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Research Article

A Study On Willingness To Pay For Improved Water Supply In Selected Households Of Coimbaore Corporation

G.Vaishnavi[1]and Dr.C.Parvathi2
Research Scholar, Department of Economics, Avinashilingam Institute of Home science and Higher Education for Women, Coimbatore. vaishuyashmi@gmail.com
Associate professor, Department of Economics, Avinashilingam Institute of Home science and Higher Education for Women, Coimbatore. economic.parvathi@gmail.com

ABSTRACT

Water scarcity is a major issue in the developing countries. As a result of population expansion, water distribution to homes is becoming increasingly difficult. As the quality of water delivery infrastructure deteriorates, clean water is mingling with sewage and becoming a cause of waterborne illnesses. In the city of Coimbatore, the Contingent Valuation Method was used to determine the willingness to pay (WTP) for better water delivery. This study looks into the relationship between WTP and socioeconomic factors as income, housing, and employment. In addition, 100 people were randomly selected and handed questionnaires. In statistical analysis, multiple regression is performed to find the variables that determine WTP for enhanced water supply quality. According to the data, the income variable had the biggest impact on the WTP for increased water supply. The amount of water supplied to the general populace was often inadequate. As a result, it's apparent that urban households regard water as a valuable commodity, as evidenced by their willingness to pay for it. Those with a higher income were more willing to pay for higher water quality and more consistent supply. This finding sustain the environmental economic theory which assumes that the demand for an improved environmental quality increases with income.

KEY WORDS: Contingent Valuation Method (CVM); Willingness to Pay (WTP); Regression Model; Improved Water Supply

INTRODUCTION

Toxic-free drinking water is crucial for human health and survival. Water is utilised in a variety of ways in the home, including drinking, cooking, cleaning, gardening, and laundry. Any change in water supply has an immediate effect on human health and ability to perform daily duties. As a result, the water should be safe to drink and the household supply should be reliable. The bulk of the world's population is currently affected by overpopulation, which has had a significant influence on water quality and

availability. Various estimates put the number of people without access to safe drinking water at around 700 million, with 2.5 billion people suffering the repercussions.

Poor sanitation and limited water supply are to blame for the majority of waterborne infections in Asia, South Africa, and the Central World. According to a new WHO/UNICEF poll, three out of ten people (2.1 billion) lack access to safe, readily available water at home, while six out of ten people (4.5 billion) lack basic sanitation (WHO, 2017). The majority of water for residences comes from public wells, bottled water purchases, private wells, and vendor purchases. These sources not only waste time and money, but they also pose a risk of spreading waterborne infections. Authorities are working to meet current population demands while also increasing economic growth. (Akhtar et al, 2018)

STATEMENT OF THE PROBLEM

Population growth is the increase in the number of individuals in a population. Since the end of the Cold War, the population of many countries throughout the world has grown, particularly in Sub-Saharan Africa, the Middle East, South Asia, and Southeast Asia. In some of the world's poorest countries, rising population numbers are predicted to increase demand for natural resources, food, fuel, jobs, housing, and other services. The paucity of water is compounded by population growth. “Increasing demand and competition for water for domestic, industrial, and municipal uses is a result of population growth. Water is also needed for agriculture and industrial use, and for the evacuation of waste materials”.

In locations with limited water supplies, high populations, and rapid population growth, water scarcity and stress are increasingly likely. People relocate to water-stressed areas and cities as population development limits the amount of water available per person (Population Action International, 2012). Due to the inadequate water supply, the current water supply is insufficient to meet people's daily needs. As a result, wealthy countries' governments will be pushed to update their water delivery systems.. The study's precise goals were established in this setting.

- To differentiate the sample respondents based on their income groups
- To investigate the socioeconomic features of a sample of Coimbatore Corporation's urban families;
- To determine the willingness of Coimbatore Corporation residents to pay for improved water supply.

METHODOLOGY

The current research is focused on the spatial distribution of drinking water in Coimbatore. During the months of February and April 2019, a multi-stage, stratified, simple random sampling procedure was used to pick 100 sample respondents for the study. The statistical results for the study were calculated using SPSS version 19.

Result of the study

The following section discuss the findings of the study. At first the researcher has tried to find out the income groups of the sample respondents which is depicted in table (1).

TABLE-1
DETAILS OF SELECTION OF SAMPLE RESPONDENTS OF THE DOMESTIC HOUSEHOLDS

Level of Income	East Zone	West Zone	North Zone	South Zone	Central Zone	Total
Lower Income	12	8	7	5	16	48
	(60)	(40)	(35)	(25)	(80)	(48)
Middle Income	6	9	12	13	4	44
	(30)	(45)	(60)	(65)	(20)	(44)
Higher Income	2	3	1	2	0	8
	(10)	(15)	(5)	(10)	(0)	(8)
Total	**20**	**20**	**20**	**20**	**20**	**100**
	(100)	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**

Source: Field Survey, (2019).

The sample size was chosen based on income levels such as "Lower Income, Middle Income, and Higher Income", as shown in Table 1. In each zone, a home was chosen at random. In the current study, 20 sample households were chosen in each zone, for a total sample size of 100.

DEMOGRAPHIC AND SOCIO- ECONOMIC PROFILE

The demographic and socio-economic profile of the respondents is been given in table (2)

TABLE-2
DETAILS OF SOCIO- ECONOMIC CHARACTERISTICS OF SELECTED HOUSEHOLDS

Characteristics	Particulars	Total	Percentage
Age Group	0-20	13	13
	21-40	39	39
	41-60	34	34
	Above 60	14	14
	Total	**100**	**100**
Education Level	Up to Primary	12	12
	High School	34	34
	HSC	11	11
	UG	35	35
	PG and above	8	8
	Total	**100**	**100**

Type of House	Nuclear	65	65
	Joint	35	35
	Total	**100**	**100**
Level of Income	Upto 50,000	53	53
	50,000 - 1,00,000	26	26
	1,00,000 - 2,00,000	16	16
	Above 2,00,000	5	5
	Total	**100**	**100**

Source: Field Survey, (2019)

Between the ages of 1 and 20, 39% of the homes studied are between the ages of 21 and 60, and 13percent are between the ages of 1 and 20. Table (2) reveals that the majority of the people in the sampled families are between the ages of 21 and 40, indicating that they are in the workforce. It was widely assumed that the younger generation is more sensitive to water scarcity, which could affect Per Capita Water Demand. 65 of the 100 households were made up of nuclear families, whereas only 35 were made up of joint families.

Nuclear families made up around a quarter of the households in all zones. The amount of water required per household increases as the number of persons per dwelling increases. The education level of the households was documented in all of the locations. The majority of the households have a High School or UG education level, as seen in the table. Others accounted for less than 20% of the total. Low educational attainment translates to a low standard of living, and hence to a lack of awareness of groundwater depletion and conservation initiatives.

In all zones, roughly 12% of households were illiterate, and the highest degree of education was Undergraduate, which accounted for 35% of responses. Education levels influence both the increase in water use and the awareness of water conservation technology, programmes, and legislation. However, it was discovered during the survey that people from all groups showed minimal concern for water conservation..

It is clear that roughly 5% of the population earns more than 2,00,000 pm, while approximately 16% earns between 1,00,000 and 2,00,000 pm; hence, Coimbatore Corporation is home to a diverse population, with some earning less each year and others enjoying a high level of life. A little more than 26% of respondents had incomes ranging from Rs.50,000 to Rs.1,000,000, with the remaining 53% falling into the low-income category.

WATER CONSUMPTION PATTERNS

Domestic water consumption pattern of the selected respondents is been given in the table (3).

TABLE-3

WARD WISE DETAILS OF WATER CONSUMPTION IN SELECTED HOUSE HOLDS

Zone	Drinking	Cooking	Bathing	Washing	Cleaning	Gardening	Vehicle

					House		cleaning
East	**325**	**980**	**1017**	**593**	**139**	**48**	**200**
Mean	16.25	49	50.55	29.65	6.95	2.45	10.05
SD	7.46	8.26	7.05	7.58	2.29	4.48	4.23
West	**349**	**890**	**1688**	**535**	**150.5**	**35**	**185**
Mean	17.45	44.5	67.05	26.75	7.52	1.75	9.25
SD	6.98	7.09	11.06	6.24	3.5	3.04	3.73
North	**294.5**	**784**	**1353**	**497.5**	**189**	**41**	**158**
Mean	14.72	39.2	67.65	24.87	9.45	2.05	7.9
SD	5.24	9.3	11.16	5.56	3.86	3.15	4.01
South	**316.5**	**982**	**1456**	**458**	**178**	**31**	**134**
Mean	15.82	49.1	72.8	22.9	8.9	1.55	6.7
SD	2.98	6.73	11.03	3.66	3.13	3.1	2.2
Central	**351.5**	**827**	**1301**	**435**	**168**	**21**	**114**
Mean	17.57	41.35	65.05	21.75	8.4	1.05	5.7
SD	2.3	5.06	8.81	4.43	2.27	1.76	1.45

Source: Field Survey, (2019). Liter Per Capita per Day (LPCD).

The amount of water used in different parts of the city differed significantly. The table (3) shows the total water usage pattern throughout all zones of the city in order to determine the Liter Per Capita per Day (LPCD). The corporation's west zone consumed the most water out of the five zones, with an LPCD of 192 litres. The middle zone had the lowest water consumption, with an LPCD of 161 litres. Summer water use was higher than winter water consumption, possibly due to the increased volume of garments to be washed, utensils to be cleaned, and bathing intensity was also higher in the summer than in the winter.

WILLINGNESS TO PAY FOR IMPROVED WATER SUPPLY

Willingness to pay is a word used in economics to describe how much a client is willing to pay for water. It's a concept that's been tested in a number of research initiatives around the world, and it's shown that people in destitute countries are happy to pay for water. The cost of establishing a city's public water service has been proved to be equal to the earnings from water purchases.

TABLE (4)

WILLINGNESS TO PAY FOR IMPROVED WATER SUPPLY AMONG THE SELECTED HOUSEHOLDS

S.no	Item	Low income in (%)	Middle income in (%)	High Income in (%)
1	Need water and willing to pay	45	50	78
2	No need of extra water	20	18	20
3	Need water but unable to pay	35	32	02

Source: compiled from field survey, (2019).

The above table (4) shows the willingness to pay for improved water supply among the selected households. It can be identified from the study among the selected groups for low income group 45 percent have stated that they need water and they are willing to pay for improved water supply followed

by 35 percent who stated that they need water but they are unable to pay for it and 20 percent said that they no need extra water for their consumption. In case of middle income group 50 percent said that they need water and they are willing to pay for improved water supply, 32 percent said that they need water but unable to pay for it and 18 percent said that they no need extra water. Whereas, for high income group 80 percent said that they need water and they are willing to pay for it and 20 percent said that they no need of extra water and only 02 percent said that they need water but they are unable to pay for improved water supply.

In the current study multiple regression analysis was applied to identify the relationship between the variables selected for the study and willingness to pay for improved urban water sources by the respondents. The result can be seen in the table below. For the study variables like LPCD, the total distance for water collection, sources of water, time spent for water collection and the family size is considered to be the key determinants of willingness to pay for improved water supply among the selected respondent group.

MULTIPLE REGRESSION FOR WILLINGNESS TO PAY FOR IMPROVED WATER SUPPLY AMONG THE SELECTED HOUSEHOLDS

Table No 5: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.840	.706	.703	.594

Table No: 6 ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	544.678	5	108.936	309.080	**.000**
Residual	227.331	645	.352		
Total	772.009	650			

Table No: 7 Coefficients

Variables	Standardized Coefficients	T	Sig.
LPCD	.229	4.525	.000*
Total Distance for Water Collection	.299	5.675	.000*
Sources of Water	-.035	-1.636	.102^{NS}
Time Spent for Water Collection	.138	1.733	.084^{NS}
Family Size	.210	2.296	.022**
Income	.312	4.232	.000**

Dependent Variable: Willingness to pay
**** = Significant at 1% level, ** = Significant at 5% level, ^{NS} = Not Significant***
Source: compiled from field survey, (2019).

Regression analysis is used to identify the variables influencing Willingness to pay for improved urban water supply. At the household level five variables have been identified, which include distance for water collection, Family size, LPCD, sources of water, time spend for water collection etc.. Correlation matrices were applied to understand and shortlist the variables, which influence the willingness to pay for improved water supply at the household level. From the above table it is identified that variables such as LPCD, Total distance for water collection, income and family size is statistically significant at 1 percent level which indicates that these variables were found out to be influencing the respondents in their willingness to pay for improved urban water sources for their water necessity. All the above variables were found out to be influencing the amount spent for their secondary water source which indicated that increase in family size, income and total distance for water collection and LPCD increase the respondent's willingness to pay for improved urban water sources. The `R` squared value gives the goodness of fit of the model and the value being 0.706 which indicated that 71 percent of the variation was influenced by the combined effect of all the independent variables. Multiple correlation coefficient (0.840) between willingness to pay and the set of independent variables shows good amount of correlation and is found to be significant at 1 percent level ($p<0.01$) as tested by the 'F' ratio value being 309.080

Thus, it is evident in the current study the respondent's willingness to pay for improved urban water sources will be based on their size of family, income and the distance for water collection and LPCD.

CONCLUSION

Although India does not have a water shortage, certain areas of the country experience water stress from time to time as a result of chronic negligence and lack of oversight of water resource development projects, as well as economic reforms such as globalisation, liberalisation, and privatisation. The yearly rainfall in India is unevenly distributed across the country and at different times of the year. People should continue to concentrate on their water saving habits in order to increase water supply because it is a cost rather than a cost. In the future, humans must control and limit their use, as well as avoid wasting and polluting water with industrial and domestic waste. With water getting polluted people willing to pay for secondary water source is highly influenced by their income where low income people does not prefer paid water and high income group wishes to pay extra for their water needs. From the study it is evident that water is influenced by income group.

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