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From Local Government provision to Private Sector participation: Reforming water supply in Mumbai

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Abstract

Urban infrastructure is poised for some major changes in the country with the current trends of rising levels of urbanisation. However, both Urban Local Bodies and Water Utilities are not fully prepared to meet with the challenge due to their dependence on old governance structures based on public management. What is required in the changing context is governance reform with change in their outlook and orientation, which requires a change in their structure, approach and functioning for giving better service performance. Mumbai is one such large Indian city experiencing this situation due to its tilt towards public ownership and management of water supply. This paper gives an overview of water supply system functioning in Mumbai city and the outcomes first; it then suggests that an improvement in water supply service is possible in the city through reforming the service through institutional restructuring, better functioning and private sector participation. It also discusses successful examples that could be replicated in the city and also the learnings from the failures of such attempts.

Key word: Urban water, water supply system, institutional changes, organizational reform, PPPs

INTRODUCTION

Indian cities are not fully geared-up for reforming the delivery of core services like water supply and sanitation, whereas it is a prerequisite for their growth and overall quality of living. Most of the cities still follow the old guiding principle of limited gradual supply expansion, use inadequate and irrational tariffs, persist with ill-adequate organizations and systems and are yet to formulate their agenda in implementable terms. There is a general paucity of water sector studies. This paper argues the need for reform through gradual moving away from provisioning by local government towards private sector participation in service delivery in Mumbai.

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Mumbai is a large metropolitan urban agglomeration with the water supply provided mainly by the Municipal Corporation of Greater Mumbai (MCGM). Mumbai city is of the size 432 sq km area and 12 million population within the jurisdiction of MCGM. The city draws water from water impoundments 100 km away through water pipeline system under gravity. It is a perception among people and decision makers that there is adequate water supply so no need to worry.

Water Supply

Mumbai city primarily draws water from the nearby reservoir impoundments created in the catchments to the north of its location. Currently, the water harnessed amounts to 2,969 MCM/year. With an additional amount of 292 MCM/year earmarked for utilization, the sum total of water harnessed would go up to 3,261 MCM/year (MCGM 1994).

The water harnessed is brought down to the leveling reservoirs in the city through a conveyance pipeline and distributed through a network of major and minor pipelines that run across the city. The MCGM has an installed capacity of water supply of 3,193 million Litres per day (hereafter termed as MLD) from these reservoirs. Of this, 100 MLD is delivered to the Thane Municipal Corporation, leaving a balance of 3,093 MLD for Mumbai.

The water quality is currently monitored by the MCGM, only at the sources,. At the receiving end, water quality is monitored by the ward offices of the MCGM and reported in terms of proportion of the samples with contamination (MCGM 2002). The current water quality at sources broadly meets with the criteria of water supply standards in terms of physical parameters, but do not conform to the same in bacteriological parameters.

Water Demand

Water demand in Mumbai primarily consists primarily of domestic and industrial components. Although industrial use accounts for good amount of water, its growth has been slow due to the fact that most of the water intensive heavy manufacturing industries have moved outside the city, paving way for low water consuming light manufacturing and service industries. However, as the population of Mumbai city continues to grow, so does its water demand.

Future Requirements

To meet the future water requirements of the city, the MCGM has apparently made provisions through planned water projects. These projects involve construction of water intake structures at rivers and natural lakes, and impoundment of reservoirs in the upstream catchment areas of the BHA. While the Bhatsa project is soon to be completed, the work on Middle Vaitarana and others did not even commence for the want of environmental clearance.

Organisational Arrangements

The MCGM has a separate water supply division that takes care of a wide range of its operations – service delivery, maintenance, water works, meter reading, billing and procuring municipal appurtenances. Its Hydraulic Engineering Division is responsible for the construction, operation and maintenance of reservoirs, intake structures, treatment plant as well as all hydraulic instruments, including large pipelines. It also lays down regulations on the use of material for water storage and distribution systems to water supply to the meters that can be used for water consumption measurement.

Water Pricing

Water pricing is an important component of urban water supply; particularly, in relation to its costs and objectives. Whereas the cost of water supply provision (of old assets and conveyance) is roughly around Rs 4 per thousand litres, the price charged for water supply ranges from Rs 2.25 per thousand litres in residential slums (or chawls), to Rs 3.50 per thousand litres in high rise buildings, while commercial/industrial units are charged in a range of Rs 10.50 to Rs 38 per 1000 litres, depending upon the consumption level (MCGM 2002). The water tariff structure of metered connections is essentially a uniform rate structure that distinguishes the users by the purpose for which it is used and, to some extent, their socio-economic status. In the case of un-metered connection, water tariffs are levied at 65% of the annual ratable value of the property under commercial/ industrial use (MCGM 2002)

REVIEW OF CURRENT WATER SUPPLY SYTEM IN MUMBAI

The water supply system does not cover some of the aspects that deserve attention when it comes to service delivery:

(a) Water Adequacy: There is a shortfall of about 900 MLD between the water supply and demand in Mumbai, which continue to grow in the absence of step up in water supply. The fact that there are a good number of private water suppliers (such as mobile tankers) and that there is a large market for bottled water, the deficits in water supply are existent. The municipal authorities have become complacent in water resource development planning. Avoiding leakage and pilferage in slum areas are major technical challenges.

(b) Water supply service: Water supply is not regular and continuous (i.e., 24x7) in Mumbai. It is intermittent with an average supply of two hours a day in the city and three and a half hours in the suburbs. Water supply coverage is also erratic over space, time and sectors; and some sectors are privileged in getting it better than others. The common coping strategy to deal with it is the storage of water, especially in slums and large residential complexes.

(c) Alternate Service Providers: Water markets are emerging in the peripheral areas of Mumbai. Informal small scale water service providers are emerging that provide water supply service to the locations without municipal water connection by drawing water from municipal pipeline, primarily for drinking purposes. Also, bottled water supply is very much in vogue in various parts of the city, particularly in the business areas, due to the demand for good reliable water and willingness to pay for it.

(d) Water losses: Leakage losses from water distribution system amount to a high of 25% and above, despite the attempts to reduce it. Incidentally, the causes of water leakage include pilferage and losses from pipelines (which are about 50-100 years old). Some of the western countries' cities, in contrast, in spite of having a per capita water supply less than that of Mumbai, have attained the service levels of continuous water supply made available to their citizens.

(e) Organisation of water supply entity: The entire range of water supply and sewerage functions are entrusted to a single entity – the MCGM. This typical local government organization has inefficiencies in service delivery like any large public sector monopolist. The staffing is high against the service provided, and duty specification has not been achieved, which promoted low level of accountability of staff. Unlike professionally run organizations, both back-office (internal) and front-office (external) operations are neither well structured nor automated. This poses serious coordination issues.

(f) Pricing and Tariff structure: The current tariff structure of uniform price does not identify the necessity and luxury characteristics of consumption. Moreover, domestic water tariffs are pegged to property rental, which not only is an inefficient method but also exposes it to the loopholes in property valuation due to Rent Control Act, and others that are already affecting property tax adversely. Given that these distortions are difficult to correct, water tariffs based on property rental will also meet with the same difficulties. Tariff needs to be restructured to target reducing consumption beyond a threshold level in domestic sector, preferably based on Increasing Block Tariffs (IBT), and attempts should be made to minimize cross-subsidy between industrial and domestic sector.

(g) Financial Management: Good financial management involves making use of cost-recovery principles and following the systems that provide clear idea of organisation's assets and liabilities. Water tariffs are not designed to meet full costs of water and its supply. They have been sufficient enough to fund about 40% of capital works expenditure and managed enough to meet with operation and maintenance charges. Ideally, urban water pricing should recover: (a) costs of water as a resource (development and treatment costs) (b) costs of providing access (conveyance and distribution costs) (c) opportunity costs of making the option available (Bagchi 2003).

REFORMING MUMBAI's WATER SUPPLY SYSTEM: TRANSITION FROM GOVERNMENT TO PRIVATE SECTOR INVOLVEMENT

The above analysis presented clearly outlines the need for reforming water supply system in Mumbai and come out of the lower level equilibrium traps that are inherent in the current model. Reforms on institutional and governance fronts are required to graduate towards efficient and responsive water supply service, so that efficiency gains can be captured in service delivery. Reforms can be carried out through some major changes to the way water supply system is run, in a graduated manner, which are discussed hereunder:

(a) Strengthening the current institution(s) (Corporatisation),

(b) Structural improvements to existing institutional arrangements (Expanding Institutions)

(c) Experimenting with new institutional structures (Private sector participation).

A. Corporatising water supply function: Move towards professional service delivery

The first and important step towards improving the current water supply system is to move towards professionalising water supply service through corporatisation of the municipal water supply entity i.e., MCGM/its water supply department. Corporatisation of water supply entity involves the following features incorporated into water supply management:

(a) autonomous decision making,

(b) appropriate organizational structure,

(c) sound policies, accounts and management practices,

(a) autonomous decision-making:

Creating an autonomous water supply entity is expected to lead to professional running of the entity in a corporation style with good planning, decision making and controlling of finances and operations.

Finances are an important matter of concern, as the municipal body is dependent upon State and Central government grants and the general pool of revenues. Capital projects are undertaken by the municipal body through capital grants and/or loans of multilateral agencies. Due to the municipal structure, the entity is not able to use innovative methods of finance to undertake projects. As an autonomous entity, it can resort to alternative financing options like borrowing from market (through either floatation of bonds or raising low cost private debt) for financing both capital and O&M projects. Hyderabad and Chennai Metro Water Boards have demonstrated the potential

for achieving this by mobilizing a part of the capital costs through floatation of tax free bonds. Here, when the financing decisions are taken by the board of the autonomous entity, it would lead to not only access to finance but also make them accountable by ensuring that the project finances are sound in terms of design and returns credit-worthy. Likewise, external borrowing from development finance institutions, multilateral agencies and even banks can be resorted with considerable negotiation power. Financial discipline is necessary when complacency has prevailed over service delivery.

Water tariff structure and its periodic revision decide the amount of cost recovery and returns over investment and, thereby, determine the financial performance of water supply service. The current tariff structure is insensitive to demand characteristics of people and places, and there is little incentive for service coverage to low-income groups or any explicitly targeted sections. Although current tariff structure based on uniform volume rate is simple for operation, gradually one has to may move away towards blocked tariffs, given their potential for promoting water conservation and also for providing service to the poor through variants of design. Two part tariffs with a lifeline block targeting unaffordable low income sections of population and high price block for high income groups is considered as appropriate system for developing country cities.

(b) appropriate systems and staffing for service delivery

Water supply is an obligatory municipal function and the MCGM provides it with the technical expertise built over time. While the core technical functions of water supply i.e., bulk water procurement, treatment, conveyance, storage and distribution, can be the concentration of activity, it needs to be filled with appropriate staffing and systems for service delivery. An important aspect of service provision is also streamlining the staff at various levels and broad basing the tasks to which they can be individually assigned. This means less number of dedicated and accountable staff for each task and even more tasks (but there can be more shifts). These organizational restructuring and redeployment options can be exercised in the case of autonomous water supply entities run in a professional manner by their board of managers.

An important element of effective service delivery is the use of systems for information gathering and processing and the levels of automation. The data collection, logging and recording methods deployed are quite outdated and are not easily understood or cannot be easily logged in by any third party. Data logs from customer water meters, observations of water devices, water supply system information are not fed to a centralized information unit; information is at disarray and retrieval of file takes good amount of time and involves manual labour. A corporate entity would automate data generation, collection, processing and analysis functions of water supply service, so that the data base is kept at a central place and is available for retrieval, queries and search.

Further, poor interface with the public in the case of grievance handing comes out as an obvious reference, but the staff members also lack several professional skills and orientation for providing such service. Information retrieval is difficult in manual systems and the interface with customer can not be well maintained. While integrating the systems and staff, the staff shall be properly trained and some of them could be usefully employed in data analysis and processing functions, rather than occupying data collection alone. It will also provide scope for upward mobility of the employees within the organization. This will improve customer interface and service delivery, help dealing with grievances and enhance the image of the corporation.

(c) sound policies and management practices

There is a lot of scope for improving the municipal budgeting and accounting practices in municipal bodies, including water supply sector. Ideally, this should start from changes in data entry formats to system design i.e., developing a good MIS, to a shift in the nature of accounting system from cash based to accrual based accounting. Such systemic changes will lead to better knowledge of assets and costs (fixed/sunk and variable/recurring), control over assets and increase the accountability of employees against spending on water supply operations.

Water resource accounting involves preparing physical and financial accounts, in order to take decisions and set targets. Resource accounting systems elicit information on water availability, use and wastewater accounts as well as defensive expenditures on capital and operations can be obtained and economic valuation from time to time can be performed, which will aid the water resource development and management policy (Nallathiga, Rao and Rambabu 2005). They enable the agency make rational and well-informed decision making and guides policy making in terms of allocation priorities and tariffs (Ramakrishna 2005).

B. Establishing Institutions: Strengthening the operational framework

Good urban water management requires good institutional arrangements in place. This necessitates some transformations in current institutions as well as creation of new institutions, within the larger framework, so that the management objectives can be met.

Unbundling of institutions

Unbundling service delivery (design, operation and maintenance of water supply system) and policy & regulation functions of the water supply system and creation of two separate institutions is a first step of reform in Mumbai. An institution like Maharashtra Water Resource (Regulation) Authority (MRWA), which is the only kind of institution created in India, shall take care of policy making (e.g, tariffs) and regulation of water supply service e.g., quantity, reliability and grievances.

New institutional structure

The institutional reforms shall include the formation of

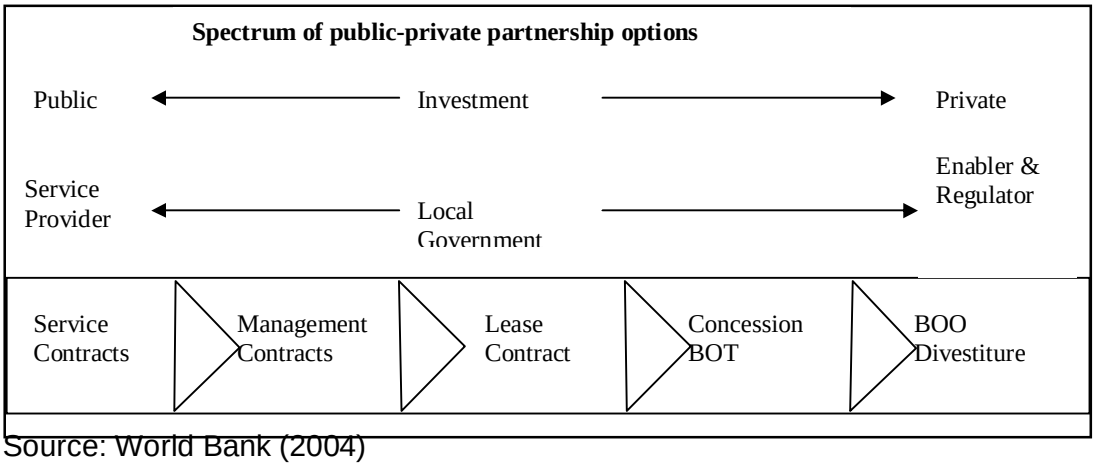
(i) an autonomous City Water Supply Entity (CWSE) for water supply service delivery – a corporatised body discussed earlier, and

(ii) an autonomous financial entity on the lines of the IDF (Initiative Development Fund) suggested by the GoM (2001), for taking care of the funding of large projects and system improvements, including capacity building exercises, which is akin to Project Development Fund mechanism suggested by The World Bank (1999) (see Box 1 for more details).

In such re-organisation, the regulatory body (including the Municipal Corporation itself, if CWSE is independent concessionaire) shall specify the appropriate service standards to be achieved, covering the aspects related to service coverage, reliability, continuity and norms for redressal of consumer grievances.

C. Private Sector Participation in Water Supply Service: Moving towards competitive management

Private sector can play a greater role in the water supply service delivery and its performance depends on the role/responsibility assigned to it. The range of participation varies from minimal role as in service contract to a complete responsibility in the case of divestiture. Between these two, there is a spectrum of partnership options for involving private sector, as shown in the diagram.



Source: World Bank (2004)

PSP Options in Water Supply Service

It is argued that public sector has to play some role in the provision of essential good like water, as it has to ensure that natural monopolies associated with a public good/service like water supply are not mis-used by private entity and to engage private sector benignly in driving down the costs and increasing the coverage. Also, this has to be accompanied by quality of service, for which independent regulator is required to levy service standard and price. This essentially calls for realigning the balance of public and private sector roles in public service delivery improvement that should lead to better distribution benefits of a public good like water. An example mention-worthy is the huge amount of water losses in current water supply network, which is somewhat neglected. Correcting this through operational improvements to network would itself lead to savings on investment on capital. The following table shows which of the private sector participation (PSP) model is appropriate for the given characteristics of the water supply sector and the examples of these models existing in various countries is shown in **Annexure I**.

PSP Option	Asset Ownership	Operation & Maintenance	Capital Investment	Commercial Risk	Duration
Management Contract	Public	Private	Public	Public	3-5 years
Lease Contract	Public	Private	Public	Shared	8-15 years
Concession/ BOT	Public	Private	Private	Private	25-30 years
BOOT/BOO	Public/ Private	Private	Private	Private	20-30 years

Source: World Bank (2004)

Outsourcing of non-essential services

Outsourcing is the simplest form of private sector participation even in the corporatisation model, so that the water supply entity can concentrate on the delivery of core technical services it is supposed to deliver. The water supply entity can identify the areas in which it has a strong expertise and those that are strategically important and several peripheral activities, such as organizational services, billing and metering, and service provision components, such as pipe laying, data and information systems support, can be outsourced to private sector players through efficient use of Service Contracts, Management Contracts, Joint Implementation Contracts and similar instruments. This provides scope for system improvements and concentration on core services. It also lends an opportunity to these agencies to innovate incentive structures and new practices that will lead to better service delivery. The advantages of long-term contracting and its variants are discussed in Johnson, McCormally and Moore (2002).

Annexure I : Examples of Private sector participation models already operational

Contract type	*Scope of responsibilities*	*Basis for remuneration*	*Tenure*	*Examples*
Management/ Service contract	Limited operational responsibility. Service contracts are for specific tasks, such as bill collection and civil works. Management contracts cover a larger set of operational responsibilities. Funding for new investments remains the responsibility of the public sector	*Fixed fee* Fixed fee or fee plus performance related payments based on a number of pre-set benchmarks	Usually 3-5 years	Johannesburg Amman Gaza Monagas (Venezuela) Gambia Mali Namibia Sao Tome Principe
Affermage contract	Greater responsibility is given to the operator, including all management (technical and commercial) or existing operations Funding for new investment remains the responsibility of the public sector. Limited risk is assumed by the operator, who is exposed to unexpected challenges in demand and the possibility that a shortfall between revenues collected and the affermage fee will not be paid by the government	*Per unit share* The operator collects the revenues and remits the difference between revenues and the calculated affermage fee (which is based on volume of water produced and sold to the contracting authority). The affermage fee may be modified to include performance bonuses related to efficiency.	Usually 8-15 years	Cote d'Ivore Senegal Gdansk Niger
Lease contract	Greater responsibility given to the operator, including all management (technical and commercial) of existing	*Residual claimant* The operator is able to retain all revenue	Usually 8-15 years	Guinea Mozambique

	operations Funding of new investments is retained by the public sector Risk assumed by the operator is greater than under an affermage; it includes not just unexpected changes in demand, but also changes in the composition of the customer base where a progressive tariff structure is in place.	collected, minus a lease fee (fixed in advance, normally to cover the financing costs of the infrastructure) paid by the operator to the contracting authority. Performance bonuses may be paid related to efficiency		
Concession contract	Complete responsibility for management and investment transferred to the private operator. Responsibility for fending of new investment rests with the operator	*Residual claimant* The operator retains the revenue it collects, minus a concession fee (fixed in advance, normally to cover debt from earlier investments in infrastructure) paid by the operator to the contracting authority.	Usually 25-30 years	Manila Buenos Aires Gabon Casablanca Macao Cameroon Cape Verde Bulgaria Chile

Source: Rosenthal and Alexander (2003)

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