

A STUDY OF URBAN WATER SERVICES AND SERVICE LEVEL BENCHMARK STANDARDS IN AIZAWL (MIZORAM) MUNICIPAL AREA

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Abstract

Rapid and unchecked urbanization entails huge resource crunch in Aizawl, among them is water resource. Inadequacy of the resource is enhanced by its location in a hilly terrain. Urban local bodies are legally attributed with four basic urban services including water supply. In Mizoram, Public Health Engineering Department (PHED) provides water services to the urban citizens. It is a challenge for the implementing department to maintain quality services. The Ministry of Urban Development, Government of India has prescribed the standard service level benchmark and the Thirteenth Finance Commission (2010-2015) has also made it mandatory to notify the service level benchmark and to prepare plans to reach the marks accordingly. The present study evaluates the status of current scenario of urban water supply services and the service level benchmark issued by the Urban Development and Poverty Alleviation Department (UD&PA), Government of Mizoram.

Keywords: Urban Water Supply, Service Level Benchmark, Public Health Engineering Department (PHED), Urban Local Bodies (ULBs), Ministry of Urban Development (MoUD).

Introduction

Infrastructure and service deficit is a phenomenon in India. Rapid and unchecked urbanization during the last decades gives rise to pressure on urban resources, infrastructure and services (IUIS, 2011). To address the stated

challenges, in December 2005, the Government of India (GOI) has launched the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) with a whopping investment of US \$11 Billion on basic urban infrastructure and services (Ramachandran, 2015). It has

identified 63 cities across India and in order to improve service delivery, the Ministry of Urban Development (MoUD) has prescribed Service Level Benchmark (SLBs) in the four key areas of service delivery such as Water Supply, Sewerage, Storm Water Drainage and Solid Waste Management (MoUD, 2007). The SLB acts as the standard in which service performance of the state level agencies and urban local bodies are monitored and evaluated in the backdrop of the target goals. The Millennium Development Goals (MDGs) of the United Nations also aims at reducing to half the number of people without adequate access to water and sanitation services by 2015. Prof. Amartya Sen has rightly puts it, "Active public policies are required to ensure the fruits of development are widely shared, and that it trickles down to the last person providing them with basic needs." (Payat, 2015)

The state of Mizoram has experienced a rapid growth of urban areas and is one of the most urbanized states in India. There are 23 notified towns with a population of 5,80,106 which is 52.87 per cent of the total population of the state. The population of Aizawl is also increasing from 74,493 in 1981 to 2,93,416 in 2011 which is 26.74 per cent of the entire state

population and 50.56 per cent of the total urban population in Mizoram. Urbanization in Aizawl is growing at a higher rate than the capacity of the government to tackle with it which leads to high incidence of poverty, deficiency in basic civic amenities- water and sanitation, sewerage, housing, infrastructure, transport and communication system, finance and administrative problems, etc.

The need for quality water is acute in the urban area. Improper sewerage and waste water have polluted the river and streams. Besides the piped supplied water, people fetch water from the spring and hand pumps and the quality of water in these sources have declined over a period and hence there is a fervent demand for quality water supply.

Aizawl Municipal Area

Aizawl was established on 25th February 1890 by the British and originally it was a fortified place and a military outpost. The British developed infrastructures like Tlawng waterway, cart road between Sairang and Aizawl and Aijal bazaar opening the avenue for the growth of Aizawl town. Aizawl was originally planned for 7,000 people, it was spacious and beautiful (Thanhlira, 1983). When the British left India, Mizo District Council was formed in 1952 and since then new residential

areas have sprung up and is growing haphazardly. When it became a capital of Mizoram then Union Territory in 1972, there were more avenues for employment, both in private and public sector which has resulted into pull factor and more and more people migrated from different places to the Aizawl.

Table- 1: Decadal Population Growth of Aizawl

Census Year	Population	Decadal Change	Growth Rate (%)
1971	38,260		
1981	74,493	36,233	94%
1991	1,55,240	80,747	108%
2001	2,28,280	73,040	47%
2011	2,93,416	63,542	28.53%

Source: Census Documents

The level of Aizawl decadal population growth rate has increased from 94 per cent between 1971-81 to 108 per cent between 1981-91; however, a decline was witnessed between 1991-2001, at a low 47 per cent and 28.53 per cent between 2001-2011. The Aizawl City population according to 2011 Census was 2, 93,416 lakhs, it constitutes 26.74 per cent of Mizoram total population, the sex ratio was 1025 and literacy rate 98.36%.

Aizawl was declared as a city by the Government of Mizoram in 1999. An urban local body known as Aizawl Municipal Council (AMC) was formed and started functioning in the year 2008. On 15th May 2008 several localities taken together with their respective boundaries

were declared as the area of AMC by the State Government and subsequently, localities have been added from time to time. The Aizawl Municipality Area is 437 sq. km. comprising 19 Wards, and a total of 83 localities.

The state government is lagging behind in setting up Urban Local Bodies (ULBs) in tune with the 74th Constitution Amendment Act (CAA), 1992. Urban Water Supply is specified as one of the items in the 12th Schedule of the Constitution of India to be legitimately put under the ULBs functions. Public Health Engineering Department (PHED), Government of Mizoram still provides water supply services to the urban citizens.

Benchmarking Water Supply

According to Business dictionary.com, ‘Bench-marking’ is “Measurement of the quality of an organization’s policies, products, programs, strategies, etc., and their comparison with standard measurements, or similar measurements of its peers. The objectives of bench-marking are (1) to determine what and where improvements are called for, (2) to analyze how other

organizations achieve their high performance levels, and (3) to use this information to improve performance.”

As prescribed under Chapter 10.160 (viii) of the Reports and Recommendations of the Thirteenth Finance Commission (13th FC), target of Service Level Benchmark during 2015-2016 for ULBs in respect of Water Supply under Urban Development & Poverty Alleviation Department, Government of Mizoram is shown as under:

Table – 2:Service Level Benchmark of Water Supply during 2010-16

Sl. No.	Proposed Indicator	SLB (2010-11)	SLB (2011-12)	SLB (2012-13)	SLB (2013-14)	SLB (2014-15)	Target (2015-16)
1	Coverage of water supply connections	54%	58%	63%	68%	74%	75%
2	Per capita supply of water	70.27 lpcd	72.27 lpcd	75 lpcd	75 lpcd	75 lpcd	85 lpcd
3	Extent of metering of water connections	91%	95%	98%	100%	100%	100%
4	Extent of non-revenue water (NRW)	40%	40%	40%	40%	40%	30%
5	Continuity of water supply	8 Min.	8 Min.	10 Min.	10 Min.	10 Min.	15 Min.
6	Quality of water supplied	100%	100%	100%	100%	100%	100%
7	Efficiency in redressal of customer Complaint	50%	50%	70%	75%	75%	80%
8	Cost recovery in water supply services	11%	13%	15%	20%	20%	30%
9	Efficiency in collection of water supply related charges.	75%	75%	80%	90%	90%	90%

Note: SLB means (Service Level Benchmark); lpcd means (litre per capita per day)

Source: Gazette, Urban Development & Poverty Alleviation Department, Government of Mizoram.

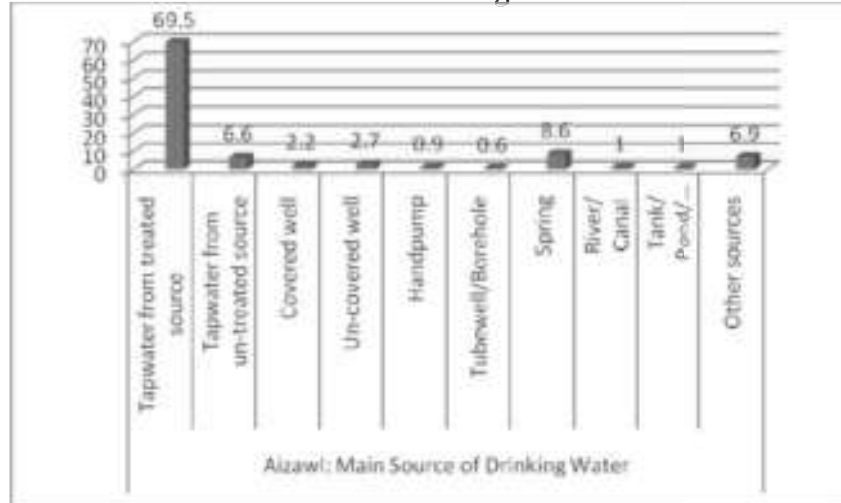
The workout is based on the water supply connections and the number of families projected for the years at the end of 2010, 2011, 2012, 2013, 2014 and 2015. The years 2010 -11 to 2014-15 has been earmarked by the 13th FC. Current services and target levels during the financial years have to be submitted by the ULBs to the Government of India by the end of 31st March every year as per condition number eight of the 13th FC with regard to the incentive framework to receive general performance grant. State governments and ULBs have to comply with the nine eligibility conditions (in case of Aizawl it is eight) to draw its share of the general performance grant beyond the basic grant allocated to the ULB (13th FC, 2009). In this paper, data collection and evaluation has been carried out for the water supply services with respect to the Aizawl Municipal Area for the year 2015-16.

Coverage of Water Supply Connections

Coverage of Water Supply connections is measured by the total number of households connected to the piped water connections provided by the PHED, as a percentage to the total number of households in the Aizawl Municipal Area. This is the preferred/highest level of

Reliability-A according to Service Level Benchmark handbook issued by the MoUD. There are two water distribution divisions in Aizawl, namely, Aizawl North Water Distribution Division and Aizawl South Water Distribution Division. In total, there are 13 sections under the north division and 12 sections under the south division. As of 1st October 2015, number of water house connections in Aizawl is 43,984. Number of households in Aizawl according to the 2011 census is 60,432. In terms of percentage, number of households covered with water supply connection is 72.78 per cent against the benchmark of 75 per cent during 2015-16. In the current financial year, water service is short of 2.22 per cent. And, the overall shortage against benchmark target of 100 per cent is 27.22 per cent with a total number of 16,448 households without PHE piped connections. The target benchmark percentage (%) since 2011 up to 2016 is going on at an incremental basis, in 2011 the target was 54 per cent which has gone upward to 75 per cent in 2015-16. PHE Department today can give piped water connections to all households who have applied for connections. Water provision to households at common public stand posts cannot be considered as an acceptable permanent service provision standard.

Table -3: Source of Drinking Water in Aizawl



Source: Census of India, 2011

The main source of drinking water in Aizawl is PHE tap water consisting of 69.5 per cent. Some localities have perennial water source subscribed by the family residing in the adjacent area. Most of them didn't have PHE connections. Local association is formed for management and membership and annual fee is collected from each family. Tap water from untreated source consists of 6.6 per cent. The traditional source of water among the Mizo society is a Spring (Tuikhur), it occupies 8.6 per cent of the water source in Aizawl.

Other sources totalled 6.9 per cent, such as during the dry season period, a number of local water service providers with profit motive sell water in a carrier to different localities. The cost of water is comparatively high to the piped water

supply by PHED. One tanker with a capacity of 2000 litres cost Rs. 1500-2000 depending on the distance. There are a number of private sector water providers in and around Aizawl.

Per Capita Supply of Water

Per capita supply of water is measured by the total quantity of water supplied per consumer per day. According to McKinsey Global Institute (MGI) Report(2010), in India, urban citizens have access to only 105 litres per day of potable and piped water supply (with only 74% coverage), as compared to a minimum basic requirement of 150 litres. Ministry of Urban Development has specified the benchmark level as 135 lpcd (litre per capita per day) and the target for 2015-

16 in Aizawl is 85 lpcd. The Greater Aizawl Water Supply Scheme (GAWSS) – Phase I, opened in 1988 was planned for providing 135 lpcd for 80,000 people and GAWSS-Phase II,

was commissioned in 1999 for providing water services at 78 lpcd for 3,10,000 people (PHE, 2008). The average actual water supply in Aizawl during September, 2015 is as follows:

- | | |
|--|------------------------|
| a. Quantity of Water supplied to the distribution system | - 433,7,91,936 litres. |
| b. Population served | - 2,85,439 |
| c. No. of days in a month | - 27 days |
| Per Capita Water Supplied [(a/c)/b] | - 56 lpcd |

With rapid urbanisation, leakages, interrupted power supply, deficit manpower, pipe burst and sufficient supply of rainwater during summer, etc. the actual lpcd is meagre and short of the benchmark target.

functional by the end of September 2015 is 43,936. Water meter is already installed in 99.27 per cent of the total households having piped water connections. Only 48 households are still to install water meter.

Metering of Water Connection

Extend of metering water connection is measured as the total number of functional metered water connections expressed as a percentage of the total number of water supply connections. Metering of water connections is the ongoing activities of State Investment and Programme Management Implementing Unit (SIPMIU) and it is expected to achieve 100% metering (ADB, 2009). The current service level benchmark on water meter connection is 100 per cent. There are 43,984 water connections and 272 public stand posts in Aizawl and total number of water meters installed and

Extent of Non-Revenue Water (NRW)

Non-revenue water consist of consumption, which is authorised, but not billed such as public stand posts, real losses of water due to leakages in the transmission and distribution networks, illegal water connections, water theft and metering inaccuracies, etc. This indicator highlights extend of water produced which does not earn the utility any revenue. This is computed as the difference between the total water produced (ex-treatment plant) and the total water sold expressed as a percentage of the total water produced (MoUD, 2007). The total water produced from GAWSS – Phase I & II are 7.3 MLD and 22 MLD respectively and the total

quantity of water distributed during the month of September 2015 is 433.79 MLD. The percentage of NRW as declared by the PHED is 40 per cent.

Continuity of Water Supply

Continuity of water supply indicates the average daily water supply period to the customers. The existing system of water distribution is on weekly basis to a consumer for 45 minutes to 60 minutes a day. The benchmark of water supply by MoUD is 24 hours a day and the benchmark of water supply in Aizawl issued by the Urban Development & Poverty Alleviation Department is 15 minutes a day.

Quality of Water Supplied

Protected water supply is a sine qua non of public health of a community and World Health Organisation (WHO) refers to “control of water supplies to ensure that they are pure and wholesome as one of the primary objectives of environmental sanitation” (CPHEE, 1999). Quality of water supplied is measured as the percentage of water samples that meet or exceed the specified potable water standards, as defined by the Central Public Health and Environmental Engineering Organization (CPHEEO) and the Indian Standard 10500-2012: Drinking Water-Specification (Second Revision).

Table-4: Quality of Water in 2014

Sl. No	Source	Temp (°C)	pH	TDS	EC	F.coli
1	Rain Water	20.83	5.43	8.73	17.53	Absent
2	PHE Phase – I	23.7	6.73	78.06	151.1	> 10
3	PHE Phase – II	22.92	7.04	81.36	158.34	> 3
4	Handpump/Tubewell/Borehole	21.02	6.5	174.46	350.53	> 3
5	Spring	19.46	6.13	243.86	491.93	> 40

Note: pH - pH scale measures how acidic or basic a substance is. It ranges from 0 to 14. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic. TDS - Total Dissolved Solids; EC- Electrical Conductivity; Faecal Coliform- microbiological contaminants of natural waters. The safe levels of water quality are:

- (a) pH : 6.5 – 8.5
- (b) Total Dissolved Solids (mg/litre) : 500 – 2000
- (c) Electrical Conductivity (microsien) : Not more than 250
- (d) F. Coli (MPN/100 ml) : Zero

Source : Thasangzuala, 2015.

**Table-5: Report on Urban Water Sample Analysis
for the Month of August, 2015**

NUMBER OF SAMPLE TESTED									
Ground Water		Surface Water		Traditional	RWHS	RWHS	Open	Others	Total
HPTW	SP	Gravity	Pumping	Spring	(I)	(C)	Well		
29			31	21					81
CONTAMINATED SAMPLES									
26			Nil	2					28

Source: State Referral Institute (SRI), Public Health Engineering Department, Government of Mizoram.

MoUD's Service Level Benchmark of quality water supply is 100 per cent in the current year. And, the number of sample tested during the month is 81. Number of samples that meet the specified potable water standards according to CPHEEO is 53. Piped water supply is potable and quality is 100 per cent according to the SRI, meanwhile, according to the table-4, the quality of water in GASS – I & II has more than permissible microbiological contaminants.

Efficiency in Redressal of Customer Complaints

The indicator means that the total numbers of water supply related complaints redressed within 24 hours of receipt of complaint, as a percentage of the total numbers of water supply – related complaints received in the given time period. The PHE Department does

not have body or cell for complaint redressal. Complaint is usually received when there is water supply shortage and metering problems. It is difficult to assess the number of complaints received since there are 24 sections in Aizawl. The Junior Engineers, Sub-Divisional Officer, Executive Engineer, etc. receives complaints from the consumers. On average, 10 – 50 complaints is received during the month and redressed as quickly as possible.

Cost Recovery in Water Supply Services

The indicator is measured as total operating revenues expressed as a percentage of the total operating expenses incurred in the corresponding time period. Aizawl is having one of the most expensive water supply schemes in India. The per capita cost of water is Rs. 2250/- in GAWSS-Phase I and Rs. 3,660/- in

GAWSS-Phase II. Water goes down in the pipe with pressure often resulted to increase leakages as valves are not able to withstand such pressure. This has created a lot of problems with huge quantity of un-accounted or non-revenue water.

Table-6: PHED: Income and Expenditure

Sl. No.	Division	Operating Expenditure (in Lakhs)	Operating Revenue (in Lakhs)
1	Aizawl Water Distribution Division North	99.97	86.86
2	Aizawl Water Distribution Division South	63.14	74.34
3	Aizawl Water Transmission Division	872.29	Nil
	Total	1035.4	161.2

Source: Public Health Engineering Department, GoM

Operating expenditure includes total operation and maintenance cost including electricity, oil, common salt, staff, etc., accrual of revenue through the transmission division is absent and it is entirely related to the pumping of water, maintenance of pipelines, etc. Target benchmark of the UD & PA is 30 per cent and benchmark set by MoUD is 100 per cent. The present actual recovery of cost is 15.57 per cent.

Efficiency in Collection of Water Supply Related Charges

Efficiency in collection is defined as current year revenues collected, expressed as a percentage of the total operating revenues, for the corresponding time period. Until very recently, user charge and tax is very limited in water supply and water charge

as flat tariff was levied in Aizawl which were far below the operating cost. Higher level of cost recovery in water supply is expected with revision of water tariff in December 2014 and introduction of water metering. Computerised billing system is implemented under the Asian Development Bank (ADB)-assisted Mizoram Public Resource Management Program(MPRMP) and efficiency in collecting water supply related charges is expected to improve to 90 per cent. Since, 90 per cent is still not met; the efficiency percentage is pegged at 80 percent.

Conclusion

Water distribution network in Aizawl is divided into different zones in different altitudes vary from 150 to 400

meters. The haphazard and unplanned settling pattern of the area has made water supply services a challenging task for the service delivery agency. In analyzing the overall performance of the PHED, out of the nine benchmark prescribed by the MoUD; SLB have been achieved in the two benchmarks – Firstly, the Quality of Water Supplied and Secondly, Efficiency in Redressal of Customer Complaint which are 100 and 80 per cent in the former and latter respectively. Water quality in traditional spring and rain water has more than the standard iron content while the piped supplied water has 100 per cent quality. In State Referral Institute, where water quality is tested, the standard used is Indian Standard Specification whereas the stipulated target by MoUD is the standard set by CPHEE. Besides, an independent analysis of a researcher has shown microbiological contaminations.

PHED has claimed that they have 100 per cent efficiency in redressal of customer complaints, but this is also questionable as they do not have customer grievance redressal mechanism. Water Meter connections is almost completed and application of e-governance will enhance the efficiency to collect water bills. The PHED plans to use 'SMS Blast' from September 2015 for water service information, which will bridge the gap between the service delivery agency and the stakeholders.

Coverage of Water Supply, Per Capita Water Supply and Non-Revenue Water remains a challenge as they depend on financial resource, availability of water and dependability of monsoon system. The biggest hurdle so far in the water service delivery is extent of operating cost recovery. The agency is facing huge financial resource crunch and staffing requirements; it employs large numbers of skilled, semi-skilled and unskilled people apart from regular employees. With revision of water tariff and water meter installation, problem will be solved up to a great extent.

Urban water supply in Aizawl is still non-participatory, i.e. it is mostly a bureaucratic function and no public representative. With the ADBs extensive financial and institutional assistance in improving quality of water, lengthening the supply duration to 24 hours per day, expansion and rehabilitation of existing distribution systems, reservoirs and machinery, replacement of old and leaking service connections, installation of bulk and consumer meters and program to cut non-revenue water, better service delivery is on the way. The reform measures under the JnNURM, and the Service Level Improvement Plan in its modified version, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) plays a crucial role in undertaking various fiscal, financial

and institutional changes in the water process along with people's sector. The challenge now lies in the participation to have better urban water effective implementation of reform governance.

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