supply & Sewerage Schemes is being carried out by the State PHED. The local bodies generally receive some grant assistance for capital works on water supply and sanitation from the State Government.

The State Water Supply & Sewerage Boards do not have much autonomy in setting tariffs and generating revenues for O&M. Since the State Governments have the power to issue directives to the Boards, it is apparent that tariff revisions still require prior consent of the respective State Government and in essence rests with the State Governments.

1.2 OPERATION & MAINTENANCE SCENARIO

It has been observed that lack of attention to the important aspect of Operation & Maintenance (O&M) of water supply schemes in several towns often leads to deterioration of the useful life of the systems necessitating premature replacement of many system components. As such, even after creating such assets by investing millions of rupees, they are unable to provide the services effectively to the community for which they have been constructed, as they remain defunct or under utilized most of the time.

Some of the key issues contributing to the poor Operation & Maintenance have been identified as follows:

- i) Lack of finance, inadequate data on Operation & Maintenance
- ii) Inappropriate system design; and inadequate workmanship
- iii) Multiplicity of agencies, overlapping responsibilities
- iv) Inadequate training of personnel
- v) Lesser attraction of maintenance jobs in career planning
- vi) Lack of performance evaluation and regular monitoring
- vii) Inadequate emphasis on preventive maintenance
- viii) Lack of operation manuals
- ix) Lack of appreciation of the importance of facilities by the community
- x) Lack of real time field information etc.

Therefore, there is a need for clear-cut sector policies and legal framework and a clear demarcation of responsibilities and mandates within the water supply sub-sector.

From the Indian experience, it has been observed that in the case of pumping schemes, by and large, about 20 to 40% of the total annual Operation & Maintenance cost goes towards

the personnel (Operation & Maintenance Staff), 30 to 50% of the cost is incurred on power charges and the balance is utilized for consumables, repairs and replacement of parts and machinery and miscellaneous charges. In most of the cities in India, the tariffs are so low that they do not even cover the annual Operation & Maintenance cost.

Measures such as control of Unaccounted for Water (UFW) and metering of the water connections, as detailed below may help reduce the wastage of water and increase the revenue to the local body to the maximum extent.

1.2.1 UNACCOUNTED FOR WATER (UFW)

Several pilot studies conducted in the country have shown water losses in the distribution systems to be of the order of 20 to 50% of the total flow in the systems. It has been noticed that maximum leakage (more than 80%) occurs in the distribution system and house service connections. In addition, losses do occur at the source, transmission system, treatment plant and service reservoirs, which may add up to another 10 to 20% of the total output. In India, where water supply is, by and large, intermittent (supply hours ranging from 3 to 10 hours), the external pollution may get sucked into the system through points of leak, during non-supply hours when the system is not under pressure, causing health hazards. Therefore, a systematic approach towards wastage, leakage and preventive maintenance should form an integral part of Operation & Maintenance on a regular basis to save considerable quantity of water, prevent possible contamination, improve pressures in the distribution system and increase revenues to make the systems self-sufficient. If such measures are taken up by the water supply agencies in the country, there may not be any immediate need to take up augmentation schemes. Another important aspect is non-availability of indigenous good quality and precise electronic leak detection equipment for usage in the leak detection exercise.

1.2.2 METERING OF WATER SUPPLY SYSTEMS

There are no two opinions that metering of water supply is desirable to minimize wastage and to maintain economic pricing of water. Though most of the major towns have been provided with domestic and bulk water meters, over the years it has been observed that 20 to 50% of the installed meters remain defunct due to their poor quality. Sometimes tampering of the meters by the owners has also been noticed. Moreover, the infrastructure and repair facilities for water meters are not adequate in most of the Urban Local Bodies and Water Supply Boards, which delay their repairs and early reinstallation. In the absence of working meters, billing for water consumed is often estimated, either on average basis or on flat rate, as the case may be. Though a few companies have been manufacturing water meters for domestic use, it is necessary to get domestic and bulk water meters of the desired quality and precision manufactured within the country through technology transfer from developed countries for Indian market. As per the prevailing practice, the consumers own the domestic meters. As such, they have direct access to the meters. However, it is perhaps worthwhile to explore the possibility of owning such meters by the respective water supply agencies and local bodies themselves to ensure that the consumers do not have direct access to the meters so as to avoid possible tampering of the meters.

1.3 NEED FOR MODIFICATION IN POLICY FRAMEWORK FOR EFFECTIVE OPERATION AND MAINTENANCE

In the light of the 74th Amendment to the Constitution, the role and responsibilities of Urban Local Bodies have increased significantly to provide the basic facilities of water supply and sanitation to the community on a sustainable basis. The said amendment has enabled the Urban Local Bodies to become financially and technically sound to provide these basic civic amenities to the community. Though certain degree of cross-subsidy is inevitable in respect of the economically weaker sections of the society, it is very necessary to run the water supply systems on commercial principles due to the fact that water is an economic good and as such it should no longer be considered as a free commodity. Therefore, imposition of realistic tariffs for various beneficiaries and its effective realization is the key to the success of water supply sector performance including that of operation and maintenance. Of late, it has also been observed that even the poor are willing to contribute some percentage of the user charges for such facilities, provided reliable service is ensured by the water supply authorities and Urban Local Bodies.

Apart from providing minimum required quantity of drinking water to the people, the operation and maintenance authorities should always bear in mind that its quality is maintained at all times to safeguard the health of the community. City level consumer forums may be set up to keep a vigil on the water sources to prevent possible contamination and make periodical reporting to the operation and maintenance agencies for appropriate action well in advance. At the same time, awareness programmes on water conservation, wastage prevention, water quality, personal hygiene etc. may have to be designed and implemented with the help of NGOs, Residential Welfare Associations and neighborhood committees.

Consumer satisfaction should be the topmost priority of the operation and maintenance agencies. Complaint/suggestion cells may be set up by the operation and maintenance agencies to enable the consumers to lodge complaints on aspects such as leakage and wastage of water, low pressure at consumer's end, contamination/poor quality of water, pilferage of system components, malfunctioning of water meters, problems related to meter reading, payment of bills, etc. and suggestions, if any, for better performance of the system. At the same time, all such complaints received by the operation and maintenance agencies should be attended to within a reasonable time frame, so as to win the confidence of the consumers.

1.3.1 PUBLIC PRIVATE PARTICIPATION

Though privatization of water supply and sanitation sector could not make significant progress as of now, there is substantial potential available in the country for privatization and hence there is an urgent need for the same. Perhaps, it could be introduced in phases, either on Build, Operate and Own (BOO) or Build, Operate, Own and Transfer (BOOT) basis. Primarily, it is possible in two ways i.e. privatization of the existing water supply systems and secondly, privatization of systems in newly developed townships, housing colonies, business and commercial complexes, etc. There are some inherent problems due to which privatization could not be introduced in the existing water supply systems. For

instance, many local bodies and water supply departments, which are responsible at the local level for the operation and maintenance of such systems, are unable to recover even the operation and maintenance cost from the beneficiaries. By and large, the tariff rates being charged from the consumers are very low and there is a general reluctance for enhancing the same. Under the circumstances, without aiming at full cost recovery, privatization cannot be a successful proposition.

1.4 NECESSITY FOR AN O&M MANUAL

The Manual on Operation and Maintenance is a long felt need of the sector. At present, there is no Technical Manual on this subject to benefit the field personnel and to help the O&M authorities to prepare their own specific manuals suitable to their organizations. The Chief Engineer's Conferences held in previous occasions including that held at Chandigarh, in November 1998 had also emphasized the need and requested the Ministry of Urban Development & Poverty Alleviation to take initiative to prepare the said Manual. Realizing the need, the Ministry has decided to prepare the said Manual and make it available to the field agencies.

1.5 OBJECTIVES OF OPERATION AND MAINTENANCE

The objective of an efficient operation and maintenance of a Water Supply System is to provide safe and clean drinking water in adequate quantity and desired quality, at adequate pressure at convenient location and time and as economically as possible on a sustainable basis.

In engineering parlance, operation refers to timely and daily operation of the components of a Water Supply system such as headworks, treatment plant, machinery and equipment, conveying mains, service reservoirs and distribution system etc. effectively by various technical personnel, which is a routine function. The term maintenance is defined as the art of keeping the structures, plants, machinery and equipment and other facilities in an optimum working order. Maintenance includes preventive maintenance or corrective maintenance, mechanical adjustments, repairs, corrective action and planned maintenance. However, replacements, correction of defects etc. are considered as actions excluded from preventive maintenance.

The O&M Manual is required to encompass various issues pertaining to an effective O&M such as technical, managerial, administrative, HRD, financial & social aspects etc.

1.5.1 OBJECTIVE OF THE MANUAL

The Manual on Operation and Maintenance is intended to serve as a guide to strengthening the technical, operational and managerial capabilities required of the concerned personal to operate and maintain water supply services as per acceptable norms of quantity quality, sustainability, reliability and cost.

1.5.2 WHO WILL USE THE MANUAL

This manual is intended primarily for the managers and technicians in-charge of the operation and maintenance of the urban drinking water supply systems.

1.5.3 HOW TO USE THE MANUAL AND LIMITATIONS OF THE MANUAL

The procedures mentioned in the manual are intended to be guidelines for ensuring effective O&M of the water supply systems. This manual is not exhaustive but will serve as a reference volume for the agencies incharge of the water supply systems to develop their O&M programmes to suit their specific problems depending on the size of the system, type of agency and location of the water supply system. This manual should be used as a supplement and not to replace existing manuals which describe procedures and techniques for O&M. Any agency desirous of formulating O&M programmes should do so only on the basis of an exhaustive assessment of their existing water supply systems.
