Assessing the Efficiency of Water and Sanitation Agencies of Punjab, Pakistan: A Benchmarking Approach

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Abstract

The current era is about competition and to stay up to date with remarkable performance. Pakistan is a third world country and many of the services provided by Public organizations to the public lack in performance. WASA is one of the Public organizations, which operate in Punjab, and provide one of the basic necessities of the life to the public i.e. water and sanitation. The review of the previous literature before 2011 suggests that this conception of low productivity is also true about WASA. By analyzing that data, it is learned that after 2011 this organization is making progress. Four units are under consideration (Faisalabad, Multan, Rawalpindi, and Lahore). Data envelopment analysis was applied in order to measure the performance of the units. Analysis showed that 3 units are performing well and are efficient. These units are: (1) Faisalabad, (2) Multan, and (3) Lahore. Whereas, right now Rawalpindi is not performing well and an inefficient one. It is improving by time and showing progress in the collection system to make efficiency better.

Keywords: DEA, Public organizations, Efficiency measurement, WASA Punjab

Introduction

The water supply and sanitation programs of Pakistan are assisting government in smooth provisioning of required raw materials for the development of infrastructure of safe water and sanitation services. The role of WASA is very important as the level of their performance greatly effects the level of risk of spreading viral and bacterial diseases. Water and Sanitation management has strong impact on economic growth as all the sectors of the economy, whether, industrial, agriculture, manufacturing or services, cannot work properly without using services

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of water and sanitation department. According to the Ministry of Planning and Development and Reform, Pakistan (PC) (2005), the water supply and sanitation programs of Pakistan offer a wide range of employment opportunities, assist and encourage other related industries which provide necessary products and services for the development of infrastructure of water supply, treatment and sanitation for instance pipes and sanitary items. In developing countries there have been a low performance problem in water and sanitation department and level of desired performance never been achieved. Same is the situation in Pakistan where gap between level of desired performance and level of actual performance is very wide. According to the Anjuman Samaji Behbood (ASB) (2004), performance of water supply and sanitation (UWSS) agencies/authorities can be improved by standardization of information on the performance. As the standardized information provide a base of comparison between performances. Comprehensive comparison of WASA performance has never been performed in the Punjab, Pakistan. Thus, standards for performance measurement and the performance improvement area have not been determined and shared with other stakeholders to improve the state of water and sanitation services.

Benchmarking has been implemented in WASA Punjab for the purpose of performance improvement. Benchmarking is based on the concept of measuring performance on the basis of certain key performance indicators and then making its comparison with own previous performance and/or with other related/similar organizations. According to ASB (2004), performance benchmarking has emerged as an important element for improving water and sanitation services department performance. Aforementioned, it assists the senior management in identifying required performance improvements, setting performance improvement goals and monitoring performance improvement process. Currently, uncommitted administration, inefficient billing and collection process, high operational costs, old and deteriorating infrastructure, and lack of technical skills are some common but major performance issues faced by WASAs of Punjab.

The main aim of the current study is to analyze the operational and financial performance of WASAs of Punjab, Pakistan and to benchmark the efficiency.

The objectives of the study are:

- To measure the performance of the WASAs of Punjab, Pakistan
- To assess the operational efficiency of the WASAs of Punjab, Pakistan

- To assess the financial efficiency of the WASAs of Punjab, Pakistan
- To make suggestions for the betterment in the performance

Literature Review

According to the Asís, Leary, Ljung, & Butterworth, (2009), clean water and adequate sanitation and sewerage facilities are inevitable for a healthy society but poor administration of institutions and infrastructure resulted into poor provisioning of services to rural areas. It was noted that in developing countries poor water and sanitation services are common especially in Sub-Saharan Africa and South Asian countries where provisioning of water and sanitation services are ill managed. Zeraebruk et al. (2014) suggested that for the improvement of performance of water and sanitation services, management of both public and private sector institutions and regulatory authorities should come forward with innovative, effective and practical solutions for the issue of measurement and monitoring of the performance of their water utilities. As mentioned above, Punjab, Pakistan WASAs are facing similar water and sanitation problems as faced by many other developing countries, therefore, performance needs to be measured and monitored for them. For the purpose or performance improvement via benchmarking, first step is to collect all related information. According to the Berg & Corton (2007), the management should collect information in such a manner that can assist them in decision making. Collected information must be analyzed for evaluating performance, benchmarking and decision making i.e. ***"used for strategic, operation, financial and administrative planning"*** (Berg and Corton, 2007).Muranho et al. (2014) endorsed Asís, Leary, Ljung, & Butterworth (2009) andargued that water distribution networks are directly related to the public's well-being. Muranho et al. (2014) noted that water and sanitation service providers enjoy monopoly, therefore it is necessary to keep an eye on their performance. The use of performance assessment methodologies in the management practices develop competitiveness in the ways operations are carried out, that further lead to improvement in efficiency and initiation of continuous improvement. Alegre and Coelho (2012) argued that performance assessment is the key for achieving sustainability. Performance assessment is **"*any approach that allows for the evaluation of the efficiency or the effectiveness of a process or activity through the production of performance measures*"** (Alegre and Coelho, 2012). Performance assessment has now recognized as an essential part in performance management of water and sanitation services (Sadiq *et al*., 2010). Cardoso *et al*. (2004) mentioned two types of performance

evaluation tools that can be used by water and sanitation managers. Those are: (1) systems of performance indicators and (2) technical performance assessment tools. Performance evaluation tools, such as the International Water Association (IWA) Performance Indicators System (PIS) assist the management in evaluating the water utility's performance. Moreover, Benchmarking is a powerful management tool that is used for comparing one's business processes and performance metrics with the industry's best and/or best practices (van der Willigen, 1997; Alegre et al., 2006; Crotty, 2004; Radivojevic et al. 2007). According to the Berg & Danilenko, (2011), systematically application of benchmarking is a powerful tool that can lead to improve resource optimization for the organization that has a goal to bring considerable improvements in performance. Moreover, benchmarking can also be used as a base for achieving efficiency in operations. It inherits the feature of helping management in capacity building for improving technical efficiency, coverage area, and financial state specifically in those areas where service provisioning is complex. Estache & Kouassi (2002) noted that in South Asian countries increased public or private financial support for water and sanitation sector improvement has not brought considerable positive changes as it not resulted in efficiency improvement and also substantial amount of financial and technical resources wasted. Moreover, Tahir *et al*. (2011) noted that the speed of increase in water resources is not the same as the increase in the population of Pakistan. It means there is a gap between the amounts of services supply and demand.

In the light of the findings reported by (WSP, 2010: WSP, 2006: WSP, 2008) through benchmarking, it is evident that metric benchmarking cannot be regarded sufficient enough. Objective of benchmarking is to improve performance within all sectors of water and sanitation services. Water and Sanitation Program-South Asia (WSP-SA) strongly advocates the application of benchmarking initiatives in South Asian countries i.e. Bangladesh, India, and Pakistan. The program does not focus on application only but emphasis of using the findings of benchmarking assessment to take corrective actions in policy, planning, operations and infrastructure. Many initiatives have been taken from public and private sectors to equip WASAs with technical and financial resources so that action plan can be devised and implemented to identify areas, where improvement is required. The data analysis suggests that all the issues cannot be solved only with the financial support as there is need to improve internal performance management system (WSP, 2010). This indicates that for sustainability in operation of WASAs not only infrastructure improvements are required but also there is a dire need of

improving internal processes. Upgraded customer database as done by WASA, Rawalpindi, improved billing and recovery system and more metering will improve financial performance. From improved billing and collection system, many projects for improvements can be funded.

According to the WSP (2010), in Punjab, Pakistan the data analysis has identified gaps in performance of WASAs. Few WASAs have initiated performance improvement process to fill the performance gaps. The Rawalpindi and Faisalabad Water and Sanitation Agencies (WASAs) are two utilities who have adopted performance improvement process and enjoying various benefits from the training program conducted by Asian Development Bank and SAWUN/ADB on process benchmarking. According to WSP (2010) performance of Pakistan WASA on account of operational expenditures and operating ratio have been encouraging. Substantial amounts of finances are spent on account of salaries and energy costs. Generally, both constitute more than half portion of their total operating expenditures. Remaining balances leaves no option for initiating projects for improvements and quality further deteriorates.

The combination of unrealistic tariffs, incomplete customer database and poor collection means that WASAs are dependent on government subsidies or private sector funds to meet their deficits. Many grants and subsidies are on ad-hoc basis; therefore, forward budgeting is not possible. The reliance on subsidies from government and private sector makes managers accountable and responsive to government, politicians and private funding agencies rather than to their customers (WSP, 2010;Kingdom & Jagannathan,2001). The literature discussed shows that WASAs of Punjab are in vicious circle of poor management and poor performance. There is need of taking rapid actions in the water and sanitation sector. Benchmarking is a useful tool that can lead to implement improvement policies.

Research Methodology

The current study focuses on the quantitative approach as the data collected is in numerical form and can be quantified. Information about the working units of WASA within the Punjab province was collected through personal visits and a specific data collection form was designed to collect data in required format. As there was no need for a specific environment to conduct the study only data were collected through personal visits to the units. Data were retrieved with the help of officials having permission from the authorities. A specific format, which is required to put data in a specific order was used. The format was developed using Excel. The format was then delivered to the WASA personnel responsible for financial book keeping. The reason to use a

custom format is that the current study just focused on the secondary data and no primary data needed to be collected. No questionnaire or interview needed to be introduced. Financial data was collected from the accounting systems of the four working units of WASA. The collected information was then verified by the officials. The information then received personally and kept for further proceedings. Data was collected for three financial years i.e. 2012-13, 2013-14, and 2014-15. The DEA model, which was used in order to evaluate the performance of WASA units within the province of Punjab was CCR along with input orientation. Constant Ratio to Scale (CRS) scale was used as it limits the inputs to be constant. Multi-stage method was used in order to calculate slacks to ensure the accuracy.

Outputs for the units were assumed to be following.

- No. of Consumers Served
- Revenue

Inputs for the units were assumed to be following.

- Management Cost
- Maintenance Cost
- Operations Cost
- Energy Cost

Analysis and Results

This section provides an in-depth insight into the calculations made for the envelopment and the efficiencies of the working units of WASAs of Punjab Province. The data about 4 DMUs is collected for consecutive three financial years and efficiencies of the DMUs have been measured.

Table 1: Financial Data of WASAs

Year	Variable	DMU			
		Faisalabad	**Multan**	**Rawalpindi**	**Lahore**
2012-13	No. of Cons.	241,738	195,497	93,395	528,684
	Revenue	619,983,000	301,627,000	132,477,080	8,417,526,000
	Mgmt. Cost	560,136,000	314,239,000	268,400,000	1,935,866,000
	Maint. Cost	139,569,000	63,500,000	85,448,000	1,902,633,000
	Ops. Cost	6,988,450	3,492,500	14,318,000	99,450,000
	Energy Cost	457,060,000	296,877,000	299,395,000	2,585,482,000
2013-14	No. of Cons.	249,892	208,234	111,643	600,777
	Revenue	629,598,000	336,369,000	158,555,983	7,946,252,000
	Mgmt. Cost	619,151,000	326,334,000	253,290,000	1,991,834,000
	Maint. Cost	115,639,000	86,040,000	172,719,000	1,516,631,000
	Ops. Cost	8,672,925	9,894,600	14,890,000	118,035,000
	Energy Cost	362,627,000	405,262,000	399,428,000	2,861,963,000
2014-15	No. of Cons.	260,506	233,061	114,544	667,530
	Revenue	647,538,000	346,525,000	197,790,970	8,642,456,000
	Mgmt. Cost	634,249,000	355,436,000	268,400,000	2,115,558,000
	Maint. Cost	94,356,475	86,101,000	195,814,000	1,692,600,000
	Ops. Cost	7,650,525	21,539,540	7,285,000	185,000,000
	Energy Cost	442,342,000	414,809,000	400,888,000	3,246,500,000

From the above data collected from DMUs of WASA the following results were derived by applying Data Envelopment Analysis (DEA).

Table 2: Efficiency Summary of DMUs

2012-13			2013-14		2014-15	
DMU	**Technical Efficiency**	**Efficiency (%)**	**Technical Efficiency**	**Efficiency (%)**	**Technical Efficiency**	**Efficiency (%)**
Faisalabad	1.000	100%	1.000	100%	1.000	100%
Multan	1.000	100%	1.000	100%	1.000	100%
Rawalpindi	0.559	56%	0.691	69%	0.877	88%
Lahore	1.000	100%	1.000	100%	1.000	100%
Mean	0.890	89%	0.923	92%	0.969	97%

Table 2 represents the technical efficiency of the DMUs under consideration for the consecutive financial years. In 2012-13, Faisalabad, Lahore and Multan proved to be completely efficient. Whereas, Rawalpindi showed 56% efficiency. For the year 2013-14, again 3 DMUs were efficient and Rawalpindi with some improvement came to 69% efficiency. 3 DMUs performed 100% as the previous years and Rawalpindi showed improvement again with 88% efficiency level in the year 2014-15.The previous studies which have been conducted in the same context to benchmark the performance of WASAs within Punjab devise that performance of none unit is up to the mark but these were conducted before 2011. WASA Rawalpindi updated the consumer database and introduced MIS. With the implementation of these tools WASA Rawalpindi enabled itself to recover promptly and upgraded billing system is the product of this. it is recommended that upgraded MIS systems should be implemented within all WASAs of Punjab and these systems should be centralized and integrated. Consumer databases to be updated periodically and consumer registration process should be computerized. finance personnel should be hired. To improve billing and recovery billing systems should be upgraded. Recovery personnel should be hired. Training and development paths should be there within the organization, both for technical and managerial staff in order to make sure the better level services to the public and back end support to the organization.

Conclusion

The results of the analysis show that 3 DMUs are up to the mark regarding technical efficiency and financial efficiency. From the current scenario, it cannot be ascertained that consumers are fully satisfied and the qualitative efficiency of the units is up to the mark. There must be more work in this field and customer satisfaction surveys must be conducted for further in depth insight to improve the performance of WASAs. Upgraded MIS systems with centralized and integrated access

along with periodic updated consumer databases can offer numerous advantages. To make sure the optimal use of finances, finance personnel should be hired. Consumer base need to be enhanced by providing optimized services to the public. Training and development paths should be there within the organization, both for technical and managerial staff in order to make sure the better level services to the public and back end support to the organization.

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