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WATER, SANITATION AND HYGIENE: CHALLENGES OF THE MILLENNIUM

Organisational performance of Indian WATSAN

Dr. S. K. Velayudhan, India

THE WATER AND Sanitation (WATSAN) sector in India is going through a lot of changes. The effort by WEDC and DFID and also the opening up of the economy have provided the impetus for the changes in Water and Sanitation sector in India. In some large cities WATSAN is managed by autonomous bodies created for the purpose. In other locations 'Municipal Corporations' or other local bodies are responsible for 'Water and Sanitation' along with a number of other public services like schools, health, roads etc. The creation of autonomous organisations is to improve service quality and efficiency but such efforts are restricted to large cities. This study therefore examines the performance variations by size of organisations to understand the implications for managerial action.

Methodology

This is an exploratory study and therefore case study approach is used, instead of survey or experimental approach. Five organisations are studied using indepth interviews and through use of published sources of information.

The organisations studied include:

- Chennai Water Supply & Sewerage Board
- Hyderabad Metropolitan Water Supply & Sewerage Board
- Bangalore Water Supply & Sewerage Board
- Mysore City Corporation
- Hill Water Supply & Sewerage Works, Rural & Urban Development Department, Government of Uttar Pradesh

The aspects examined include the size of operations, their effectiveness of service, operational efficiency and their financial performance. Within each of these, a number of factors are studied.

The aspects examined under "size of operation" include: Water Produced (Quality and Quantity), Water Delivered (Population and connections).

Aspects covered under "Effectiveness of Service" include: Service Coverage (Water & Sewage), Service timing, Domestic Per capita Water consumption, Sewage Treatment.

Aspects covered under "Operational efficiency" are: Unaccounted Water, Population covered per employee, connections per employee.

Aspects covered under 'financial performance' include; tariff, percentage, staff costs, days receivable, debt service ratio, profitability and operating ratio.

Data and analysis

The analysis of data show variations on the factors across organizations. The variations are presented here.

Size of Operations

Water Produced : It varies from 75 million litres per day (mld) to 655 mld. The large cities produce on an average 590 mld. while the small towns produce 106 mld. The water produced in the large cities is 5.5 times of that for small towns.

Water Delivery : Under this are examined 'target population', 'population density' and 'connections'.

- The target population varies from 400,000 to 5.2 million. The large cities have an average population of 4.9 million and for small towns 700,000. The large cities have a target population seven times that of the small towns.
- Population Density : It varies from 10,800 persons / sq.km to 25,000 persons / sq.km. The large cities average a density of 20,270 persons / sq.km while for small towns it comes to 11,685 persons / sq.km. The large cities are 1.7 times more dense than small towns.
- Connections : The number of connections vary from 49,000 to 450,000. The connections for the large cities average 330,000 while for the small towns it is 70,000 i.e., large cities have 4.71 times the number of connections as the small towns.

Effectiveness of Service

Service coverage for water supply : This ranges from 90 percent to 100 percent, with an average of 97 percent. The large cities have coverage of 92 percent while for small towns it is 100 percent i.e., large cities are slightly less (.92) effective than small towns.

Service timings : This varies from slightly less than 2 hours (1 hour 45 minutes) to 5 hours per day. The average service timing is 3.4 hours a day. The large cities have average service timings of 2.42 hours, while it is 4.75 hours for small towns. The service timings for large cities are about half (.51) that of small towns.

Water Consumption (Domestic, per capita) : This ranges from 80 litres percapita per day (lpcd) to 136 lpcd, with the average as 99.2 lpcd. The large cities have an average per capita consumption of 88 lpcd while for smaller towns it is 116 lpcd. The per capita consumption in large cities is about ³/₄ (.76) of that of small towns. **Sanitation coverage** : The sanitation coverage varies from 25 percent to 96 percent with the average at 66 percent. Coverage in large cities is 82 percent while for small towns it is 43 percent. The sanitation coverage is approximately twice (1.94) in large cities than for small towns.

Sanitation treatment : The sanitation treatment varies from just sewage farming to 85 percent treatment. In large cities the treatment level is higher with 100 percent primary treatment in one case to 85 and 60 percent treatment for the others. In the case of small towns, the treatment is 25 percent in one case and the other has sewage farming. The large cities have better sewage treatment facilities than small towns.

Operational efficiency

Unaccounted for water : The unaccounted for water show only a small variation from 27 percent to 30 percent, with the average at 29 percent. Unaccounted for water for large cities is close to 30 percent, with the average at 29 percent. Unaccounted for water for large cities is close to 30 percent and for small cities about slightly less than 29 percent, showing not much difference between them.

Population served per employee : This varies from 750 to 1,733 with the average as 1,160. The large cities have 1,105 population served by an employee while it is higher for small towns at 1,243. The productivity per employee in terms of population served is for large cities 89 percent of that of small towns.

Connections per employee : The connections per employee varies from 47 to 136 with the average at 93. The large cities have 70 connections per employee while for the small towns it is 127 connections per employee. The productivity in terms of connections served per employee indicate that large cities have only 55 percent productivity compared to small towns.

Financial performance

Financial Sustainability : Aspects examined include 'average domestic tariff' and 'average commercial / industrial tariff'.

- Average Domestic Tariff : the average domestic tariff varies from Rupees(Rs.)1.50 / Kilo-litre (K.L.) to Rs. 3.5 / K.L., with the average at Rs. 2.70 / K.L. The large cities have an average tariff of Rs.2.8 / K.L. while for small towns it is Rs.2.46 / K.L., indicating higher tariffs for large cities.
- Average commercial / Industrial tariff : The average industrial tariff varies from Rs.5.00 / K.L. to Rs.50 / K.L., with the average at Rs.25 / K.L. The average industrial tariff for large cities is Rs.45 / K.L. while for small towns it is Rs.5.15/K.L., indicating that for large cities it is substantially (8.77 times) higher than for small towns.

Proportion of expenditure on staff : It varies from 14 percent to 48 percent, with 27 percent as the average. The staff expenditure for large cities average 21 percent while it is 48 percent in the one case available for small town. This indicates that in large cities the expenditure on staff is much less than half of that for small towns (44%).

Inference

The size of organisations and service level vary considerably with large organisations producing more than five times water than small ones, serving population about seven times with density 1.7 times and having about five times more connections.

Effectiveness of Service

The service coverage is uniformly high at 97 percent. The issue is of sufficient supply. The small towns are able to supply water twice that of the large cities. Availability of water resource in large quantities could be a critical constraint for the large cities. This observation is supported by the data on per capita availability of water. The per capita availability of water in large cities is $3/4^{\text{th}}$ that of what is available in smaller towns.

Sanitation coverage and treatment is lower compared to water supply coverage. In the case of sanitation the influence of size on effectiveness is a reversal of the observations on water supply service. The small towns have very low coverage and treatment compared to large cities, with the coverage being half of the large cities. The possible reasons for these are two :

- The problem of sanitation is less acute in small towns because of lesser population and density
- The cost of collection, treatment and disposal is a high cost operation requiring substantial investment which the smaller towns can ill-afford, given their multiple priorities.

Operational Efficiency

The unaccounted for water does not vary much but what does vary is the productivity level. The productivity levels are higher in small organisations than for large organisations. The possible reasons for these include :

- Smaller organisations being less complex to manage show greater efficiency
- The advantages available to large organisations, in terms of better technology and economies of scale are not being realised by the large organistions.

The uniformity in unaccounted water is a very interesting observation. While this figure could be correct it is also possible that, difficulty in measurement of loss could be an influence. It is generally agreed upon that the unaccounted water works out to about 30 percent.

Financial Performance

The tariff for domestic consumers is not very different for large and smaller locations though slightly higher for the larger cities. The difference is mostly in the case of commercial / industrial tariff. It is substantially higher in the case of large cities. The most probable explanation is that the opportunity to charge exists in large cities than for small towns.

The proportion of expenditure on staff indicates that it is much less for large cities than for small towns. Given the higher productivity for small organisations, this suggests high level of expenditure on materials and overheads other than staff for large organistions. The most probable reason again is that the small organisations being less complex and easier to manage are more efficient.

Implications

- The study has initiated an effort to provide performance indicators for organisations in WATSAN sector in India. In the absence of any other basis these can be used as a set of benchmarks for these organisations.
- The variations in performance levels of WATSAN organisations in large cities and small towns suggest the need for using different benchmarks according to the size of the organisation.
- The study brings out the high levels of efficiency in small organisations in the WATSAN sector. The implication is that organisations in WATSAN sector have scope to improve the quality of service. This suggests the need for managerial efficiency, possibly through commercial orientation. This would affect the type of management structure, systems, technology, pricing etc.
- The service level variations indicate that one of the critical problem for large cities is water resource. This would then suggest measures to tap new sources eco-

nomically and conserve existing sources. The need for new technology and new approach would be critical than incremental approach to such problems. Utilisation of economies of scale / volume, introduction of superior leak detection mechanisms, rain harvesting are some of the ways. The organisations have to look for options and creative solutions.

- Higher sanitation service levels for large cities compared to smaller towns indicate the priorities. This may or may not always apply but is an indicator to organisations in small towns that, high-cost sanitation-service may not be always necessary and careful thought has to be given before schemes are considered. The options relevant for large cities may not be suitable for small towns.
- The different tariff levels for domestic and industrial consumers and variation according to opportunity to charge suggest the need to closely examine the price sensitivity of consumers. Such an exercise will help :
- Identify consumer groups requiring different service levels and willingness to pay. This will help increase revenue.
- This will avoid overcharging or of low charges. Low charges will affect viability while overcharging can result in loss of consumers. For example, if industrial consumers in industrial estates are charged very high prices, then it is likely that they may search for alternative sources of water supply.
- The results suggest a comparative study of management systems, structure and policies according to size of organisations and organisation type.

DR. SANAL KUMAR VELAYUDHAN