AN ANALYTICAL STUDY ON WATER UTILIZATION PATTERN OF HOUSEHOLDS IN CHENNAI CITY

(With Special Reference to Teynampet Zone)

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Abstract

Water scarcity is an abstract concept to many and a stark reality for others. It is the result of myriad environmental, political, economic, and social forces. Due to geography, climate, engineering, regulation, and competition for resources, some regions seem relatively flush with freshwater, while others face drought and debilitating pollution. In much of the developing world, clean water is either hard to come by or a commodity that requires laborious work or significant currency to obtain. According to the United Nations, water use has grown at more than twice the rate of population increases in the last century. By 2025, an estimated 1.8 billion people will live in areas plagued by water scarcity, with two-thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change.

Keywords: *Water scarcity, house hold, Election commission, politics. Supply,*

INTRODUCTION

"Life cannot exist without water in this world" as stated in the Thirukkural. Water is essential for life. The amount of drinking water required is variable which depends on physical activity, age, health issues, and environmental conditions. Water covers some 70% of the Earth's surface. Approximately 97.2% of it is saline, just 2.8% fresh. Potable water is available in almost all populated areas of the Earth, although it may be expensive, and the supply may not always be sustainable. According to UNICEF report on Indian Water, there will be constant competition over water, between farming families and urban dwellers, environmental conservationists and industrialists, minorities living off natural resources and entrepreneurs seeking to commodify the resources base for commercial gain.

The water you drink today has likely been around in one form or another since dinosaurs roamed the Earth, hundreds of millions of years ago. While the amount of freshwater on the planet has fairly remained constant over time

continually recycled through the atmosphere and back into our cups the population has exploded. This means that every year competition for a clean, copious supply of water for drinking, cooking, bathing, and sustaining life intensifies.

The study focusses on the domestic utilization of water among households in Teynampet zone of Chennai City. Beyond analyzing the activity base water utilization, the paper examines the saving mechanisms adopted by the households in that study area.

Literature Review:

A. Murugesan, N. Bavana, C. Vijayakumar, T. Vignesha (**2015**) in his survey titled *'Drinking Water Supply and Demand Management in Chennai City – A Literature Survey'* gives a detail about the water scarcity, quality of water in Chennai city and supply and demand of the drinking water in Chennai city. They depicted the natural reasons and human cause in the scarcity of water problem in Chennai with the study of the 20 different journals in ground water source, water dearth and drinking water quality. They also explained the importance of water storage and awareness of rainwater harvesting.

S. Gayathridevi, T. Johnson, C. Vijayalakshmi (**2017**) in their article *'Water Management in Chennai– A Fuzzy Study'* discussed about the major factors which had caused the flood in Chennai city during December 2015. This article is made by using the fuzzy logic control to identify which of the factors have played major role in that flood. They also examined the present condition of pollution in Chennai and how they affected the water bodies and they provide some of the mathematical models by the fuzzy logic.

Tariq Ahmad Bhat (**2014**) in his study entitled *'An Analysis of Demand and Supply of Water in India'* provided the descriptive picture on the demand and cause for demand of water in India. He has been found that the demand for water is increasing substantially due to increased population, growing urbanization and rapid industrialization. He describes that the supply of water is inadequate compared to its growing demand in agricultural and human need in day-to-day life. He also estimated in his study that more than 2.2 million people die each year from disease related to contaminated drinking water and poor sanitation.

S. Sethuram (2014) in his paper *'Case Study: Water Management Issues in Chennai, India'* describes water security, policy changes and to analyze the policies and adaptation strategies where the survey results implied that an increase in water use efficiency is much needed. In his study where there is a need to purchase of water for drinking and cooking makes the households for more expense and states that the current demand management programs are insufficient to support Chennai's population growth, management through conservation and efficiency needs further enhancement and dynamic action.

Dexter V. L. Hunt and Christopher D.F. Rogers (**2014**) in their paper titled as *'A Benchmarking System for Domestic Water Use'* introduces a new benchmarking system i.e., using band rating for measuring the water-use performance of a domestic water use in the UK and suggested that any band-rating is best aligned with overall potable mains water consumption. It influences of Demand-side and supply-side approaches were considered from where it was found that user behavior has an equally.

Objectives:

The following objectives have been intended in the present study. The following are the objectives of the research.

➢ To study the water saving mechanisms adopted by the households

➢ To find the proportion of amount disbursed for water consumption by the households in the study area.

Methodology:

Research study should be a broad for the purpose of analysis. The entire study relies upon primary data alone to opt the research strategy where, it will be used for the purpose of finding the consumption and utilization pattern of households in the city. The study has random sampling procedure for selection of households in the city of 472 households of Teynampet zone among fifteen zones which covers eighteen wards in Chennai corporation. The data are analyzed through SPSS software to find the results and where the Chi-square test is conducted for the study.

The study conducted on Teynampet zone which is one among the fifteen zones in the Chennai Corporation which lies in Latitude 13.05495°, Longitude 80.23922° and covering an area of 25.19 Sq.km. The study has done with a field visit for collecting the information through a questionnaire across the eighteen wards. The samples collected from the 472 households in the study area Teynampet zone

A Short Analysis on Activity based Water Utilization among the Households:

In the field study, the total respondents are about 472 households in the Teynampet zone of Chennai city. The households of 71% are not taking the tap water directly for drinking purpose. With some basic facts of the study area, the short descriptive analysis of data discussed below.

In the study, the households depend upon the metro water for their consumption where the households are consuming more water from the source of Common Water Shared Tanks where the metro water board brings the water through lorries or through inbuilt motor supply to the metro water tanks placed near the dwelling units. This common water shared tanks accounts 45% and bore water stands next with 32% which are the major two water supply for households in their area. The other sources as indoor water tap is only 19% where all the households have their taps in the house and some of the households have well water supply of 4% in their residing areas.

The study area has the major source of drinking water as Packed Cane Water of 63% of households using it for daily drinking purposes. The households also using the piped water for their drinking of 30% which is relatively low as compared with packed cane water for their drinking purposes. A few people from the city are moving towards a refilling center to fill up their needs of drinking purposes which casts 7% among the other sources of drinking water. The people of the various wards are preferring their drinking water source is even in low earners, the source is fully on Packed cane water which is quite costly among other sources. Irrespective of their earnings, the people are using this type of source for their drinking purposes.

Households major water using appliances in their houses as namely Bath Tub, Water Heater, Washing Machine, Hand Basin, Flushing Toilet and Shower. From the field study, the households major water using appliances are Shower accounts 67.4% and Washing Machine 56.4% which uses more quantity of water for their daily use and the other appliances are Flushing Toilet is 43.%, Hand Basin 21.8%, Bath Tub 10.4% and Water Heater 4.7%. These appliances were using the amount of water comparatively less enough with other two appliances. This shows a water usage monitoring in households should be needed to control the usage of water according to their need as washing machine is the major utilization of water among the households where huge amount of water is needed irrespective of

their washing quantity of clothes. In the study there were the households of 71.4% says that there will be a less usage of water if clothes were washed manually where against 28.6% of people says that the less usage is not possible by manual washing.

Then, the household's usage of water based on their daily activity as Drinking, Cooking, Bathing, Laundering, Toilet Flushing, Vehicle Washing and Gardening. Among that activity based water usage, the households were using 76.1% for Bathing and 71% for Laundering which shows that high compares with other purposes as Vehicle washing, gardening and toilet flushing. The other major purposes are drinking and Cooking accounts 56.1% and 52.8% of households use water daily. In the field work, the household's states that their daily purpose of water usage is for washing, drinking and cooking which are all their main purpose of consumption among the households, rather than the usage of other domestic purposes.

Analysis of Water Saving Mechanism adopted by the Households

Using Chi-Square test, the following test has conducted between kind of Housing Ownership residing in and Water Saving Mechanism adopted by the households in SPSS Software.

Hypothesis:

H_0: There is no statistically significant relationship between the housing ownership and the water saving mechanism adopted by the households.

H_1: There is statistically significant relationship between the housing ownership and the water saving mechanism adopted by the households.

Table 1.1:
Chi-Square Test – I
Housing Ownership and Water Saving Mechanism Cross tabulation

Housing Ownership		Water Saving Mechanism		Total
		Yes	No	
Own House	Count	148	74	222
	% within Housing Ownership	66.7%	33.3%	100.0%
	% within Water Saving Mechanism	58.7%	33.6%	47.0%
	% of Total	31.4%	15.7%	47.0%
Rent House	Count	84	136	220
	% within Housing Ownership	38.2%	61.8%	100.0%
	% within Water Saving Mechanism	33.3%	61.8%	46.6%
	% of Total	17.8%	28.8%	46.6%
Apartment House	Count	8	7	15
	% within Housing Ownership	53.3%	46.7%	100.0%
	% within Water Saving Mechanism	3.2%	3.2%	3.2%
	% of Total	1.7%	1.5%	3.2%
Slum Area	Count	12	3	15
	% within Housing Ownership	80.0%	20.0%	100.0%

	% within Water Saving Mechanism	4.8%	1.4%	3.2%
	% of Total	2.5%	0.6%	3.2%
	Count	252	220	472
	% within Housing Ownership	53.4%	46.6%	100.0%
Total	% within Water Saving Mechanism	100.0%	100.0%	100.0%
	% of Total	53.4%	46.6%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.441[a]	3	.000
Likelihood Ratio	41.231	3	.000
Linear-by-Linear Association	8.037	1	.005
N of Valid Cases	472		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.99.

Interpretation: In the different kinds of housing residencies, the households were adopted different water saving measures. The people who are residing in own house about 66.7% of households are having water saving measures whereas 33.3% of the households does not have this measure. On accountably, the own house people of 47% have adopted water saving techniques as fitting a water saving shower head, water saving tap for wash basin, censored taps. Within the water saving mechanism, it ranks 58.7% between the housing residents.

People residing in rent house having 38.2% of the people with water saving measure as used water for gardening, toilet flushing and moping floor. The households of 61.8% are not aware about water saving mechanism in the houses. Relatively equal with the own house of overall weightage as 46.6% in determination of adoption of water saving measures. As the people residing in apartment houses say 53.3% of the people are aware about the water saving measures whereas 46.7% of the

households are not adopted the water saving appliances and water saving techniques among the households. In the slum areas, 80% of the households are aware about the water saving mechanism as against 20% of households are not aware about the water saving measures in their dwelling units. Overall weightage of apartment house and slum area residents are 3.2% each kind of housing ownership.

In overall, 53.4% of households are aware about the water saving measures by different housing residential units. 46.6% of households are not aware about the water saving mechanism in the study area.

Chi-Square Test Interpretation: For this Chi Square test, the calculated value (P value) is 40.441 with a degree of freedom (df) is 3, according to the table value with 0.05% significance the value is 0.0717. So, we are rejecting the null hypothesis (H_0) and accepting the alternative hypothesis (H_1) where the study has shown statistically significant relationship between the housing

ownership and the water saving mechanism adopted by the households.

Major Findings of the Study:

The major findings from the study are based on the responses of 472 households as follows,

♦ Households are preferring Packed Water for their drinking purposes irrespective of the other sources of the water supply.

♦ Metro water and Commonly Shared Tanks are the major source of use by the households.

♦ Majority of the households are using the water for bathing, laundering and cooking purposes.

♦ Households felt that the usage of water will be lesser if the clothes washed manually.

♦ 71% of households does not drink the Metro water directly even it is treated by the water board.

♦ Shower and Washing Machine are the two major appliances uses water in large quantity.

♦ 56.1% of households needs an improvement in the quality of water supplied through the water board.

♦ 59.7% of the households are felt that the water should be charged for the consumption purposes.

♦ Majority of the households irrespective of their efficiency, they are adopting water saving measures in their houses.

♦ Relatively a greater number of households are not aware about the problem of water scarcity in their area.

♦ 33.3% of the households are do not think about water should be saved for future or further purposes.

♦ Majority of the households as not yet adopted rain water harvesting mechanism in their houses where 44.9% of the people save rain water rarely

♦ Around 62.9% of the households gave priority of water for drinking purposes whereas 8.3% for cooking purposes.

♦ 28% of the households opted 'Moving to alternatives' if they are at water scarce periods irrespective of water availability at source.

Suggestions:

∗ The households should be educated through some frequent measures about the water conservation even at micro levels. It will help the people to be aware of reuse of water.

∗ Rainwater Harvesting is the best way to recharge the ground water. Among the people, the rainwater harvesting mechanisms should be reached and implemented to preserve water at least during monsoon seasons.

∗ Government should take necessary steps to create awareness among the people during the scarcity of water. This could enable the people to understand about the scarcity level rather than telecasting the issue in the TV news rarely. It will encourage the people to use low quantity of water.

Conclusion:

A few domestic water saving mechanisms can be adopted to make a difference. Technical measures like changes in water supply, improving maintenance, using some water saving device, etc. can improve the present situation of water scarcity. Imposing some regulatory measures to prevent the misuse of water, will be helpful tool to conserve water. Quality of water bodies in the city is degrading rapidly. So, the problem of water shortage could be addressed by using best use of the available technologies and resources to conserve the existing water resources.

India is not a water deficit country, but due to negligence and lack of monitoring of water resources development, a few states in the country experience water scarcity. India has the

power to avoid this dark future if people act immediately: start conserving water, begin to harvest rainwater and regulate the usage of ground water.

SAVE WATER, SAVE EARTH

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