International Journal of Arts and Science Research

Journal home page: www.ijasrjournal.com

EFFECTIVENESS OF WATER SUPPLY SERVICE OFFERED BY THE MUNICIPALITY A CASE STUDY OF THENI DISTRICT, TAMIL NADU

Venkatesh Andavar[1*], G. Sudha[2], D. Pandurangarao[3]

*[1]Research Scholar, Department of Management, Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India.

[2]Assistant Professor, Department of Business Administration, Annamalai University, Sidambaram Tamilnadu, India.

[3]Department of Management and Marketing, College of Business and Economics, Halhale, Eritrea, Africa.

ABSTRACT

This study is aimed at studying the effectiveness of water supply offered by the Theni district, Tamil Nadu. Rural and semi-urban areas of the district are covered in the study. Among the different districts of Tamil Nadu, Theni district has been purposively selected for the present study. The data and information have been collected from 500 customers of Theni district and they are Bodinayakanur, Theni, Periyakulam, Andipatti and Uttamapalayam which are major areas of Theni district. The result of the research has revealed that there is large gap between rural and semi-urban areas water supply services in Theni district.

KEY WORDS

Effectiveness, Rural, Semi-urban and Water supply.
.

Author for Correspondence:

Venkatesh Andavar,
Research Scholar, Department of Management,
Manonmaniam Sundaranar University,
Tirunelveli, Tamilnadu, India.

Email: giftvenkey@gmail.com

INTRODUCTION

Water is the very basis of life and is the foundation for human survival and development. Sustainable and equitable use of water over millennia has been ensured by cultural adaptation to water availability through water conservation technologies, agricultural systems and cropping patterns adapted to different climatic zones, and conservation-based life styles. But in the last few decades the consequences of population growth, industrialization and urbanization, and the associated consumerist culture, have interfered with the natural hydrological cycle of

rainfall, soil moisture, groundwater, surface water and storage of all sizes. This has led to overuse, abuse and pollution of our vital water resources and has disturbed the quality and the natural cleansing capacity of water. Water is one of the most crucial elements in our national developmental planning for the 21st century. The proper management of our limited water resources will be essential to ensure food security for our growing population and to eliminate poverty. It will be essential also to avoid the growing conflicts and the possibility of social unrest in the country in future due to water scarcity[1]. Most population growth will occur in developing countries, mainly in regions that are already in water stress and in areas with limited access to safe drinking water and adequate sanitation facilities. More than 60% of the world's population growth between 2008 and 2100 will be in sub-Saharan Africa (32%) and South Asia (30%). Together, these regions are expected to account for half of world population in 2100. Such rates of population growth will have major social and environmental impacts, given the level of economic development in many affected countries[2].

Review of literature

Gabriel (2001) in his study has revealed that over the past 25 years bottled mineral water has climbed into a position of power in the world market. By the late 1990s, the bottled mineral water market was growing three times faster than soft drinks as the major beverage selling substance. He also reported that the world market of bottled mineral water has grown quickly and is considered as a global billion dollar business. The bottled water consumption has been steadily growing up over the last three decades at the global level and it is one of the fastest growing and the most dynamic sector in the food and beverage industry[3]. Shrivastava Brajesh.K and Alam Massod (2007) stated that the total production and cumulative water consumption of various treatment units used in water treatment at Rail Neer Plant, Nangloi, Delhi meet the Bureau of Indian Standards specifications for packaged drinking water (ISO : 14543 : 2004) and various amendments incorporated till Feb, 2006. The treatment system comprises chlorination, activated carbon filtration, pesticide removing system, softener, ultra filtration, reverse osmosis, marble chip filtration unit, micron filtration, UV disinfection and ozonation[4]. Sasirega Ramani and Sudharsava Reddy (1999) in their work, 37.14% of the respondents were using packaged drinking water for health purposes. Of these, 16.43% of the respondents were using packaged drinking water as it is hygienic, 6.43% of the respondents were using packaged drinkingwater as it is easy to use, 2.29% of the respondents use it for need not carry water, 4.29% of 6.43% of the respondents were using it as it avoids wastage of water, 20.71% were using it due to employees, demand, 5.71% were using it due to the presence of salt in the water. On the whole, majority of the respondents were using packaged drinking water for health reasons[5]. Natural Resources Defense Council (NRDC, 1999) reported that most consumers widely believe that bottled water is better for them due to added health benefits, even as this is not the case. Bottled water is also perceived to be safer than most tap water, when in fact nearly all U.S. residents have access to safe and reliable drinking water[6]. AWWA (2001) a survey conducted by the American Water Works Association.

Revealed that 35% of people drink bottled water because they were concerned about tap water safety, 35% drink it as a substitute for other beverages and 12% chose to drink it for both of those reasons. 18% drink it because of taste, convenience, or other reasons[7].

METHODOLOGY AND SAMPLING

Among the different districts in Tamil Nadu, the Theni district has been purposively selected for the present study. The consumers have been selected by adopting random sampling technique through pre-tested, structured interview schedule through direct interview method. The data and information have been collected from 500 consumers and pertain to the year 2014-2015. In order to identify the effectiveness of Water supply service offered by the municipality, Weighted Mean and factor analysis has been employed with principal component extraction with varimax rotation.

RESULTS AND DISCUSSION

Effectiveness of water supply service offered by the municipality

Satisfying consumers 100 per cent is very difficult to any service provider. Many theories have been developed to study consumer behavior and satisfaction. Here this analysis has taken various factors that related water service and effectiveness. The effectiveness of the water supply service offered by the municipality in semi-urban and rural are analyzed by working out weighted mean and test and the results presented in Table No.1.

AAT=Almost Always True if Weighted Mean is 5.00
FT= Frequently True if Weighted Mean is 4.00
OT= Occasionally True if Weighted Mean is 3.00
ST= Seldom true if weighted mean is 2.00
ANT= Always Never True if weighted mean is 1.00

In semi-urban area, the results indicate that there are hoarding activities and good investment on purifying is satisfied, time required to make avail of water is convenient, time of water supply is good, duration of water supply is good, waiting time to get water is reasonable, distance of water supply location is not a burden, location and transport is good, road quality is good, family members time investment on water gathering is not a problem, organizing and sharing work for water collection is satisfied, water use by members of family is satisfied, effect on relationship with the family members is never been a problem, available time of water supply is good, daily supply satisfied, location of water supply, general availability is good and money spent on water purchase is cheaper and reasonable are seldom true while, Price of water is cheap is occasionally true and low frequently true on effectiveness of water supply service offered by the municipality.

In rural area, the availability of water supply in Hoarding activities are good, investment on purifying is satisfied, time required to make avail of water is convenient, time of water supply is good, duration of water supply is good, waiting time to get water is reasonable, distance of water supply location not burden, location and transportation is good, road quality good, family members time investment on water gathering not a problem,

organizing and sharing work for water collection is satisfied, effect on relationship with the family members is never been a problem, available time of water supply is good, price of water is cheap and low, daily supply satisfied, location of water supply, general availability is good, money spent on water purchase is cheaper and reasonable are seldom true while, water use by members of family is satisfied is occasionally true and low frequently true on effectiveness of water supply service offered by the municipality. The t-value of 16.042 is significant at one per cent level indicating that there is a significant difference in effectiveness of water supply service offered by the municipality in semi-urban and rural area. Hence, the null hypothesis of there is no significant difference in effectiveness of water supply service offered by the municipality in semi-urban and rural area is rejected.

Factor analysis for effectiveness of water supply service offered by the municipality

The factor analysis for effectiveness of water supply service offered by the municipality in semi-urban area is analyzed and the results are here under discussed.

Factor Analysis for effectiveness of water supply service offered by the municipality in semi-urban area

In order to study effectiveness of water supply service offered by the municipality in semi-urban area, the factor analysis has been employed. The principal component method of factor analysis was carried out with Eigen value greater than one through varimax rotation and the results obtained through rotated component matrix are presented in Table No.2. There are ten independent groups are extracted which account for a total of 63.91 per cent of variations on the 19 variables of effectiveness of water supply. Each of seven factors contributes 10.95per cent, 10.75 per cent, 9.99 per cent, 8.72 per cent, and 8.46per cent, 8.26 per cent and 6.76 per cent respectively.

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 19 iterations.

Factor-I
From the Table No.6,8,1, it is inferred that out of 19 items of effectiveness of effectiveness of water supply, five variables have their high, relatively tightly grouped factor loadings on factor-I.
This factor consists of
Location of water supply (0.20)
Price of water (0.68)
Time of water supply (0.57)
Family members time investment on water gathering (0.60)
Organizing and sharing work for water collection (0.75)
Hence, this factor is named as **"WATER COLLECTION".**
Factor-II: is formed with
Available time of water supply (0.69)
Distance of water supply location (0.69)
Effect on relationship with the family members (0.66)
These variables are named as "**COMFORT OF GETTING WATER**"
Factor-III: is formed with
Daily supply (0.66)
Money Spent on water purchase (0.83)
Investment on purifying (0.43)
This factor is named as "**PRICE**"
Factor-IV: is formed with
Hoarding activities (0.27)
Remote location with poor transport (0.74)
Water use by members of family (0.74)
The factor is named as "**ADVERTISEMENTS OF WATER**"
Factor-V: is formed with
Duration of water supply (0.58)
Road quality (0.68)
This factor is named as "**SUPPLY**"
Factor-VI: is formed with
Time required to make avail of water (0.84)
Waiting time to get water (0.63)
These variables are named as "**TIME OF GETTING WATER**"
Factor-VII: is formed with
General availability (0.81)
The factor is named as "**AVAILABILITY**"

The Cronbach's alpha of the scale was 0.04 indicating that each factor demonstrated very less acceptable internal consistency.
Factor analysis for effectiveness of water supply service offered by the municipality in rural area
In order to study the effectiveness of water supply service offered by the municipality in rural area, the factor analysis has been employed. The principal component method of factor analysis is carried out with Eigen value greater than one through varimax rotation and the results obtained through rotated component matrix are presented in Table No.6, 8, 2.There are six independent groups were extracted which account for a total of 65.82 per cent of variations on the 19 variables of effectiveness of water supply service offered by the municipality in rural area. The each of six factors contributes 14.68 per cent, 13.08 per cent, 10.86 per cent, 9.75 per cent, 9.34 per cent and 8.10 per cent respectively.
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 8 iterations
Factor-I
From the Table No.3, it is inferred that out of 19 items of effectiveness of water supply service offered by the municipality in rural area, six variables have their high, relatively tightly grouped factor loadings on factor-I.
This factor consists of
Available time of water supply (0.59)
Family members time investment on water gathering (0.77)
Organizing and sharing work for water collection (0.66)
Effect on relationship with the family members (0.70)
Hence, this factor is named as **"WATER COLLECTION"**
Factor-II: is formed with
Daily supply (0.50)
Location of water supply (0.64)
General availability (0.77)
Time of water supply (0.80)
These variables are named as "**SUPPLY**"

Factor-III: This factor includes
Hoarding activities (0.56)
Investment on purifying (0.77)
Water use by members of family (0.68)
These three variables are named as "**AWARENESS"**
Factor-IV: This factor is formed with
Money Spent on water purchase (0.66)
Duration of water supply (0.77)
This factor is named as "**MONEY SPENT"**

Factor-V: This factor includes
Time required to make avail of water (0.37)
Distance of water supply location (0.63)
Remote location with poor transport (0.71)
Road quality (0.61)
This factor is named as **"FACILITY"**
Factor-VI: This factor is formed with
Price of water (0.77)
Waiting time to get water (0.76)
These variables are named as "**TIME"**
The Cronbach's alpha of the scale was 0.237indicatingthat each factor demonstrated less acceptable internal consistency.

Table No.1: Effectiveness of water supply service offered by the municipality

S.No	Effectiveness of Water supply service offered by the municipality	Semi-Urban		Rural		t-Value	Sig
		Weighted Mean	Status	Weighted Mean	Status		
1	Available time of water supply is good	2.53	ST	2.38	ST		
2	Daily supply is satisfactory	2.61	ST	2.47	ST		
3	Location of water supply	2.30	ST	2.12	ST		
4	General availability is good	2.41	ST	2.23	ST		
5	Money Spent on water purchase is cheaper andreasonable	2.35	ST	2.30	ST		
6	Price of water is cheap and low	3.94	OT	2.42	ST		
7	Hoarding activities are good	2.71	ST	2.30	ST		
8	Investment on purifying is satisfied	2.23	ST	2.44	ST		
9	Time required to make avail of water is convenient	2.84	ST	2.79	ST		
10	Time of water supply is good	2.33	ST	2.63	ST		
11	Duration of water supply is good	2.90	ST	2.52	ST		
12	Waiting time to get water is reasonable	2.55	ST	2.43	ST	16.042	0.01
13	Distance of water supply location is not a burden	2.27	ST	2.52	ST		
14	Remote location with poor transportation	2.33	ST	2.17	ST		
15	Road quality good	2.30	ST	2.51	ST		
16	Family members time investment on watergathering is not a problem	2.04	ST	2.57	ST		
17	Organizing and sharing work for water collection is satisfied	2.11	ST	2.58	ST		
18	Water use by members of family is satisfied	2.16	ST	3.03	OT		
19	Effect on relationship with the family members is never been a problem	2.16	ST	2.38	ST		

Source: Primary and Computed Data

Table No.2: Factor Analysis for Effectiveness of Water supply Service offered by the Municipality in Semi-urban Area

S.No	Effectiveness of Water supply service offered by the municipality	Rotated Factor Loadings on						
		Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Factor VII
1	Available time of water supply		.69					
2	Daily supply			.66				
3	Location of water supply	.20						
4	General availability							.81
5	Money Spent on water purchase			.83				
6	Price of water	.68						
7	Hoarding activities				.27			
8	Investment on purifying			.43				
9	Time required to avail water						.84	
10	Time of water supply	.57						
11	Duration of water supply					.58		
12	Waiting time to get water						.63	
13	Distance of water supply location	.	.69					
14	Remote location with poor transport				.74			
15	Road quality					.68		
16	Family members time investment on water gathering	.60						
17	Organizing and sharing work for water collection	.75						
18	Water use by family members				.74			
19	Effect on relationship with the family members		.66					
20	Eigen Value	2.081	2.044	1.898	1.659	1.607	1.571	1.285
21	% of Variance	10.950	10.758	9.990	8.729	8.460	8.269	6.762
22	Cumulative % of Variance	10.950	21.708	31.698	40.427	48.887	57.156	63.918
23	Cronbach's Alpha	0.043						

Table No.3: Factor Analysis for Effectiveness of Water supply Service offered by the Municipality in Rural Area

S.No	Effectiveness of Water supply service offered by the municipality in rural area	Rotated Factor Loadings on					
		Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
1	Available time of water supply	.59					
2	Daily supply		.50				
3	Location of water supply		.64				
4	General availability		.77				
5	Money Spent on water purchase				.66		
6	Price of water						.77
7	Hoarding activities			.56			
8	Investment on purifying			.77			
9	Time required to avail water					.37	
10	Time of water supply		.80				
11	Duration of water supply				.77		
12	Waiting time to get water						.76
13	Distance of water supply location					.63	
14	Remote location with poor transport					.71	.
15	Road quality					.61	
16	Family members time investment on water gathering	.77					
17	Organizing and sharing work for water collection	.66					
18	Water use by members of family			.68			
19	Effect on relationship with the family members	.70					
20	Eigen Value	2.790	2.486	2.063	1.853	1.776	1.539
21	% of Variance	14.682	13.084	10.860	9.753	9.348	8.100
22	Cumulative 0 of Variance	14.682	27.766	38.626	48.379	57.727	65.827
23	Cronbach's Alpha	0.237					

Source: Primary and Computed Data

CONCLUSION

The foregoing analysis shows that there is a significant difference in effectiveness of water supply service offered by the municipality in semi-urban and rural area. The factor analysis for semi-urban indicates that there are ten independent groups are extracted which account for a total of 63.91 per cent of variations on the 19 variables of effectiveness of water supply and they are grouped into water collection, comfort of getting water price, advertisements of water, supply, time of getting water, and availability. The factor analysis for rural indicates that There are six independent groups were extracted which account for a total of 65.82 per cent of variations on the 19 variables of effectiveness of water supply service offered by the municipality and they are water collection, supply, awareness, money spent, facility and time. Finally it is concluded that there is large gap between rural and semi-urban areas' water supply services in Theni district municipality.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST

We declare that we have no conflict of interest.

BIBLIOGRAPHY

1. Kathpalia G N and Kapoor. Water Policy and Action Plan for India 2020, an Alternative, 2002, 6.
2. Water in the world, *UNESCO,* 2009, 30-31.
3. Gabriel J. Bottled water, Understanding a social phenomenon Ambio, *Journal of the Human Environment,* 30, 2001, 118-122.
4. Shrivastava Brajesh K and Alam Masood. The Qualitative assessment of the water consumption for manufacturing packaged drinking water at Rail near Plant, *Journal of Scientific and Industrial Research,* 66(3), 2007, 227-230.
5. Sasirega Ramani and Sudharsava Reddy C H. A study on Institutional consumer perception of packaged drinking water, *MBA Project Report, Depart of Management Studies, Sri Sairam Engineering College, Chennai,* May 1999.
6. NRDC (Natural Resources Defense Council), Bottled Water Pure Drink or Pure Hype? http://www.nrdc.org/water/drinking/bw/bwinx.asp, 1999, last accessed Mar 31st 2011.
7. AWWA (American Water Works Association), Dawn of the Replacement Era, Reinvesting in Drinking Water Infrastructure, 2001, Last accessed Mar 31 2011.