Meeting Basic Needs: Domestic Water Supply

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1. Introduction

Improved water supply for domestic use brings about several benefits to water users including prevention water borne diseases, saving of time spent on water fetching and storage, maintaining clean and domestic environment and enhanced convenience. Similarly, better sanitation results in prevention of water borne and water related diseases through safe disposal of human waste and clean living environment. As people enjoy healthy living, they can save time and energy that was spent on arduous water fetching, and be engaged in economically beneficial activities and management of household affairs such as caring for children. Taking benefits of better water supply and sanitation further, it can lead to more employment opportunities and enhancement of domestic income levels with development of industrial and agriculture based enterprises.

In view of these benefits, provision of safe and adequate water supply for domestic use of all Sri Lankans at affordable prices, is the primary objective of the water supply sector activities. Improved water supply is an effective and simple way of providing health benefits, economic opportunities, enhanced convenience, and higher standard of living for people. Provision of facilities for safe disposal of human waste is essential for enhancement of benefits derived from better water supply. Unfortunately, priority attached to sanitation is considerably low and integrated approach to water supply and sanitation can maximize overall benefits to people.

2. National/Regional Targets and Basic Indicators

The national targets for provision of water supply and sanitation had been prepared and revised from time to time since planning stage of International Water Supply and Sanitation Decade. It is generally recognized that targets in water supply and sanitation should be set at national level and regional level, by taking urban or rural nature of the given community. Sector vision and the latest national and regional targets for urban and rural communities are given below:

Sector Vision

To improve the standard of living, promote economic prosperity and preserve environment by providing access to safe drinking water and adequate sanitation to the people of Sri Lanka.

Sector Targets

In Water Supply

- Access to sufficient and safe drinking water is provided to 85% of the population by 2010 and 100% by 2025
- Piped water supply to 100% urban population by 2010
- Achieve service level and quality of water to national standards in both urban and rural areas

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In Sanitation

- Access to adequate sanitation is available to 70% of population by 2010 and 100% by 2035
- Major rehabilitation work in Greater Colombo Sewerage System to be completed by 2010
- Piped sewerage systems in major urban areas to be completed by 2015

Local Authorities have been reclassified recently and as a result several urban councils have bee upgraded to municipal councils and new urban councils have been created in former Pradheey Sabha areas. As a practice, the coverage targets are set for urban and rural communities. Howeve there is a considerable population in peripheral areas of urban centers where water supply an sanitation facilities are generally poor. Also, there are many townships within rural areas wit urban characteristics. These two types of communities with urban characteristics are categorize as rural areas.

The definition of safe and adequate water is defined as ability to secure adequate water fo domestic and maintain sanitary living conditions through piped water supply systems, deep well with hand pumps, protected dug wells and rainwater harvesting systems. Adequate sanitatio means human waste disposal using piped sewer systems and other forms of water sealed latrine Service level and associated cost of each mode of service can vary to a very large degree.

3. Service Coverage

The principal indicator, which is used very widely to determine the access to water supply an sanitation services by public, is service coverage. This denotes the share of population as percentage or an absolute number with access to respective services. There are other indicato that determine the quality of service provided to those with access to services. For piped wate supplies, such indicators may be, among many others, quality parameters, duration of wate supply, hydraulic pressure at delivery point and water service charges.

National level service coverage of population is the summation of corresponding values fo administrative districts and provinces. When data are collected, village level and divisional lev data are collected through primary data sources and subsequently, district, provincial and nation level data are computed. Very often international literature refers to national level coverage i order to compare achievements of various nations. However, national service coverage has only limited significance at national level because it does not indicate the regional disparities an where planners should pay their attention immediately.

The service coverage or percentage of population that has access to at least basic water an sanitation facilities differs from source to source depending on the source of primary data an definition of modes of service. Recent data compiled by NWSDB and organizations of the Unite Nations are given below:

Coverage (Year)	Urban %			Rural %			Total	
	1 (1993)	2 (1993)	3 (2000)	1 (1993)	2 (1993)	3 (2000)	1 (1993)	2 (1993
Water Supply	89	100	91	60	100	80	61	71
Sanitation	80	73	91	70	56	80	60	60

1. Water Supply and Sanitation Related Information (1993) - National Water Supply and Drainage Board
2. Water Supply And Sanitation Sector Monitoring Report (1993)- WHO/WSSCE/UNICEF
3. Global Water Supply And Sanitation Assessment Report (2000)- WHO/WSSCE/UNICEF

National census conducted in year 2001, collected data on water supply and sanitation at individual household level. This data is not yet available in final form. Unfortunately, this census excludes Northern and Eastern areas.

4. Institutions

The number of institutions involved in water supply and sanitation services is numerous and interrelationships among various institutions are very complex. While the role of public sector institutions is significant both in development and management of water and sanitation related services, the role and responsibilities of people and organized communities in the form of Community Based Organizations (CBO) are often underestimated. In Sri Lanka, the vital role of people and CBOs in the water and sanitation sector can be summarized as follows:

- In development and management of rural water supply and sanitation facilities, the community assumes entire responsibility with limited assistance from external agencies in the form of technical support and partial capital cost subsidy.

- The percentage of population that depends on onsite facilities such as protected dug wells and water sealed latrines is significant. The corresponding figure for protected dug wells is 12% of the population. Total responsibility for construction and maintenance of these facilities rests with beneficiary with occasional external support.

- In provision of urban water supply services, the recipient communities bear the responsibility for payment of a significant of part of capital expenditure and total expenditure of operation and maintenance cost through water tariff. However, the information and opportunities offered to people in planning and decision-making relating to all matters in urban water supplies is very limited.

The roles and responsibilities of public sector institutions as investors and service providers are predominant. The lead institution in this category is the National Water Supply and Drainage Board (NWSDB), which functions at national level with extensive network of offices and water supply schemes under the supervision of the Ministry of Housing and Plantation Infrastructure. NWSDB is responsible for supply of over 95% of total volume of piped water supplied in Sri Lanka. It performs all functions of a service provider including billing and collection for water services. Its annual capital investment programme which ranges from Rs. 4-5 billion per year, includes construction of new water supply schemes, rehabilitation/expansion of existing water supply schemes and implementation of community water supply programmes.

Some Local Government institutions or Local Authorities (LA) namely, Municipal Councils, Urban Councils and Pradeeshiya Sabhas (PS) play a vital role in provision of water supply and sanitation services. However, the level of involvement varies between Local Authorities to a very significant degree depending on their institutional capacity to manage. NWSDB supports the Local Authorities to implement such projects and programmes and to build institutional capacity.

Ultimate goal is to develop the capacity of Local Authorities to enable carrying out water sup and sanitation related services because it is the only mean of providing most cost effective a people friendly service.

The Provincial Councils (PC) increasingly show interest in planning and implementation community water supply and sanitation projects. There is significant potential for expansion the role of PCs to assume more responsibilities and monitor/support LAs to manage water sup and sanitation services in their areas of authority.

5. Major Policy Issues

5.1 Urban Water Supply and Sanitation

5.1.1 Cost Recovery and Investments

The public sector including the Government of Sri Lanka (GOSL), NWSDB, Provincial Coun and Local Authorities is the principle investor and service provider in the urban water supply a sanitation (UWSS) sub sector. Funding from foreign sources received by the GOSL and its o resources are invested through NWSDB and LAs. A part of revenue generated by NWSDB fr water sales is also invested in the development work. Present level of cost recovery in url water supply schemes is limited to recovery of operation and maintenance cost and a relativ minor part of capital cost.

Corresponding level of cost recovery is even lower for LA owned water supply schemes. forms of sanitation including piped sewerage services are provided free of charge and theref no cost recovery. Large scale investments are required in urban areas to rehabilitate aging wa supplies and to expand existing water supply schemes in order to serve rapidly increasing url population and industries.

With the diminishing role of GOSL as an investor, in conformity with current policy investments in infrastructure development, the NWSDB and other service providers/invest should be able to generate sufficient funds for reinvestment. Towards this end, water char should provide for recovery of at least full supply cost, which consists of O&M cost and cap cost. Financial sustainability is a key for promotion of private sector investment and to gene sufficient funds for meeting all forms of financial commitments.

5.1.2 Services for Poor

At least 40% of the population living in urban areas is considered as poor and their lim affordability does not permit gaining access to water and sanitation services at marker pri fixed for full supply cost recovery. They cannot be denied of access to basic water supply sanitation on health and social grounds and therefore, services should be provided at subsidi rates. Such subsidies need to be targeted to deserving people.

Unfortunately, neither sufficient data nor indicators are available to identify the poor who dese special consideration.

5.1.3. *Institutional Reforms*

It is envisaged that the private investors and operators will play an increasingly important role in the sub- sector. Actions are being well underway to establish a regulatory authority to regulate tariff structures for water and sewerage services and to determine and enforce due level of service to consumers. If NWSDB is expected to function effectively in this competitive environment, early steps should be taken to convert it an efficient organization particularly with improved performance in financial viability, operational efficiency and customer services.

Minimization of risks of investments is vital for encouragement of private investment and to negotiate for fixing relatively low tariffs. A key factor in this regard is reasonable access to required amount of water resources by the service providers through legally constituted system of water entitlement administration.

5.2 *Rural Water Supply and Sanitation*

5.2.1 *Sustainability and Financial Viability*

Water users as individuals and as Community Based Organizations (CBO), are the prime movers in part contribution towards capital cost, O&M, and generating sufficient revenue from water sales to make such services financially sustainable. Private investments at individual family level for construction of water supplies such as protected shallow wells, and sanitary latrines is considerable in terms of total investment and population coverage.

Long-term sustainability of these services depends on continued existence and strength of CBOs and evident fragility of CBOs is a major threat. These communities will require technical and technological support for proper management of facilities whenever necessary. Immediate steps should be taken to strengthen CBOs to ensure sustainability of services.

6. Community Empowerment and Participation in Management

Sustainability of the water supply and sanitation schemes was considered as a major challenge faced by the sector planners and managers. Empowerment and participation of communities at all stages of development were seen as appropriate solutions to this critical problem. Many initiatives have been taken during last decade to mobilize recipient communities in planning, construction and management of water supply and sanitation schemes and significant progress has been made in this regard.

Today, there are many communities owned and managed water supply schemes through out Sri Lanka. Communities have selected technological alternatives to suit their capacity to manage and pay. Past experience demonstrate that the process involved in community mobilization is time consuming and therefore, costly. It should be recognized that this activity is vital for overall success of the project and resources utilised are a worthy investment. In responding to this critical need, project-implementing agencies such as NWSDB and the Community Water Supply and Sanitation Project have secured specially trained staff with community development and mobilization skills.

The community empowerment and participation extends well beyond mere supply of water to members of the community. In many instances, sufficient revenue is raised to cover operation and maintenance costs and future replacement costs. Community empowerment also motivates people

to engage in watershed protection and conservation programmes and other community development programmes.

7. Infrastructure Development

Owing to low investment, poor management and aging, present water and sanitation infrastructure, particularly in urban areas is unable to support rapidly increasing population and urbanization. Although some investments have been made during last 25 years, past investments were inadequate to meet increasing demand to upgrade ailing infrastructure and construct new infrastructure. Inadequate level of maintenance has contributed to fast deterioration of services. Given the limitation of financial resources, investments in development of sewerage systems were remarkably low. It should be noted that per capita investment in development of sewerage is considerably higher than same for water services. Among a long list of indicators of poor services offered by water supply systems are high system leakages, low system pressure, intermittent water supply, poor quality of water, and frequent interruptions to services. Degradation is even more apparent in the only major piped sewerage system in the country, Colombo sewerage system. Collapsing sewers, overflowing manholes, discharge of storm water into soil sewers and unauthorized discharge of sewage into natural water bodies are common occurrences.

Deteriorating water quality in natural sources of water, which provides water for domestic water supplies, poses new challenges to infrastructure development and demands extra capital investments from already limited financial resources. As water quality in rivers deteriorates, it requires expensive and sophisticated treatment processes to treat. Increasing salinity intrusion in coastal reaches due to sand mining and rising sea levels will require investments in abatement infrastructure such as salinity barriers.

It is estimated that at least Rs 10 billion should be invested annually during next 10 years to overcome serious constraints in essential urban water supply and sanitation infrastructure.

8. Investment and Cost Recovery

Increasing urbanization and industrialization will make heavy demand for more and better water services and creates waste disposal problems. Since beginning of moderate level investment in water and sanitation related infrastructure in around 1980, GOSL was the sole investor in the sector through agencies such as NWSDB. Nearly, 65% of the investments in the sector were received by the Government from foreign multilateral and bilateral agencies and the demand for investments remained far in excess of availability of funds. However, sustainability of investments, particularly financial viability and implementation capacity of the implementation agencies continue to be an unresolved issue to date.

Private sector investments in the sector are actively promoted as a viable solution for securing adequate investment.

Rural water supply schemes owned by local communities perform better particularly, in cost recovery in comparison to centrally managed urban water supply schemes. It is vital for long-term sustainability that near full supply cost be recovered from those consumers who can afford to pay for water and sewerage services with targeted subsidies for poor sections of the society.

9. Appropriate Technology

Research development of new technology relating to water supply and sanitation takes place on continuously. However, it appears that major and revolutionary developments of technology in conventional water and wastewater treatment do not take place. Nevertheless, rapid inflow and adoption of new technologies are slow in Sri Lanka due to many reasons. The cost involved, inappropriateness, lack of awareness, and reluctance to change prevailing systems and adoption of new technologies are among many reasons. Where advantages of new and appropriate technology outweigh disadvantages of foregoing factors, introduction of new technologies is possible with suitable modifications to suit local conditions. Several technological findings such as rainwater collection systems, simple solar water disinfection methods and roughing filters are evident in rural water supply.

10. Indicators in Use

The indicators currently used in water supply and sanitation sector can broadly be divided into two categories. The first category covers the status, performance and trends in the sector wide activities. The second category can be used to monitor performance in operations and management of sector institutions.

10.1 Sectoral Indicators

- Population coverage: the segment of population with access to water / sanitation services from pre-defined means of service provision such as piped water, protected dug wells and water sealed latrines, expressed as a percentage of total population living in a given geographical unit at a given time. The geographical unit can be national level, urban or rural areas, provinces, districts, divisions, villages, or local authority areas.

- Population coverage by mode of provision of water and sanitation services. This indicator expresses the percentage of population of a given geographical unit, served by various means used in provision of water and sanitation services.

- Duration of piped water supply: This is the percentage of population with access to piped water supply, categorized according to the average number of supply hours per day i.e. percentage of population with continuous water supply, same with access to water supply during 18 to 24 hours per day etc.

- Water and sanitation related diseases. Total number of reported cases of sickness due to water and sanitation related diseases can be collected from Health Authorities and that can be presented as a percentage of population living in the Division, district, Province or national population.

10.2 Institutional Indicators

NWSDB being the lead institution in the sector has developed a comprehensive set of indicators to enable presentation and monitoring its activities. It covers water quantity, water quality, commercial and financial aspects, human resources and consumer relations.

Key Performance Indicators are given below:

- Operating Ratio – O & M Expenditure / Billing
- Collection Efficiency % – Amount Collected /Billing x 100
- Unit Production Cost – O & M Expenditure / Quantity of Water Produced
- Unit Revenue Rs/m^3 – Quantity of water Billed / Quantity of water Production
- Average Tariff Rs/m^3 – Billing / Quantity of water Billed
- Number of employees / 1000 Connections
- Non-Revenue Water (NRW) % – $\frac{(\text{Amount Produced} - \text{Amount Billed}) \times 100}{\text{Amount Produced}}$
- Total Number of Service Connections at end of every month
- Average Age of Consumer Complaints
- Average Age of Arrears
- Ratio between Domestic Tariff and Non-Domestic Tariff

11. Conclusions

Water supply and sanitation activities have shown remarkable progress during last several decades. Large proportions of people have access to these services. Yet, it should be noted that considerable number of people do not have access to those services and large-scale needs may exist in northern and eastern parts of the country.

As steps are being taken to meet basic human needs in water supply and sanitation, improvement of level of service including reliability of services, duration and quality of water, will become necessary and eventually it should reach the status of self-reliant utilities that can support industry and urban growth. Major developments of this magnitude require, sound national policy and political commitment for reforms in the sector. These reforms should support financial sustainability, private sector investment, reforms of existing institutions and creating competitive environment and offer better service to people.

Information is vital for decision-making by planners and Managers in development and utility management. Reliability and adequacy of data and information is an important issue in Sri Lanka as the case in many developing countries. Collection and collation of data and dissemination of available data & information need to be improved and by doing so deficiency of management information be addressed up to certain level. Well-developed indicators can be very useful to present information effectively.

References

Water Supply and Sanitation Related Information (1993)- National Water Supply And Drainage Board

Water Supply And Sanitation Sector Monitoring Report (1993)- WHO/WSSCE/UNICEF

Global Water Supply And Sanitation Assessment Report (2000)- WHO/WSSCE/UNICEF

Conference proceedings of The National Engineering Conference on Engineering for the Emerging Millennium (2000) – Institution of Engineers Sri Lanka.

Management Information Report – December 2001 National Water Supply And Drainage Board.