International Journal of Advance and Applied Research (IJAAR)
Peer Reviewed Bi-Monthly

ISSN – 2347-7075
Impact Factor – 0.899
Vol.6 No.3 Jan – Feb 2019

An Analysis of Pricing Pattern of Drinking Water Supply: A Case Study of Pune Municipal Corporation

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Abstract:

It is often said that water should be freely available to all because it is a gift from nature. It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. Municipal authorities/ state governments in developing countries are especially hard press to design, develop and finance the basic urban services. The present research paper attempts to review the tariff structures present in Pune Municipal C, and makes a comparative analysis of water budget. The main objective in this research paper is to analyse the pricing pattern of water supply. This paper clearly highlights the need for changes in the management practices such as metering; applying appropriate user charges; reducing water losses; increasing water availability; coverage etc. to solve the water problems.

Key Words: Water consumption, Annual Ratable Value, Water tax, Economic analysis

Introduction

It is often said that water should be freely available to all because it is a gift from nature. It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. Municipal authorities/ state governments are especially hard press to design, develop and finance the basic urban

services. The present research paper attempts to review the tariff structures present in Pune Municipal C, and makes a comparative analysis of water budget. The main objective in this research paper is to analyse the pricing pattern of water supply. This paper clearly highlights the need for changes in the management practices such as metering; applying appropriate user charges; reducing water losses; increasing water availability; coverage etc. to solve the water problems.

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Financing of infrastructure, in general, and basic urban services, in particular, is different from financing other industrial activities because of its characteristic features of non-excludability, externality, and huge investment requirements, and so on. The commodities that are marketable are generally priced on the basis of the equality between its level of demand and supply. The equality of the marginal cost of producing a commodity and the marginal revenue generated out of it determines the equilibrium price. Such a clear-cut pricing mechanism cannot be adopted for urban services because of its features of non-excludability and externality.

Objectives

The following are the objectives of the study,

1. To understand property tax system in Pune Municipal Corporation
2. To understand and study the economics of water supply of the Pune city.

Hypotheses

As the main objective of this study is to discuss pricing pattern of water supply the following hypotheses are framed:

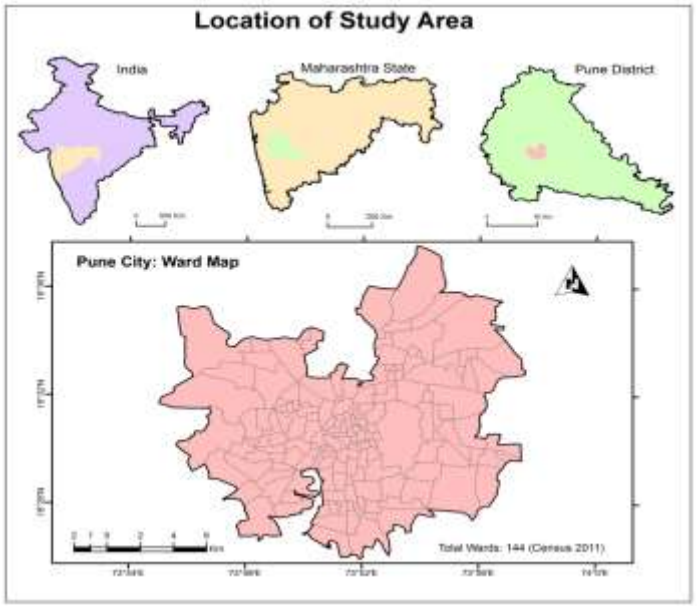
H1 - There is a significant correlation between water tax and water consumption.

Database

The data collected is mainly from the Pune Municipality and from other official sources including oral communication with PMC officers, official PMC websites and prominent citizens in the city who are able to recall the experiences of the past. Needless to

say there are gaps in our information system and the level and quality of information is not the same at all places and in all aspects.

Location of the study area



Pune city is located at 18°32' North 72° 51' East. It is situated near the Western margin of the Deccan Plateau.Pune Municipal Corporation (PMC) area covers 243.31 sq. km. composed of 144 general electoral wards according to 2007 which comes under 14 administrative wards of Pune Municipal Corporation. The city is located in saucer shaped basin at an average altitude of 560 m. from mean sea level. The area surrounded by off shots of Sahyadri hills extends mostly from west to east. Pune is slight hollow on bank of Mula and Mutha Rivers on Deccan plateau.

An Analysis of Pricing Pattern of Water Supply

At present, the water is supplied through the Khadakwasala Dam through Khadakwasla-Parvati pipeline and the Mutha Right Bank Canal by irrigation department. The meter system was introduced on 1st January 1980. Initially, fixed rates were set for usage of water for both domestic and non-domestic purposes.The problem with this system was that the water was supplied with uniform rates without considering the extent of usage. To differentiate the water usage and to get additional revenue from the water supply, the rates for water supply were revised from January 1st, 1982. Different rates for non-domestic water usage were introduced. But, this led to a series of problems in the revenue collection. Faulty meters disrupted the smooth flow as envisaged. This system also required the recruitment of a large number of field officials to go out and collect the meter readings personally from the citizens' residences and properties. This was a long and tedious process and was not well-received by the citizens. Moreover, those meters those were malfunctioned,

required frequent attention. Some of the meters that were installed were affected by the dust accumulation and registered faulty readings. To deal with the situation, the PMC decided to charge the people whose meters were faulty or non-functioning on a quota basis. But this charge was higher than the normal charge and it led to conflict between the citizens and the corporation. Some citizens even refused to pay the higher charge.

From 01/04/2000 for domestic use water and non- domestic use of water charges were introduced. These user charges were linked with the property and according to the property type water tax was collected. The administration has repeatedly tried to introduce metered water billing system in the city, arguing that it will help them calculate water tax accurately. But as there is very less coverage of water meter, it is very difficult to calculate water tax. Previously, due to metering, faulty bills were prepared or due to some problem with the meter or non-working of meter, water charge was collected with some fixed rate basis on Kota system, without considering the property type and actual usage of water. The present reform says that, the water charges are more depend on the property. Therefore, basis on the property the usage of the water varies. In view of this, it was decided in the Pune Municipal Corporation that the water charges should be linked with the Property tax.

The reform "User Charges for Water Supply" was introduced by PMC with the primary goal of generating more revenue from the water supply. The reform was also aimed at providing certain other benefits, including an increase in the coverage of users, improvement in the method of measurement of service, improvement in the billing and collection efficiency and 100 per cent cost recovery. The corporation also decided to install a user-friendly tax collection system, cut down on cost and create a single window for the user charge. The implementation of user charges for water supply was an administrative decision. It was discussed in the general body meeting of the corporation and passed with the approval of the majority. The citizens accepted it as it was now more suitable for them to pay the charges along with the property tax.

Table 1 - Domestic Property Taxable Amount Slabs and Present Water Charge

Sr. No.	Slab (in Rs.)	Rate
1.	0-1000	Rs. 1159 per year
2.	1001-3000	Rs. 1288 per year
3.	3001-5000	Rs.1417 per year
4.	5001 and above	32% of RV or Rs. 3200 whichever is less

(Note: the charges are applied on the yearly property tax amount).

(Source: MilkatkarPustika, Corporation office, PMC, Page no.6, Meeting no. 116, 12/02/ 2018)

Existing Water tariff structure of Pune Municipal Corporation

Budgetary support is good for improving basic services. Current estimates indicate Rs. 398.7 Crores in the year 2015-16, was spent annually for water and sanitation. Of this amount approximately 80 % came from water tax 18% camefrom water benefit tax 2% came from different level of governments. Despites of this current level of investment, but the question remained whether people have access to safe drinking water.

The levels of social investment are required to improve the connectivity, quality and NRW. As the urban population is on the rise it is required that high amount of water with good and proper management.

One such initiative taken by PMC in 2016 was the introduction of new tariff structure.

Table 2 - Water supply tariff of Pune Municipal Corporation

Sr. No.	Water usages	Unit (KL/Month)	Revised rate from 1/4/2016 (Rs. /KL)
Non –Meter Water Rate			
1.	A. Residential	1) 0 to 22.50 (150 lpcd)	Rs. 5.50/1KL
	B. Cantonment Board	2) 22.50 to 30 (150 to 200)	Rs. 9.20/1KL
		3) 30 to 37.50 (200 to 250)	Rs. 18.30/1KL
		4) More than 250	Rs. 37.50/1KL
2.	Non – Residential	1) 0 to 20	Rs. 47.50/1 KL
		2) 20 to 40	Rs. 49.40/1 KL
		3) 40 to 60	Rs. 51.90/1 KL
		4) more than 60	Rs. 59.80/1 KL

(Source: Water tax rate booklet, Corporation office, PMC, Page no.2, Section 'C', Meeting no. 99, Subject no. 861, 16/02/ 2016)

The tariff structures for municipal water supply in various cities are widely different from each other in terms of their supply slabs, connection type's viz. domestic, commercial, industrial etc. State and Government of India are responsible for choosing urban tariff structures. Broadly classifying, the tariff structure for municipalities in India can be divided into following two categories:

1. **Metered Connections**
2. **Unmetered Connections**

Most of the cities in India have a mixture of metered and unmetered connections. In PMC area, 30% connections are metered. These are in Pune and Kadki CB and meant for commercial areas.

Currently, water tax is calculated on the basis of property tax which is almost lump sum amount for 1 KL water. There are different arguments put forward by citizens from the housing societies as well from the slum areas, "PMC imposing their structure of water tax on us because there is no transparency in the water tax rate. Water tax is collected with same rate from high water consumption and low water consumption. Accurate consumption of water is not recorded anywhere. Hence, we are paying excess amount for water blindly".

Water tax calculation according to PMC's 'water rate chart booklet, 2016', 1000 litres water is provided at Rs. 5.50 for 150 lpcd water, Rs. 9. 20 for 150 to 200 lpcd, Rs. 18. 30 for 200 to 250 lpcd and Rs. 27.50 for more than 250 lpcd water for residential usage of water and for non-residential it depends on the carpet area and water meter count. For example, minimum water charges are for,

1. Teashop - Rs. 900/ shop/month,
2. Washing centres Rs.430/shop/month,
3. Star hotels, Mangal Karyalayas Rs.3172/month, etc.

Water meters are to be installed in the all residential areas before the year 2021 year. Hence, water tax calculation for the residential areas is on the basis of Annual Rateable Value (ARV). This is again does not explain exact amount of water use. This rateable value is basisd on property carpet area and not basisd on the water consumption.

PMC almost gets Rs. 197 crores revenue income from water tax which is almost 82%, of the total revenue. That is just because of high water rate. Majority of people has to pay this much amount of water without considering actual use of water. Water charge seems to be high. Then, water consumption, domestic water charge is Rs. 5.50 for 1000 litres water which means it is Rs. 165/month and Rs. 1980/ year. It is estimated that water charges are going to increase by 15% each year.

Conclusion and findings

1. Conclusion

1. Meter system was introduced on January 1st, 1980. Initially, fixed rates were set for usage of water for both domestic and non-domestic purposes. The problem with this system was that the water was supplied with uniform rates without considering the extent of usage.

But, this led to a series of problems in the revenue collection. Faulty meters disrupted the smooth flow as envisaged. This system also required the recruitment of a large number of field officials to go out and collect the meter readings personally from the citizens' residences and properties. This was a long and tedious process and was not well-received by the citizens.

This situation changed from April 1st, 2000. The Municipal Corporation after much thought decided to link water charges with the Property Tax. Earlier, the faulty meters generated incorrect bills or in some cases the water charge was collected at a fixed rate basis on a quota system which did not consider the property type or the actual number of users in the property. The Pune Municipal Corporation (PMC) now started levying charges for domestic water usage. This charge was linked to the property and water tax was collected according to it.

As water metres are not installed in PMC, water tax is collected on the basis of the ARV (annual rateable value) of the property for the residential property. Wherever water meters are installed for the commercial and industrial purpose, water tax is collected according to water usage. However, for the residential properties, water tax is collected on the flat area and not on the consumption of water. There is a direct relationship between water tax and flat area (large area - high water tax, small area - low water tax. This relationship is considered to calculate water tax amount for each flat).

Hence, each family has to pay different water tax. That is why it is very difficult to link per head water cost and per head water usages.

2. It is observed that due to this system rich people pay more water tax than poor people with less consumption of water. Middle class pay comparatively low water tax with same water consumption. The following table clearly shows this:

Table 3 – An example of ARV and paying water tax

Sr. No.	Description	Family no 1 Rich family	Family no. 2 Middle family
1.	Annual rateable value	12280	3290
2.	Annual water tax	Rs. 4830	Rs. 1481
3.	Total family members	03	04
4.	Total annual water consumption @ 150 lpcd	162000 litres annually	216000 litres annually

(Source: Collected samples by field survey)

From the above table it is clear that, Family no. 1 is paying more water tax than family no. 2 with less water consumption. For applying water tax for each family, Municipal Corporation considered economic status of the family because water tax should be affordable for each citizen. The basis for applying water tax is economic condition of the family and not the water consumption.

3. There is a separate provision for slums to pay property tax. There are about 12 lakh (33%) slums in the city. The general body has proposed a lump sum tax of Rs. 100/ month for residential and Rs. 150/ month for commercial property as a service tax and not a property

tax. Levying water tax rate for slum is also different; if it is temporary hut then water tax is Rs. 39.29/ month and Rs. 63.28/ month for permanent hut.

4. Almost more than 60 % slum does not get property tax or service tax bill so indirectly they do not have to pay their water tax. In fact, some slums are there at Vishrantwadi (Jaibhimnagar, Kamgarnagar, Sainiknagar, Vadar vasti), Yerawada (Bhimnagar), Bhosari (Adinathnagar, Vikas colony, shanti nagar, gavhanevasti), Parvati slum area (Janata Vasahat), having two PMC separate water connections given during elections. Among these, 60 % slums have illegal connections.

5. Maximum outlets connected to main drainage line are illegal and with very shallow depth. Hence, breakages of pipes are witnessed frequently and ample water goes waste. (It was observe during survey)

6. In general citizens pay 0.55 paisa for the 1litre of water; it is comparatively fewer amount which is paid to get drinking water. Water supply income is less and water supply expenditure is higher. That is why, the difference between income and expenditure has been increasing year by year.

Table 4 - Share of investments in different services of water department

	Revenue: Income		Revenue: Expenditure	
Sr. No.	**Revenue Details**	**Share of income (in %)**	**Expenditure Details**	**Share of Expenditure (in %)**
1	Water tax	79	Employee salaries	33. 48
2	Receipt from system	1. 41	Loan repayment	2. 68
3	Water benefit tax	16	Electricity	37
4	Others	1. 82	Others	14. 28
5			Operation and Maintenance	1
6			Petrol and Diesel	0. 7
7	Total =	100 %	Total =	100 %

(Pune Municipal Corporation, Simplified budget, Water Department)

It has been observed that high amount of investment is required to improve water supply system.

7. This water tax system is not ideal; lack of management is mostly highlighted in this system of tax collection. Instead of investing high amount of money in improving water

supply system there is high illegal water connection, high amount of non - revenue water, intermittent water supply, water contamination, water theft, etc.

8. Maximum water wastage and illegal connections are seen in the slum areas and as they do not pay water tax indirectly (it is free for them). Water contamination also has been found at high level in the slum areas due to high leakages and innumerable illegal connections.

2. Findings:

1. Water charges are basis on the annual ratable value.

2. Water tax increases as carpet area of property increases resulting in rich people paying more tax than common man.

3. There are some findings on the basis of available data which are given below with the help of some statistical data. Hypotheses have been tested on the basis of available data. The method of testing the hypotheses has been stated in Para 1.4. in the first chapter. As explained, many of the statistical tools used for generalization cannot be used in this study to test the hypothesis. In some cases, if the replies of a majority of the respondents support a hypothesis then that hypothesis is considered as confirmed. Otherwise, it is considered as rejected. Moreover, some hypotheses were tested on the basis of secondary data. The data connected with the hypothesis and obtained from respondents has been used for this purpose. Conclusions of earlier studies made elsewhere were used to supplement the hypothesis of the study.

4. The following hypothesis have been tested in this chapter basisd on the available data:

I. There is a direct relationship between water tax and water consumption.

II. There is a significant relationship of water tax between ARV and expected water tax.

Hypotheses Testing 1

The hypothesis of the study is "There is a direct relationship between water tax and water consumption".

H0 Null Hypothesis: Water tax is equal to water consumption.

H1 Alternate Hypotheses: Water tax is not equal to water consumption.

This hypothesis has been tested for the water tax of selected citizens of Pune city by using Chi-square test. Water tax is actually collected on the basis of Annual Ratable Value and not on the basis of water consumption. Therefore, paying water tax is not appropriate according to water consumption.

Hypothesis 1: Water tax is equal to water consumption

Consumers are paying water tax (annual) on the basis of ARV slabs in Rupees. (O)	**Expected Value for water consumption annual @ 150 lpcd in Rs.@ Rs.5.5 for 1 K.L. water (E)**	**(O-E)**	**$(O-E)^2$**	**$(O-E)^2$ /E**

3680	891	2789	7778521	8730.102132
1481	1188	293	85849	72.26346801
1630	594	1036	1073296	1806.895623
1481	594	887	786769	1324.526936
1630	2079	-449	201601	96.97017797
1481	891	590	348100	390.684624
1481	1782	-301	90601	50.84231201
1630	1485	145	21025	14.15824916
1481	1188	293	85849	72.26346801
1481	1625.5	-144.5	20880.25	12.84543217
1630	594	1036	1073296	1806.895623
3680	891	2789	7778521	8730.102132
			Total =	**23108.55**

Degree of Freedom	**11**
Calculated Value	**23108.55**
Tabulated Values at following Level of Significance	
0.05	**19.68**

Conclusion-

Conclusion: Calculated value is more than tabulated value C.V. > T.V. That's why above Hypothesis is Rejected

Calculated value of Chi-square for 11 degree of freedom at 0.05 level of significance is **19.68** which is much lesser than the calculated value **23108.55**. As the calculated value is more than tabulated value, there is much considerable difference between T.V and C.V. Thus, the above Hypothesis is rejected. Hence, the null hypothesis of the study stands for rejection. Therefore, water tax is not equal to water consumption is proved.

References:

1. C, Ekalavya. Water Conservation: Present Scenario, Protection and Development. 20 Apr. 2019.
2. D., Aahirrao. Practical Geography. Nashik: Sudarshan Publication, 2005.
3. Dale Whittington, W. Michael Hanemann, Claudia Sadoff. The Challenge of Improving Water and Sanitation Services in Less Developed Countries. USA: New Publisher, 2009.
4. Amos Caleb, Ataur Rahman, and John Mwangi Gathenya. "Economic Analysis and Feasibility of Rainwater Harvesting Systems in Urban and Pri-Urban Environments: A Review of the Global Situation with a Special Focus on Australia and Kenya". Multidisciplinary Digital Publishing Institute (MDPI),April 2016: 1- 21.

5. BurtMurray, and Bilha Keiru. “Innovative Rainwater Harvesting Techniques for Emergencies”. Water, Sanitation and Hygiene:Sustainable Development and Multispectral approaches, Addis Ababa, Ethiopia, 2009: 1- 4.
6. Corbella Hug, and David Pujol. “What Lies Behind Domestic Water Use? A Review Essay on the Drivers of Domestic Water Consumption”.Boletín de la Asociación de GeógrafosEspañoles, Jan. 2009: 297-314.
7. Government of India. Ministry of Home Affairs. Census of Pune 2011. Ministry of Home Affairs, 2011.
8. Government of India. Ministry of Home Affairs. Directorate of Census Operations, Maharashtra (2007): Maharashtra Administrative Atlas, Census of India 2001, Mumbai.
9. Government of India. Ministry of Urban Development. Best Practices on Property Tax Reforms. In India.National Institute of Urban Affairs, 2010.
10. Government of India. Ministry of Urban Development. The National Urban Sanitation Policy 2008 (NUSP). Government of India, 2008.
11. Government of Maharashtra. Directorate of Economics and Statistics, Planning Department. District Socio-Economic Review 2009, Pune District. District Statistical Office, 2009.