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CONSUMERS' PERCEPTION TOWARDS DOMESTIC RO WATER TREATMENT PLANT IN ERODE DISTRICT

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Abstract
We can survive without food for two months or more, but we can only survive for a few days without water. Clean water contributes to good health; contaminated water can cause disease and even death. In order to be clean enough for human consumption, water usually has to be "treated" in some way. Every day it is observed from the news that large quantities of contaminants by sewage water and industrial effluents and also contamination of ground water or soil by the dyeing industries effluents are affecting the quality of water in the study area. The stated problems have made people to seek out various water treatment equipments. Drinking water is becoming a scarce and expensive commodity with increasing contaminants in the source, making filtration is essential and critical. RO water treatment plant is badly needed in the present study area.

Key words: Water ,Water Treatment Equipment ,Reverse Osmosis,Domestic RO, Consumer Perception .

INTRODUCTION

Human survival is fully dependent on water. Water has been ranked as second to oxygen by experts as essential for life. Clean water contributes to good health; contaminated water can cause disease and even death. In order to be clean enough for human consumption, water usually has to be "treated" in some way. In fact, all the cells and organs functions that make up our entire anatomy and physiology depend on water for their functioning.

WATER QUALITY POSITION IN ERODE DISTRICT

During the last two decades, Erode has gone through rapid industrialization and population growth, though it is an agriculture based area. Some industries are causing pollution, especially water contamination in the area is of concern. Due to increased industrial and textile processing units such as dyeing units, the effluents are discharged from the unauthorised dyeing units into the river. These units don't have effluent treatment plants and directly dump effluents into the river through open drains and hidden pipelines. Cauvery river is the main source of drinking water to the people in Erode district.

STATEMENT OF THE PROBLEM

Millions of people worldwide suffer from serious diseases because they do not have access to clean drinking water. The question to be asked is not, "Is my tap water polluted or contaminated". The real question is, "What are the contaminants in my water. What are their concentration levels and do they pose short or long term health risks at those levels?".Every day it is observed from the news that large quantities of contaminants by sewage water and industrial effluents and also contamination of ground water or soil by the dyeing industries effluents are affecting the quality of water in the study area.

OBJECTIVES OF THE STUDY

1. To find out the extent of variation among the consumer on their perception of the water treatment equipment.
2. To identify the level of satisfaction towards Ro water treatment equipment.

REVIEW OF PREVIOUS STUDIES

Mat Salleh, Roslina (2007) in his study entitled ***"Water Quality, Perception and Consumer's Satisfaction Towards Domestic Water Filters"*** *has discussed* that water is the most crucial source for the continuity of all creatures on earth.. The objectives of this study are to determine the quality of water supplied to homes and to study the level of knowledge, perception, practice and consumer's satisfaction towards water quality and the filtering system used in their homes. The results showed that almost all respondents (98.52%) experienced problems with the water supplied to their homes with the perception that its quality was not satisfactory and had the impression that the water could harm their health. Researchers can do further studies to assist government and consumers in drinking water consumption. Manufacturers and sales persons should be more responsible in marketing their products since it can affect the health of consumers.

Prakash *et al.,* (2007) in their study titled ***"Design & Development of Ultra Low Cost Water Purifier for Indian Rural Market"*** *has explained about* the importance of water purifiers. Water is the vital source of existence of life on earth. Drinking pure water has changed from luxury to necessity for the past few years. In general the people living in urban areas have access to good drinking water by having water purifier and at times can afford for packaged drinking water. The project

was aimed at designing a low cost water purifier suitable for rural conditions. The report outcome saw a 99% reduction of bacteria, virus and protozoa. Smell, taste and the temperature of water were found to be non objectionable.

Susan Talatala (2008) in his article titled ***"The Effect of Tap Water Perception on the Consumption of Bottled Water"*** *have discussed that* over the past 30 years, drinking water has evolved from existing as a household faucet essential to being pumped, bottled and sold as a convenience store commodity. The purpose of this study is to investigate the consumer incentive behind purchasing bottled water, namely how it is affected by a negative perception of tap water taste and safety. There was a moderate relationship between perception of tap water safety and consumption of bottled water and a strong relationship between the amount of bottled water and tap water one consumes.

Brown J, Proum S, Sobsey MD (2009) in their article entitled ***"Sustained use of a household-scale water filtration device in rural Cambodia"*** *have discussed about* the effectiveness of point-of-use water treatment .In order to evaluate the long-term uptake and use of locally produced ceramic water filters in rural Cambodia. Results indicate that filter use declined at the rate of approximately 2% per month after implementation, largely owing to breakages and that, controlling for time since implementation, continued filter use over time was most closely positively associated with: related water, sanitation and hygiene practices in the home; cash investment in the technology by the household; and use of surface water as a primary drinking water source.

Alisa Bektesevic and Grace Oloya (2010) in their study titled ***"The challenge of marketing water filters in Uganda"*** *has* examined about water filters in Uganda. The investigation has shown that the target customers are not buying the filter because they doubt its functionality of providing safe water which has thus hindered its acceptance rate. Boiling water is the accepted method which thus makes filtering disadvantaged. Also the filters performance does not meet the expectation of the respondents due its fragility and slow flow rate, the price of the filter was shown to be very expensive and unaffordable by the target group. The channels used to create awareness are not effective due to the low literacy rate affecting the level of understanding. Lastly, the underdeveloped distribution channels have not enabled easy accessibility of the product.

Jenson Chang, *et al.,* (2010) in their study titled ***"An Investigation into Sustainable Water Consumption (Bottled Water versus WaterFillz Units)"*** this report aims to perform an analysis on the environmental, economical, and social impacts of selling over-the-counter bottled waters versus implementing filtered water dispensing units such as WaterFillz. By surveying a small sample population within the Faculty of Applied Science, we have also identified that 80% of our participants are willing to drink tap water, however only 52% drink tap water at UBC

Teillet, E., *et al.,* (2010) *in their article titled* ***"Consumer Perception And Preference of Bottled and Tap Water"*** *have discussed that in order to understand consumer behavior toward drinking water, it is first necessary to determine sensory perception and liking for tap and bottled water.. Basically, three main tastes of water were highlighted and linked to the amount of minerals. The study demonstrated that the most likely preferred types of water are those with medium mineralization (total dissolved solids 300–350 mg/L), which are perceived as tasteless and cooler.*

Marc H. Gorelick *et al.,* (2011) in their article entitled ***"Perceptions about Water and Increased Use of Bottled Water in Minority Children"*** *have* described bottled water use and beliefs and attitudes about water among parents of children from different racial/ethnic groupsLogistic regression was used to evaluate the association between bottled water use and beliefs and demographic After other factors were adjusted for, race/ethnicity, household income, and prior residence outside the United States were not associated with bottled water use.

RESEARCH METHODOLOGY

The methodology of this study includes the design of the study, sampling design, geographical coverage, field work and collection of data. A pilot study was conducted on 50 consumers .Since the population is infinite, quota sampling has been adopted for the present study and the sample size is 500 respondents collected from five taluks in Erode District. The following statistical tools were used in tune with the objectives of the study.

- Descriptive Analysis
- Analysis of Variance(ANOVA)

LIMITATIONS OF THE STUDY

- The present study covers only home purpose water treatment equipment, the results obtained may or may not be applicable to large scale water treatment plant / equipment.

- As the geographical area of the study is limited to Erode district only, the findings of the study may not reflect the entire Indian scenario.
- The inherent limitation of the questionnaire is also a limitation for the study.

DESCRIPTIVE ANALYSIS

Source of Drinking Water

An attempt has made to know about the source of drinking water in relation to the satisfaction of RO water treatment. For the purpose of this study, it has been classified into five categories viz., Well, River, Tank, Community water supply and Bore-water. The details are furnished in the following table.

Table No.1, Source of Drinking Water

S.No.	Opinion	No. of Respondents	Percentage
1.	Well	30	6.0
2.	River	211	42.2
3.	Tank	69	13.8
4.	Community water supply	56	11.2
5.	Bore-water	134	26.8
	Total	**500**	**100.0**

It is determined from the above table that 6 percent of the respondents are getting water from well, 42.2 percent of the respondents are getting the water from river, 13.8 percent of the respondents are getting water from tank, 11.2 percent of the respondents are getting water from community water supply and 26.8 percent of the respondents are getting the water from bore-wells. It is found from the analysis that majority (42.2%) of the respondents are getting water from river.

Table No.2, Period of Using the Ro Water Treatment Plant

S.No.	Period of Usage	No. of Respondents	Percentage
1.	Less than 2 years	160	32.0
2.	2 to 5 years	237	47.4
3.	5 to 10 years	76	15.2
4.	Above 10 years	27	5.4
	Total	**500**	**100.0**

It is obtained from the above table that 32.0 percent of the respondents are using RO water treatment plant in their home for less than 2 years, 47.4 percent are using for 2-5 years, 15.2 percent are using in their home for 5-10 years and 5.4 percent of the respondents are using the RO water treatment plant in their home for above 10 years. It is found from the analysis that majority (47.4%) of the respondents are using the RO water treatment plant in their home for 2-5 years.

Table No.4, Source of Raw Water

S.No.	Opinion	No. of Respondents	Percentage
1.	Tap water	218	43.6
2.	Ground water	162	32.4
3.	Others	120	24.0
	Total	**500**	**100.0**

It is obtained from the above table that 43.6 percent of the respondents are getting raw water from tap water, 32.4 percent are getting raw water from ground water and 24.0 percent are getting the raw water from other sources. Majority (43.6%) of the respondents are getting the raw water from tap water.

Table No.7, Purpose of Using the Treated Water

S.No.	Opinion	No. of Respondents	Percentage
1.	Drinking	175	35.0
2.	Cooking	150	30.0
3.	Both	175	35.0
	Total	**500**	**100.0**

It is inferred from the above table that 35.0 percent of the respondents opined that the treated water is used for drinking, 30.0 percent opined that the treated water is used for cooking and remaining 35.0 percent of the respondents opined that the treated water is used for both the purpose. It is found from the analysis that majority (35.0%) of the respondents opined that the treated water is used for drinking and also for both the purposes of drinking and cooking.

Table No.8, Utilisation of Waste Water after Purification

S.No.	Opinion	No. of Respondents	Percentage
1.	Gardening	40	90.0
2.	Laundry	0	0.0
3.	Reverse to tank	0	0.0
4.	Clean the vessels	10	2.0
5.	Others	450	8.0
	Total	**500**	**100.0**

It is obtained from the above table that 90.0 percent of the respondents opined that the waste water after purification from RO is used for gardening, 2.0 percent opined that the waste water after purification from RO is used for clean the vessels and 8.0 percent of the respondents opined that the waste water after purification from RO is used for other purposes. It is found from the analysis that majority (90.0%) of the respondents opined that the waste water after purification from RO is used for Gardening

Table No.4.28, Level of Satisfaction

S.No.	Factors	Highly satisfied	Satisfied	Neutral	Dis satisfied	Highly dissatisfied
1.	Company Brand Image	66(13.2)	184(36.8)	181(36.2)	54(10.8)	15(3.0)
2.	Product quality	70(14.0)	96(19.2)	192(38.4)	111(22.2)	31(6.2)
3.	Price range	92(18.4)	189(37.8)	130(26.0)	65(13.0)	24(4.8)
4.	Product range	78(15.6)	290(58.0)	99(19.8)	33(6.6)	0
5.	Availability of the product	147(29.4)	236(47.2)	107(21.4)	8(1.6)	2(0.4)
6.	Source of information	65(13.0)	247(49.4)	179(35.8)	9(1.8)	0
7.	Awareness of the product	102(20.4)	194(38.8)	181(36.2)	20(4.0)	3(0.6)
8.	Life time of the product	48(9.6)	203(40.6)	156(31.2)	81(16.2)	12(2.4)
9.	Purchase experience	87(17.4)	221(44.2)	108(21.6)	74(14.8)	10(2.0)
10.	Removal of dust and dirt	103(20.6)	258(51.6)	112(22.4)	20(4.0)	7(1.4)
11.	Reduces the water born diseases	108(21.6)	263(52.6)	89(17.8)	34(6.8)	6(1.2)
12.	Sales people approach	71(14.2)	208(41.6)	146(29.2)	72(14.4)	3(0.6)
13.	Technical support provided by the company	143(28.6)	165(33.0)	152(30.4)	23(4.6)	17(3.4)
14.	Maintenance tips given by the company	47(9.4)	98(19.6)	193(38.6)	152(30.4)	10(2.0)
15.	Maintenance cost	88(17.6)	192(38.4)	123(24.6)	79(15.8)	18(3.6)
16.	Electricity consumption	72(14.4)	306(61.2)	97(19.4)	25(5.0)	0
17.	Service intervals provided	154(30.8)	241(48.2)	96(19.2)	7(1.4)	2(0.4)
18.	After sales services	61(12.2)	249(49.8)	182(36.4)	8(1.6)	0
19.	Advertisement	91(18.2)	211(42.2)	176(35.2)	18(3.6)	4(0.8)
20.	Availability of pamphlets and handouts	52(10.4)	199(39.8)	165(33.0)	75(15.0)	9(1.8)
21.	Warranty period	99(19.8)	216(43.2)	97(19.4)	79(15.8)	9(1.8)
22.	Free installation	114(22.8)	243(48.6)	113(22.6)	22(4.4)	8(1.6)
23.	Free water test	109(21.8)	261(52.2)	89(17.8)	36(7.2)	5(1.0)
24.	Consumer education regarding operation	64(12.8)	206(41.2)	151(30.2)	77(15.4)	2(0.4)
25.	Maintenance record from installation date	135(27.0)	166(33.2)	156(31.2)	26(5.2)	17(3.4)

It is inferred from the above table that the respondents are satisfied towards the factors “Company brand image”, Price range, Product range, Availability of the product, Source of information, Awareness of the product, Life time of the product, Purchase experience, Removal of dust and dirt, Reduces the water born diseases, Sales people approach, Technical support provided by the company, Maintenance cost, Electricity consumption, Service intervals provided, After sales services,

advertisement, Availability of pamphlets and handouts, Warranty period, Free installation, Free water test, Consumer education regarding operation and Maintenance record from installation date" as 36.8, 37.8, 58.0, 47.2, 49.4, 38.8, 40.6, 44.2, 51.6, 52.6, 41.6, 33.0, 38.4, 61.2, 48.2, 49.8, 42.2, 39.8, 43.2, 48.6, 52.2, 41.2 and 33.2 percent respectively regarding purchase of RO water treatment plant in their home. On the other hand, the respondents are neutral towards the factors "Product quality and Maintenance tips given by the company" as 38.4 and 38.6 percent respectively. It is found from the analysis that majority (61.2%) of the respondents are satisfied towards the factor 'Electricity consumption' regarding RO water treatment plant at their home.

ANOVA TEST

ANOVA is conducted to test the significance differences between personal variables and level of influence towards RO water treatment equipment.

The 5 personal variables taken for analysis are listed below:

- Family size
- Period of using RO water treatment plant
- Capacity of RO water treatment plant
- Purpose of using

FAMILY SIZE AND LEVEL OF INFLUENCE TOWARDS RO WATER TREATMENT

Hypothesis: The difference in the mean influence scores between the consumers who belong to different family size categories is not significant.

Table No.9,Family Size and Level of Influence towards Ro Water Treatment - Anova

Sources of variation	Sum of Squares	D.F	The mean score square	'F' Value	Table 'F' value at 5% level	Significance
BetweenGroups	0.863	2	0.431	0.947	2.60	Not Significant
WithinGroups	226.425	497	0.456			
Total	227.288	499				

Table reveals that the calculated value is lesser than the table value and it indicates that the different in the mean influence scores between the consumers who belongs to different family size categories is not significant.

Period Of Using And Level Of Influence Towards Ro Water Treatment

Hypothesis: The difference in the mean influence scores between the consumers who belong to different usage period status categories is not significant.

Table No. 10, Period of Using and Level of Influence Towards Ro Water Treatment - Anova

Sources of variation	Sum of Squares	D.F	The mean score square	'F' Value	Table 'F' value at 5% level	Significance
BetweenGroups	0.355	3	0.118	0.259	2.60	Not Significant
Within Groups	226.933	496	0.458			
Total	227.288	499				

Table reveals that the calculated value is lesser than the table value and it indicates that the different in the mean influence scores between the consumers who belongs to different usage period categories is not significant.

CAPACITY OF RO WATER PLANT AND LEVEL OF INFLUENCE TOWARDS RO WATER TREATMENT

Hypothesis: The difference in the mean influence scores between the consumers who belong to different capacity of RO categories is not significant.

Table No.11, Capacity of Ro Water Plant and Level of Influence towards Ro Water Treatment - Anova

Sources of variation	Sum of Squares	D.F	The mean score square	'F' Value	Table 'F' value at 5% level	Significance
Between Groups	2.572	5	0.514	1.131	2.21	Not Significant
Within Groups	224.716	494	0.455			
Total	227.288	499				

Table reveals that the calculated value is lesser than the table value and it indicates that the different in the mean influence scores between the consumers who belongs to different capacity of RO water plant categories is not significant.

PURPOSE OF USING AND LEVEL OF INFLUENCE TOWARDS RO WATER TREATMENT

Hypothesis: The difference in the mean influence scores between the consumers who belong to different purpose of usage categories is not significant.

Table No.12, Purpose of Using and Level of Influence towards Ro Water Treatment - Anova

Sources of variation	Sum of Squares	D.F	The mean score square	'F' Value	Table 'F' value at 5% level	Significance
Between Groups	0.378	2	0.189	0.413	2.99	Not Significant
Within Groups	226.910	497	0.457			
Total	227.288	499				

Table reveals that the calculated value is lesser than the table value and it indicates that the different in the mean influence scores between the consumers who belongs to different purpose of usage categories is not significant.

FINDINGS

Attributes relating to usage of RO water treatment equipment

The distribution of consumers on basis of usage of RO water treatment equipment indicates that 42.2% of the consumer have river as their main source of water .47.4% of the consumers are using Ro plant for a period of 2 to 5 years, 28.4% of the consumers use RO plant capacity of 5 litre /hr, 27% of the consumers use the equipment for 2-3 hours per day.

Attributes relating to installation of RO water treatment equipment

The distribution of consumers on basis of the installation of RO water treatment equipment indicates that 43.6% of the consumers raw water source is tap water 98% of the respondents test their raw water before installing RO equipment and 61.2% of the consumers opined that the head of the family is the deciding authority for the purchase of RO equipment.

Attributes relating to purpose of using treated water and utilization of waste water

The distribution of consumers on basis on the basis of purpose of usage of treated water indicates that 35% of the consumers use for drinking as well as for cooking purpose, and 90% of the consumers utilize the waste water that is let out from the equipment after purification for garden.

ANOVA

- The relationship between the residential status of the consumers and their influence towards RO water treatment plant is not significant.
- The relationship between the family size of the consumers and their influence towards RO water treatment plant is not significant.
- The relationship between the period of using the consumers and their influence towards RO water treatment plant is not significant.
- The relationship between the capacity of RO water treatment plant and their influence towards RO water treatment plant is not significant.

The relationship between the purpose of using the RO plant of the consumers and their influence towards RO water treatment plant is not significant.

SUGGESTION

1. The water treatment companies can confidently promote their products to achieve optimum benefits by taking advantage of high level of need acceptance among consumers.
2. The service provider should identify the variation in their expectation in order to retain the existing consumers in their beehive.
3. The service providers can target consumers residing in own house through promotion policies to leverage and generate better revenue for the company.
4. The companies can strengthen their product features to achieve optimum benefits by taking advantage of the existing opportunity.
5. The service providers can educate the consumers about the various mode of using the waste water usefully.

CONCLUSION

The study has been a rewarding exercise in the sense that it has assessed the perception of consumers on domestic RO water treatment plant. Drinking water is becoming a scarce and expensive commodity with increasing contaminants in the source, making filtration is essential and critical. RO water treatment plant is badly needed in the present study area.

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