

BENCHMARKING IN EMERGING ECONOMIES: The Performance Assessment System (PAS) Project in India

M Mehta*, D Mehta**, A Immanuel***

*Professor Emeritus, School of Planning, CEPT University, Ahmedabad, India

**Professor Emeritus, School of Planning, CEPT University, Ahmedabad, India

***Research Associate, School of Planning, CEPT University, Ahmedabad, India

ABSTRACT

Benchmarking of water and sanitation services in emerging countries pose serious challenges. This is because the conventional approach used in more developed countries does not work when water supply is intermittent, often unmetered and a large number of consumers who are poor depend on shared connections. For sanitation, cities often do not have sewerage infrastructure and population also lacks access to basic sanitary facilities for capture and storage.

These issues are being addressed under the PAS (Performance Assessment System) Project, at the CEPT University in India. The Project has three main components: Performance Measurement, Performance Monitoring and Performance Improvement. It envisages setting up a system that will be adopted over time by the local and state governments. It is already aligned with the performance benchmarking system being envisaged by the Government of India for services related to four sub-sectors: urban water supply, waste water and sanitation, solid waste management and storm water drainage. This has increased the possibilities of sustaining the performance assessment system being developed under the PAS Project¹.

Keywords: India, Pro-Poor indicators, state-wide benchmarking

¹ More information on PAS project is available at <http://www.pas.org.in/>

I. BACKGROUND AND CONTEXT

Great strides have been made in India in improving access to basic water and sanitation services during the last two decades. India has already achieved its target for the Millennium Development Goals for water supply, with 96 per cent population having access to basic water supply in urban areas in 2008. However, a few anomalies stand out. First, access to improved level of services (house level connections) has actually worsened from 52 per cent in 1990 to 48 per cent in 2008. For sanitation, access to safe basic sanitation continues to stagnate at 54 per cent in 2008 and another 21 per cent had access to only shared facilities. An estimated 18 per cent of urban population resorts to open defecation.² While the focus in India is on infrastructure investments, performance on service delivery measures like hours and reliability of supply and financial sustainability is very poor. Indian cities fare far worse than cities in South-East Asia and Africa.³ Transforming infrastructure creation to delivery of good quality services remains a key issue.

Service level assessment through key performance indicators has become a standard practice in the water sector in many countries. However, in India very little attention is paid to measurement of performance of water supply services. A few available studies of performance measurement clearly show that the Indian water service providers are relatively worse off than their counterparts in South-East Asia.

² Based on information reported in JMP (2010). Basic services are as defined by the WHO-UNICEF's Joint Monitoring Program for tracking the MDG targets.

³ Based on performance reported for 20 utilities in India (ADB and MOUD 2007) and 40 utilities in South East Asia (SEAWUN and ADB 2007).

Table 1: Comparative Performance of Utilities across Sub-regions in Asia

Performance Indicators	ADB Utility Data Book (2003)	SEWUN Utility Data Book (2005)	SSLB Data Book (2010)
	India - 20 utilities	South East Asia 40 utilities	India - 28 utilities
Service levels			
Water Coverage (%)	81.2	74.9	63.0
Water availability (hours)	4.3	22.9	4.6
Consumption/Capita (l/c/d)	123.3	106.5	130.0
Production/Population (m3/d/c)	0.24	0.22	Na
Efficiency and financial viability			
Non Revenue Water (%)	31.8	27.8	41.0
Connections Metered (%)	24.5	99.4	46.0
Revenue Collection Efficiency (%)	99.5	118.1	68.0
Accounts receivable (months)	4.9	0.9	Na
Operating Ratio	1.6	0.8	1.4
Staff/1,000 Connections (ratio)	7.4	7.2	Na
Tariffs, fees and capital expenditure			
Average Tariff (US \$)	0.12	0.31	na
New Connection Fee (US \$)	39.6	60.0	na
Capital Expenditure/Connection (US\$)	39.8	44.4	na

Sources: ADB (2004), SEAWUN and ADB (2007) and MOUID (2010).

- Despite comparable service coverage and production of water, Indian utilities perform worse on service levels as measured by hours of supply. Average duration of supply has not improved much (from 4.3 to 4.6 hours). However, the quantum of water supplied per capita is much higher than in South-East Asian utilities.
- Utilities in South Asia have lower metering levels which makes it difficult to have accurate assessment of water losses. Some pilot assessments and water audits done in India suggest very high

levels of losses at over 50 per cent.⁴ In general, there is less emphasis in these utilities on assessing and reducing physical leakages as well as non-revenue water (NRW).

- Average tariffs and connection fees in South Asian utilities are considerably lower and combined with inefficiencies noted above, this results in poor operating ratio. Most utilities do not recover their operating costs and thus lack financial viability. Interestingly, more recent studies show worsening in the average revenue collection performance, with utilities collecting only about 70 per cent of their bills.

These results clearly highlight the need and importance of introducing performance measurement in India on a wider scale. The Government of India (GoI) has embarked on a very ambitious program to fund urban infrastructure in leading urban centres in India. Under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), GoI envisages a total investment of about USD 20 billion during 2005-2012. Till date, nearly 60 per cent of the JNNURM commitment has been for water and sewerage projects. Funding assistance from the GoI is linked to commitment by the recipient state and local governments to a set of time-bound reforms that include improved performance and citizen interactions. Performance measurement, and linked monitoring and improvement will help assess the impact of these investments, and enhance their sustainability over time.

It is in this context that the CEPT University is implementing an action research project for the development of Performance Assessment Systems (PAS) for urban water and sanitation in all local governments in two states (Gujarat and Maharashtra) in India. In both these states, water and sanitation services are provided by municipal governments. The PAS Project aims to implement performance measurement in 400+ local governments with four annual rounds.

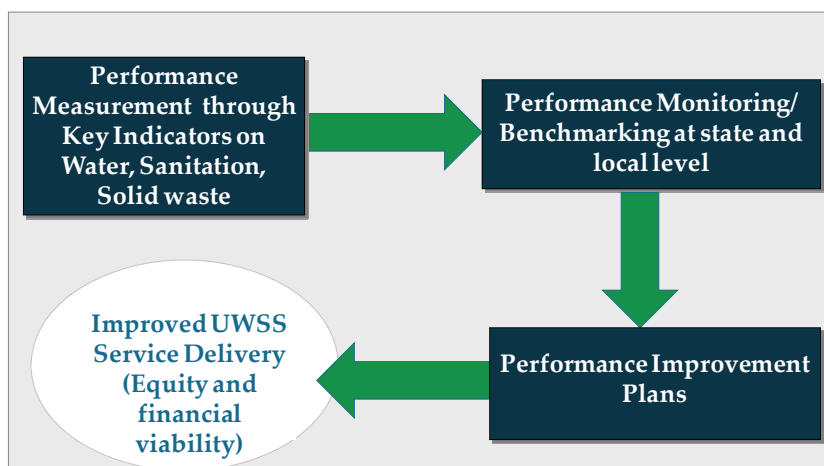
⁴ The PAS project's pilot results in a few cities in Gujarat and Maharashtra suggest that NRW ranges between 30 to 75 percent. Often, cities that had assumed NRW levels of 30-35 percent without any proper measurements found their NRW level to be about 45% after PAS studies. Measurement of water production and water consumption has remained key issues in Indian cities.

II. THE PAS PERFORMANCE ASSESSMENT FRAMEWORK

For the PAS Project, there are three key components of performance measurement, monitoring and improvement. It is felt that these three aspects are critical to ensure that these systems are used effectively at local and state levels. Such use will also ensure their sustainability.

Performance measurement is a key first component of the PAS Project. The Performance Measurement Framework (PMF) includes the overall approach, key indicators for performance measurement and reliability assessment to respond to data quality issues.

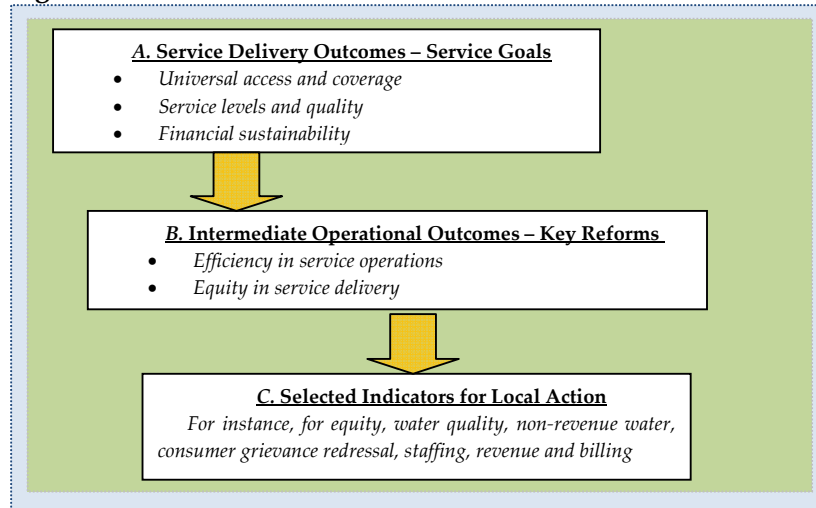
Figure 1: PAS Project: Framework for Performance Assessment



Approach and Key Indicators in Performance Measurement

Figure 2 outlines the approach to PMF for the PAS Project. The key performance indicators (KPIs) are distinguished for service delivery outcomes (or main goals of public services) and intermediate operational outcomes that reflect the plans and reforms needed to achieve the service delivery goals. This enables distinct identification of goals and reforms needed to achieve these goals.

Figure 2: PAS Performance Measurement Framework



Service goals: Goals are identified on the basis of a review of the Government of India (GoI) and state government objectives. Table 1 provides details of key service goals and related benchmarks for: (a) universal coverage; (b) levels and quality of services; and (c) financial sustainability.

Table 1: Service Goals: Key Performance Indicators and Benchmarks

Goals	Water supply	Sanitation/ wastewater	Solid waste management	Storm Water Drainage
Universal access and coverage	1. <u>Coverage:</u> % of households with individual connections to water supply network (100%)	1. <u>Coverage:</u> % of households with access to individual toilets (100%) 2. <u>Coverage:</u> % of households with individual connections to sewerage network (100%)	1. <u>Coverage:</u> % of households and establishments covered by municipal daily door-to-door SWM services (100%)	1. Coverage of storm water drainage network (100%)
Service levels and quality	2. <u>Per capita supply of water</u> (172 lpcd for metro cities, 155 lpcd for other cities with sewerage and 92 lpcd without sewerage)	3. <u>Collection efficiency:</u> % collection of waste water generated where sewerage/underground drainage exists (100%)	2. <u>Collection efficiency:</u> % collection of solid waste generated in the city (100%)	2. Incidence of water logging/flooding (0)

Goals	Water supply	Sanitation/ wastewater	Solid waste management	Storm Water Drainage
Service levels and quality	3. <u>Continuity of water supply</u> : (i) short term: daily supply at regular hours; (ii) 24*7 over time	4. <u>Sewage treatment</u> : % capacity to treat waste water collected through sewerage/open drains to required standards (100%)	3. <u>Segregation</u> : % of waste at disposal/treatment point segregated (100%)	
	4. <u>Quality of water supplied</u> : % of samples at meeting the required standards (100%)		4. <u>Recycling</u> : % of total solid waste recycled or processed (>80%)	
Financial viability	5. <u>Cost recovery</u> : % recovery of O&M costs for water supply through ULB level taxes and charges (100%)	5. <u>Cost recovery</u> : % recovery of O&M costs for waste water through ULB level taxes and charges (100%)	5. <u>Cost recovery</u> : % recovery of O&M costs for SWM through ULB level taxes and charges (100%)	

Note: Figures in brackets are the goals (benchmarks) under the GoI's SLB Initiative. Some benchmarks have been adjusted to reflect the Central Public Health and Environmental Engineering Organisation (CPHEEO) norms or the situation at the state level. For per capita supply, refer CPHEEO (1999) Table 2.1, p. 11.

The Performance Measurement Framework has identified a set of KPIs under these themes, which would help central and state level governments/agencies to monitor progress of cities.

Indicators to measure reforms: Intermediate outcomes reflect reforms needed to achieve the goals or service delivery outcomes. To identify the key reform measures, specific actions needed to achieve the service goals were identified. This is illustrated for water supply in Figure 2.2.

Many programmes by the Government of India and some state governments have linked programme funding to implementation of key reforms. For example, under the JNNURM, two key reforms focus on access for the poor and on ensuring financial sustainability in operations through full recovery of O&M costs through user fees. Similar measures are also envisaged under the programmes of the

two state governments: the Sujal Nirmal Maharashtra Abhiyan (SNMA) of the Government of Maharashtra and Swarnim Gujarat of the Government of Gujarat.

The review of other national and international benchmarking efforts also suggests several intermediate outcome indicators that need to be captured. A key gap in the current benchmarking efforts relates to measuring equity in service delivery. In low and medium income countries like India, with nearly one-fifth of urban population residing in slums, it is important that equity in service delivery is captured in performance assessment.

Based on these factors, key reforms have been identified and grouped in those related to: (a) efficiency in service operations; and (b) equity in service delivery. An effort has been made to identify reforms and related KPIs for which it is possible to specify benchmarks. It is likely that some of the indicators suggested for local action in the next section may move here after the first round of comparative assessments are completed across all the cities.

Figure 3: Illustrative Reforms to Achieve Golden Goals for Water Supply

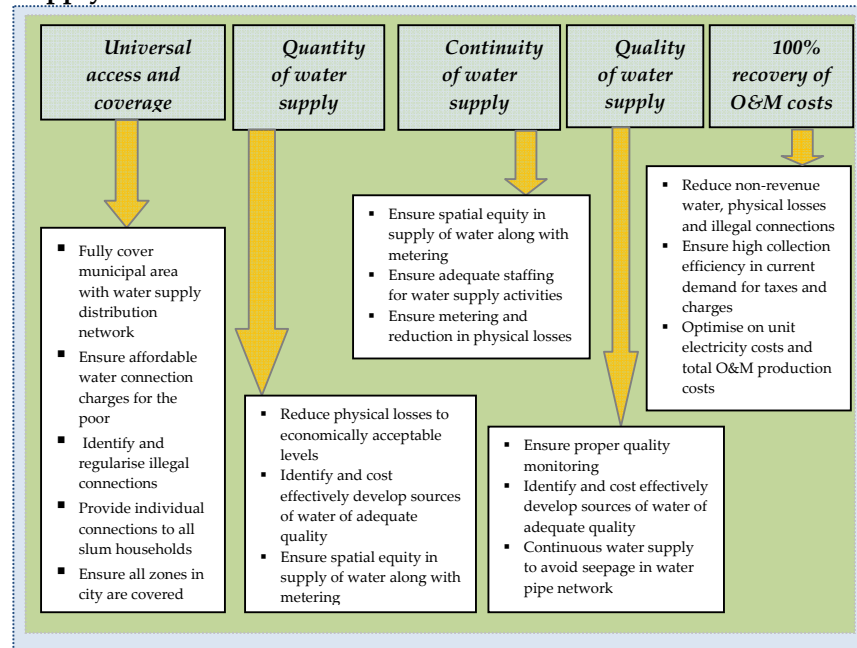


Table 2: Key Performance Indicators for Reforms

	Performance indicator	Benchmark
	Equity in service delivery	
1	% of slum households with: (a) individual water connections; (b) individual toilets and sewerage connections; and (c) door-to-door SWM collection	100%
	Efficiency in service operations	
2	% of non-revenue water to total water supply*	<25%*
3	% of wastewater samples treated to required standards *	100%*
4	% of wastewater reused for billed or unbilled uses*	>20%*
5	% of municipal solid waste disposed off through scientific landfill sites*	100%*
6	Efficiency in consumer grievance redressal as per service charter for all three sub-sectors*	100%*
7	% of total water supply connections with functional meters*	100%*
8	% collections to current billed demand for all three sub-sectors*	>90%*

Note: * Indicators with asterisks (*) and the associated benchmarks are covered under the Gol's SSLB Initiative; ** The coefficient of variation (CV) or 'relative variability' equals the standard deviation divided by the mean. It is expressed as a ratio.

Local action indicators: Additionally, PAS has developed 'local action' indicators which help the cities drill down on the KPIs to action areas needed for improved performance. For example, the KPI on 'coverage in slum areas' helps the local government look at equity issues, and local action indicators assess the extent of coverage of water/sewerage distribution network as well as slums that require provision of internal distribution network to increase the rate of individual connections for households in slum settlements. Local action indicators for reducing service expenditure include unit cost of production and unit cost of electricity for water production.

Given that the Project covers cities with population as small as 17,000 to some as large as 13 million, the PAS benchmarking framework has to ensure that the measurement framework is flexible and adaptable to big and small utilities. For example, smaller cities without the conventional systems should also be able to measure and monitor performance of waste water. For the PAS team, it has been a challenge to develop indicators for fecal sludge management practices in a non-sewered context. The project team intends to share its experience at the conference.

Performance Monitoring

The second component of PAS Project is performance monitoring. This deals with establishment of an online database of sector information that cities can access and use to monitor their performance in each of the sub-sectors. A web based portal has been developed which would give access to each of the 400+ cities, to review their information in comparison to other cities of similar characteristics in the state. This would also ensure ease in the city's functions in reporting performance to various state and central level agencies.

PAS intends to establish information system at the state level so that the information will be used not only for performance monitoring of all water utilities, but will also be used for tracking progress on various sector reforms. With the recommendations of the national Thirteenth Finance Commission on performance based grants, it is expected that PAS information will be used by the state government for allocating grants to water utilities. The monitoring system at the state level is also expected to help set targets and allocate budgets. For example, both the states of Maharashtra and Gujarat have declared to make their state "open defecation free". PAS team has developed simple simulation models to estimate extent of open defecation in each city and compute fund requirements based on various technology options.

Performance Improvement

The third component of PAS deals with performance improvement. Two critical areas of improvement, identified under PAS are: financial sustainability and increased access of water and sanitation to urban poor. PAS team is developing approaches that use the performance indicators and benchmarks to identify priority area and develop action plans. For example, a rapid water audit methodology is developed to help identify specific actions related to increasing revenues (identify illegal connections, improve billing and collection) and reducing costs (repair leaks; reduce energy costs by improving pump efficiencies etc.). For increasing access to urban poor, PAS is developing SLUM-PAS, a slum settlement level information system in a few cities. SLUM-PAS is a GIS based slum system where

information about access to services in each slum settlement is mapped and is used to develop specific projects for water supply and sanitation.

III. ADDRESSING THE EMERGING ISSUES IN PERFORMANCE ASSESSMENT

The PAS Project covers 419 cities in the two Indian states of Gujarat and Maharashtra. The first round of data collection for all cities has been completed and it is intended to do this for annually the next four years through the project. Over the five year project period, efforts will also be made to achieve gradual improvement in quality of data to increase reliability and accuracy of KPIs. Work has also been initiated in working with the state and local governments to use this information for performance improvement.

Based on the experience from the first round of data collection, a number of issues in appropriate indicators and their measurement have been identified. These emerge both due to the very different context of type of services and modes of service providers where urban local governments, rather than autonomous utilities provide water supply services. Some of the key issues are discussed below:

Coverage of water supply and sanitation services: While coverage is used as an indicator across most benchmarking exercises in both developed and developing countries, the focus is quite different in the two contexts. In the developed world, it is viewed more in terms of the commercial objective of size of the customer base. For example, the Australian National Performance Report provides details only on the total number of customers.⁵

On the other hand, in the developing world, the extent of coverage as a share of total population is an important indicator of the social objective of providing water and sanitation to all. Most performance benchmarking exercises such as that by the Asian Development Bank (ADB) and the World Bank's IB-Net have indicators related to percent of population covered. In fact, IB-Net also has a separate indicator for

⁵ Australian Water Commission and Water services Association of Australia (2007), "National performance Report, 2005-06 for Major water utilities", Water services Association of Australia

coverage through household connections versus public water points⁶. These do help to capture the nuances in coverage. In the PAS Project, access of services in the slum settlement is a separate indicator. The ground reality in slums in the cities surveyed under the PAS Project suggests the need to distinguish between a shared group connection and a public stand point. It is also essential to assess the number of persons or households actually dependent on the public or shared water point. In sanitation indicator measurements, such an approach is generally missing as the focus is only on sewerage. Generally, access to toilets is not considered separately– though the Millennium Development Goal (MDG) target is about access to safe sanitation. Thus benchmarking exercises in cities in developing countries need to also capture toilet access/coverage, especially for the poor, as a separate indicator.

Population served by the service provider: Our experience suggests a number of difficulties in actually capturing the data for water and sanitation coverage, particularly related to: a) assessing ‘nominal’ service population and households of the service provider, b) assessing population/households served per connection, a public water point or a public toilet facility, and c) for sanitation – difficulty in identifying properties with toilets, and distinguishing between a community toilet and a public toilet meant for floating population.

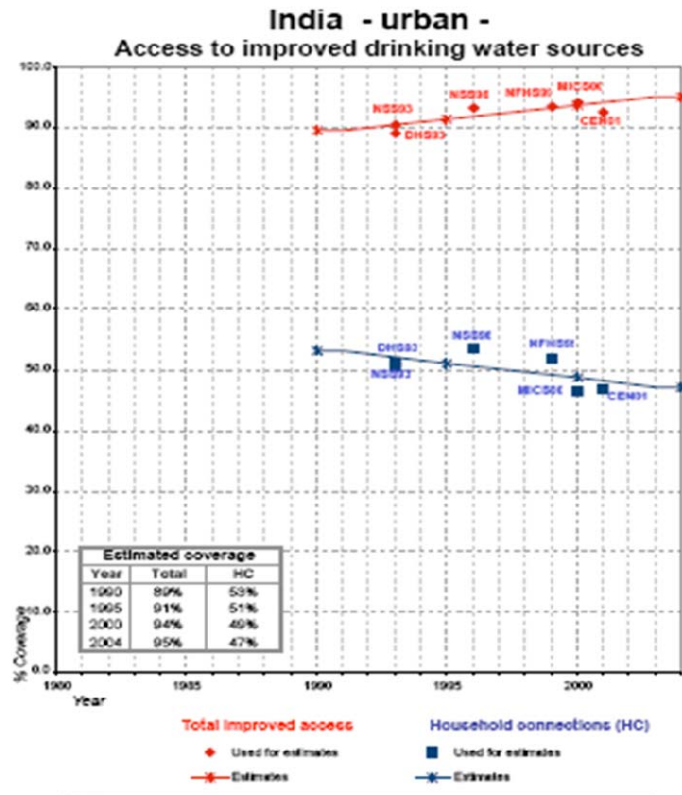
Opportunities for resolving these issues in India are mainly linked to the property tax data base (PTDB) which is the main source of revenue for all cities in the two states. There is a need to create a good baseline data on all households and their access to municipal supply through legal connections and on-site available sanitation services. This would require to be done through a carefully designed special household survey that will enable a link with the PTDB. As PTDB is computerised or most states have plans for this, the system can be easily set up efficiently and can be linked to both performance measurement as well as for billing. Also, as the property tax system is updated every four years, it will also make it possible to update the data.

⁶ Even IB-Net which does have a separate sub-indicator for public water point, does not report this on its website.

Service levels – quantity of water, service continuity and water quality: After coverage, possibly the most commonly used indicator in water supply is related to the quantity of water supplied, measured either as per capita or per connection. However, the question is the appropriateness of using only this indicator in many developing countries where water supply is non-pressurised, intermittent (often ranging from 20 minutes to two hours per day) and in some cases for less than 15 days in a month. What are the appropriate indicators? There is a need to measure days of supply, hours of supply, and intra-city variations in supply of water.

Secondly, and even more importantly, in a large number of cities there are no meters at the supply end, in the distribution system or at consumer end. This makes it difficult to measure quantity of water supplied. It also makes it difficult to assess the water balance and extent of NRW on a regular basis. Under the PAS Project, a cost-effective approach for preliminary water audit has been developed and tested in one medium sized city with a population of 150,000. It showed that compared to the urban local bodies' estimate of 33 per cent, measured NRW was actually 44 per cent. This approach is planned to be tested further in other cities and then scaled up through a market based approach. However, this will require a carrot-and-stick approach that both requires and incentivises the urban local bodies (ULBs) to take on such activities. The state government will have to play an important role as the current tariff levels are such that NRW related aspects are less important, and bottom-line for urban water supply and sanitation for ULBs is not as important as for water utilities. Thus, ULBs need to be sensitised to the costs of NRW, to get them to carry out such assessments.

Measuring equity in service delivery: The Joint Monitoring Programme of UNICEF/WHO suggests that in India while the estimated coverage of water services has improved, the house level connection ration has decreased. Such information is gathered from special surveys as utilities do not maintain such data. It is generally believed that it is the poor who lack services. However, in absence of information to substantiate this, it is difficult to validate this.



One of the important contributions that PAS Project aims to make is in the context of developing indicators that measure equity in service delivery. Across the benchmarking literature, we have not yet come across efforts at benchmarking services for the poor. The first challenge for us in the PAS Project was to identify who the poor are and where do they stay. In the first round, we have looked at the slum dwellers in the Indian cities as the poor. However, utilities do not always have information on services in the slums. PAS Project aims to remedy this situation by developing SLUM-PAS.

Context of non-sewered cities: The PAS team also faced challenges in defining appropriate indicators for safe sanitation. The indicators developed by Government of India and Asian Development Bank are based on utilities that have underground sewerage and treatment facilities. The situation on ground is quite different. Of the 414 cities surveys under PAS, only 85 cities have underground sewerage

network, and of these only about 40 cities have waste water treatment facility.

Thus, besides waste water management indicators, we would also need to develop indicators related to septage management. As of now, we are looking at the number of sewerage connections (the data for which is hard to come by as most utilities do not keep such data). Often they levy a percent surcharge on their water bill as waste water management charge. In non-sewered cities, PAS collects information on toilets connected to septic tanks and soak pits. In absence of city level data base, such information is also hard to come by.

Financial ratios: PAS team has also faced some difficulty in getting financial information from utilities. In India, most urban local governments follow 'cash-based' accounting system'. In Gujarat, the municipalities have shifted to 'accrual based accounting system. In cash based accounting, if the ULB has not paid its bills, it will not be reflected in the expenditure and hence there will be under-reporting. In the state of Maharashtra, very few ULBs have moved to accrual based system. In Gujarat, where all ULBs have moved to accrual basis, as a result of state government mandate, it is possible to get a more accurate reflection of the expenditure on water and sanitation services⁷.

Conclusion - Moving from Measurement to Improvement:

While there are many issues related to measurement of performance in an emerging economy context, the PAS experience suggests that it is important to begin with what is available and then improve the measurement over the years. One could spend years in perfecting measurement in a few pilot cities, but then it is difficult to replicate this for all the cities. Instead, it is important to start benchmarking exercise at a scale involving as many utilities as possible, by developing a system that uses the existing information with utilities. It is only with an exercise undertaken at a scale that benchmarking can make real impacts on policies and on service delivery.

⁷ A minor issue was about billing by the creditors of the utility. In many cases, the state run electric supply company did not send the bill in time and hence, it would not be included in the double-entry accounting system

The second important lesson is that benchmarking exercises should not be viewed as a data collection exercise. The cities need to understand how such information can help them improve performance. The PAS Project team is now devoting considerable time and effort in developing appropriate frameworks and modules to help cities use the benchmarking information and develop action plan. The project aims to work with about 40 cities on developing performance improvement plans. As suggested earlier, the PAS team is also developing frameworks for the state government to take up specific programmes, such as making cities “open defecation free”.

The key to a successful benchmarking is to ensure that it is “owned” by the utility and not ‘enforced’ by a regulator or state government. The ownership at local level will come only when it can be demonstrated that benchmarking leads to better service delivery and improved efficiency. It will then become a part of the routine administration at the state and local level and will become sustainable.

References:

Australia Water Commission (2007), “National Performance Report, 2005-06 for Major Water Utilities”, Water services Association of Australia.

ADB (2004), Asian Development Bank, “Benchmarking and Water Utilities Data Book”, Manila, The Philippines.

MoUD (Ministry of Urban Development) and ADB (Asian Development Bank). 2007. “2007 Benchmarking and Data Book on Water Utilities in India”.

JMP (2010) Joint Monitoring Programme for Water Supply and Sanitation “Progress on Drinking Water and Sanitation” New York: UNICEF, and Geneva: WHO.

SEAWUN and ADB (2007), South East Asian Water Utilities Network and Asian Development Bank, “Data Book of South East Asian Water Utilities, November 2007, Manila, the Philippines.

MoUD (Ministry of Urban Development). 2010, "Service Level Benchmarks: Data Book", Government of India, New Delhi.

CPHEEO (Central Public Health and Environmental Engineering Organisation). 1999, "Manual for Water Treatment: CPHEEO Guidelines". Ministry of Urban Development, Government of India.