# Water and the Consumers at Chromepet, Alandur Taluk – A Case Study based on the Pandemic

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**Abstract**

*Water is a basic right to life. Sustaining life in this earth needs water like oxygen. It's universal that the whole earth is majorly covered with water. Yet, just a very small amount of water is edible and is portable. Such precious Resource is to be used in an effective manner. This study is \*to understand the distribution of water to the consumers; \*to understand the perspective of people on the ground water; \*to understand the people's priority on the aspects of health, economy and water. Chromepet from Alandur Taluk, Kancheepuram District is been Chosen for this study. Based on the Primary and Secondary data, the datas have been transferred into spatial and non-spatial data with the help of GIS and Statistical tools.*

**Key-words:** Water Sources, Population, Economy, Water Consumers, Pandemic, Sustainable Development.

## 1. Introduction

The base of a settlement throughout human history was near a water site. And Water has played a major role in several historical pandemics and kingdom expansions. In India, in the recent years due to the population growth the water usage has increased in double fold(1).

During the pandemic and now while we try to emerge out of the economic battle around while we still counter with the Viral Attack, we can see the complete dimension of the people's perception

towards Groundwater. When health and economy took a back seat while people were busy in fetching portable water in ques by submitting their half day (time). To people who were not able to go and fetch portable water, they depended on Groundwater for drinking and cooking along with their basic needs. While most of the people who depended on groundwater for drinking more than 40% of people just drank from their taps (by storing or directly) without any filtering.

## 2. Study Area

Chrompet is a residential region in the southern part of Alandur Taluk. It is located 22 kilometres from Egmore. It lies close to Tambaram and next to Pallavaram. Chromepet is not a Tamil name. Earlier the town was the home of Chrome Leathers so the name chrome and pettai in Tamil means 'an Estate. This company has been completely demolished and Balaji Hospital has been built in that Place. The neighbourhood is served by Chrompet railway station of the Chennai Suburban Railway Network is a calm settlement region.(2)
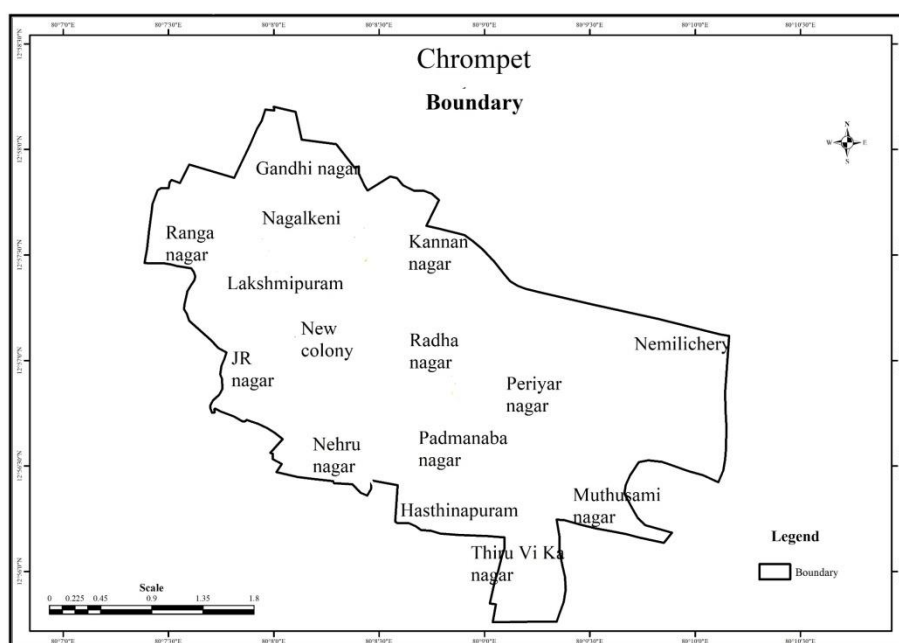


## 3. Methodology

The respondents of this study are residents living in different areas in Chromepet. A sample of 361 consumers was chosen. A self-administrative structured questionnaire was used to collect the responses of the residents. The test was done based on the primary and secondary data sources. The

null hypotheses were tested using, the Chi square test for association, ANOVA and Duncan Multiple Range Test (DMRT), paired t-test, and Karl Pearson Correlation is employed.

## 4. Analysis and Interpretation

The analysis and interpretation are based on the SPSS software for the residents' response of the questionnaire.

**Association between Water Purification before Consumption and Levels of their Water Perception in areas within Chromepet**

The Chi square test for independence is employed to examine the relationship between two groups.

Hypothesis:

$H_{011}$ - There is no association between water purification and levels of water perception.

Chi square test for association between water purification before consumption and levels of water perception

| Water Purification Before Consumption | Levels of Water Perception | | | Total | Chi -Square Value | P Value |
|---|---|---|---|---|---|---|
| | Low | Moderate | High | | | |
| Yes | 24 (25) [33.3] | 72 (75) [29.9] | 0 (0) [0] | 96 (100) [26.6] | | |
| No | 48 (18.1) [66.7] | 169 (63.8) [70.1] | 48 (18.1) [100] | 265 (100) [73.5] | 20.395 | <0.001** |
| **Total** | 72 (19.9) [100] | 241 (66.8) [100] | 48 (13.3) [100] | 361 (100) [100] | | |

Note: 1. The value within () refers to Row Percentage

2. The value within [] refers to Column Percentage

3. ** Denotes significant at 1% level

Since the p value is less than 0.05, thus the null hypothesis is rejected at 1% level of significance. Hence, it is concluded that there is association between purification of water consumption and levels of water perception. Residents' who purify water before consuming have low level of water perception with a mean of 33.3 and those who don't purify water before consuming

have moderate level of water perception with the mean of 70.1. Hence residents' who have low level of water perception or those who aren't satisfied with the groundwater in the area mostly purify their water before consumption, and residents' who belong to the moderate level predominantly do not purify before using water for their cooking or household purposes.

**Difference in Responses of Residents among Areas in Chromepet with Respect to Factors of Water Perception.**

One way ANOVA test is used to assess the presence of mean variations among different groups. This test is used to determine if there is statistically significant difference among the mean between two or more groups.

Hypothesis:

$H_{012}$ – There is no difference between Areas in Chromepet and Factors of Water Perception.

ANOVA for Significant difference among Area in Chromepet with Respect to Factors of Water Perception of Consumers in the Respective Areas

| Factors of Water Perception | Area in Chromepet | | | | | | F - Ratio | P - Value |
|---|---|---|---|---|---|---|---|---|
| | Lakshmi Nagar | Radha Nagar | Nagalkeni | Hastinapuram | Nemilichery | New Colony | | |
| Groundwater Perception | 13.71 (4.603) | 14.00 (.000) | 14.50 (.505) | 11.00 (.000) | 15.00 (.000) | 14.29 (2.894) | 4.523 | .001* |
| Environmental Factors | 15.00 (4.704) | 11.00 (.000) | 15.50 (1.516) | 13.00 (.000) | 14.00 (.000) | 14.32 (1.257) | 8.8083 | <.000* |
| Rainwater Harvesting | 16.14 (3.280) | 13.00 (.000) | 15.50 (1.516) | 15.00 (.000) | 15.00 (.000) | 15.34 (.946) | 8.395 | <.000* |
| Water Scarcity | 17.43 (2.44) | 11.00 (.000) | 16.50 (.505) | 17.00 (.000) | 14.00 (.000) | 15.68 (1.257) | 66.536 | <.000* |
| **Overall Factors of Water Perception** | 62.29 (13.885) | 9.00 (.000) | 62.00 (3.032) | 56.00 (.000) | 58.00 (.000) | 59.63 (2.078) | 9.610 | <.000* |

Note: 1. The value within bracket refers to SD

2. *denotes significant at 5% level

Based on the p value which is less than 0.05, we reject the null hypothesis at 5% level of significance. There is difference between the Areas in Chromepet with respect to the Factors of Water Perception. The respondents' have varied water perceptions based on different areas within Chromepet.

Note: 1. The value within bracket () refers to SD 2.* denotes significant at 5% level 3. Different alphabet among Age Group in years denotes significant at 5% level using Duncan Multiple Range Test (DMRT)

**Post-Hoc Test**

Based on Duncan Multiple Range Test (DMRT), Radha Nagar significantly differs from other areas in Chromepet with respect to Overall Factors of Water Perception at 5% level of significance, but there is no significant difference between Lakshmi Nagar, Radha Nagar and New Colony. Evidently, Hastinapuram differs significantly from other areas in Chromepet with respect to Groundwater Perception, but Lakshmi Nagar, Radha Nagar, Nemilichery and New Colony do not significantly differ at 5% level of significance. Also, Radha Nagar significantly differs from other areas in Chromepet, with respect to Environmental Perceptions and Rainwater Harvesting at 5% level of significance.

| Factors of Water Perception | Area in Chromepet | | | | | | F - Ratio | P - Value |
|---|---|---|---|---|---|---|---|---|
| | Lakshmi Nagar | Radha Nagar | Nagalkeni | Hastinapuram | Nemilichery | New Colony | | |
| Groundwater Perception | $13.71^b$ (4.603) | $14.00^b$ (.000) | $14.50^b$ (.505) | $\mathbf{11.00^a}$ (.000) | $15.00^b$ (.000) | $14.29^b$ (2.894) | **4.523** | **.001** |
| Environmental Factors | $15.00^{bc}$ (4.704) | $11.00^a$ (.000) | $15.50^c$ (1.516) | $13.00^{ab}$ (.000) | $14.00^{bc}$ (.000) | $14.32^{bc}$ (1.257) | **8.8083** | **<.000\*** |
| Rainwater Harvesting | $16.14^a$ (3.280) | $3.00^a$ (.000) | $15.50^b$ (1.516) | $15.00^b$ (.000) | $15.00^b$ (.000) | $5.34^d$ (.946) | **8.395** | **<.000\*** |
| Water Scarcity | $17.43^d$ (2.44) | $1.00^a$ (.000) | $16.50^{cd}$ (.505) | $17.00^d$ (.000) | $14.00^b$ (.000) | $5.68^c$ (1.257) | **66.536** | **<.000\*** |
| **Overall Factors of Water Perception** | $62.29^b$ (1.071) | $\mathbf{9.00^a}$ (.000) | $62.00^b$ (.438) | $56.00^b$ (.000) | $58.00^b$ (.000) | $59.63^b$ (.243) | **9.610** | **<.000\*** |

**Difference among the Number of Water cans Purchased before and after the Pandemic**

The test is applied between two dependent samples to compare their means. Normally, this test is used to determine whether the mean difference between two set or a pair is zero.

Hypothesis:

$H_{013}$ - There is no difference between the mean of the number of cans bought before and after COVID-19

Paired t-test between the mean of the number of cans bought before and after COVID-19

| Number of Water Cans Bought | Mean | t - Value | p - Value |
|---|---|---|---|
| Pair - Before COVID-19 After COVID-19 | .880 (.617) | **26.673** | **<.000\*** |

Note: 1. The value within bracket refers to SD

2.* denotes significant at 5% level

Since the p value is less than .05, we reject the null hypothesis at 5% level of significance and conclude that there is statistically significant difference between the mean of the number of cans bought before the pandemic and after the pandemic. The mean of the number of cans bought before pandemic is greater than the mean of the number of cans bought after the pandemic, hence we can say that the residents' of Chromepet bought less number of cans after COVID -19 which indicates that they had less access to pure water for consumption after the pandemic.

**Correlation between Factors of Water Perception of the residents' in Chromepet**

Correlation is used to find the relationship between variables. It describes the strength of the association between variables.

Hypothesis:

$H_{014}$ – There is no relationship between Factors of Water Perception.

Karl Pearson Correlation between the Factors of Water Perception

| Factors of Water Perception | Groundwater Perception (GP) | Environmental Factors (EF) | Rainwater Harvesting (RH) | Water Scarcity (WS) | Overall Factors of Water Perception |
|---|---|---|---|---|---|
| Groundwater Perception (GP) | 1 | .821** | .600** | .351** | .855** |
| Environmental Factors (EF) | - | 1 | .784** | .669** | .976** |
| Rainwater Harvesting (RH) | - | - | 1 | .480** | .833** |
| Water Scarcity (WS) | - | - | - | 1 | .708** |
| **Overall Factors of Water Perception** | - | - | - | - | 1 |

Note: ** denotes significant at 1% level

From the above r values, we can conclude that the factors of water perception positively correlate with each other.

Correlation Coeffecient between Groundwater Perception and Environmental Factors is .821 which indicates ($.821^2 = .674$) 67.4% positive relationship.

Correlation Coefficient between Groundwater Perception and Rainwater Harvesting is .600 which indicates ($.600^2 = .36$) 36% positive relationship.

Correlation Coefficient between Environmental Factors and Rainwater Harvesting is .784 which indicates ($.784^2 = .614$) 61.4% positive relationship.

Correlation Coefficient between Environmental Factors and Water Scarcity is .669 which indicates ($.669^2 = .447$) 44.7% positive relationship.

The individual Factors of Water Perception positively correlate with the Overall Factors of Water Perception which indicates that the factors are inter related with each other.

**According to the Study, Economic Factors Affecting Chromepet are:**

**Occupancy Factor:** It is evident from the raw data that 51% of the total people in this locality choose rental occupancy, due to the proximity of their work place, children's schools / colleges, public transportation, availability of the shops, Internet coverage, TV Services, hospitals etc. So the remaining 49% are permanent residence by survey. (3) By comparing this occupancy factor, it is understood that the demand for rented occupancy is high. So the landlords of the property use it to their benefit by increasing the rental rates by at least 10% YOY, which is now becoming the golden standard of Chennai rental occupancy.

**Inflation Factor:** Also, it gives way to thought for the self-occupied owners to let out their property for rent and to migrate to better locality to obtain much better social life. So it is clear that the rental rates increase by 10% YOY and it also induces the demand for the owners to give the property for rent. (4) Example: Let's take X person lives with his family of 5 members in this locality and his rent increases by 10% every year. Let's also consider that his family's gross salary increases by 5% every year. Also, we need to take our country's inflation into account, which will be in the average of 4% every year. 51% 49% Self Occupancy Rental Occupancy By the above expression, it is clear that the country's inflation and rental rates increment makes the individual poorer YOY despite of wage increment. So the individual will be forced to live in debt as his commitments increase with inflation at a higher rate than his income. It is noteworthy to take the individual's cost of spending and his monthly expenditure into account to have a better understanding of this factor.

**Supply vs Demand (Population Factor):** It's understood from the raw data that 62% of the people live in medium sized family (4-6 members). The ground water depletion is inevitable if the average size of the family increases with time. It will increase the rate of consumption with the relative rate of availability of the resources. This will result in deepening of bore wells, shallowing of old wells, swallowing of ponds and lakes and further more cause water crisis. As we know that ground water is non-renewable resource and would deplete faster if we don't exercise care. (5) The only remedy to this issue is to harvest rain water, clean and maintain the nature aquifers like ponds and lakes. It is good to know that Veeraraghavan Eri Protection Committee is run by a social activist

against polluting of the Veeraraghavan Eri, which spread over 37 hectares but now has been reduced to a pond.

**Income Factor:** It is evident that the 77% of the crowd earn below 25000 INR in this locality, which is certainly lesser that the average cost of occupancy/living in this area (Chennai Metro) with increasing family size. It is crystal clear that the economic state of Chromepet is adversely affected due to all the said factors above. This will increase poverty in this area and the poor will become even poorer due to all the factors discussed earlier. (6) The country's economy is a major factor, as it drives industrial growth, which results in job generation, that stimulates purchasing power of individuals, which results in demand, it further more increase the productivity of the product and drive economic growth, which will reduce the inflation and strengthen the rupee value against other trading partners and have effective trades.

**Pandemic Factor:** Pandemic factor is the most important factor in the present times. Pandemic has caused havoc in everyone's life. Be it job related issues, medical issues, financial issues, food related issues, etc. It is because of pandemic many lives were lost, many lost their health, many lost their jobs which in turn affected their financial lives, many lost their psychological health, etc. Pandemic aggravates economic issues in the country which causes ripple effect in the industrial and social life of the people. (7) Pandemic has tilted balance in the Socio Economic life of the people and would need 2-3 strong years to bring back normalcy in the country's economy.

## 5. Conclusion

- The distributions of water towards the consumers are uneven in the study area.
- On the perception, residents' who have low level of water perception or those who aren't satisfied with the groundwater in the area mostly purify their water before consumption, and residents' who belong to the moderate level predominantly do not purify before using water for their cooking or household purposes; those respondents who aren't satisfied with the groundwater in the area mostly purify their water before consumption, and residents' who belong to the moderate level predominantly do not purify before using water for their cooking or household purposes; Based on Duncan Multiple Range Test (DMRT), Radha Nagar significantly differs from other areas in Chromepet with respect to Overall Factors of Water Perception at 5% level of significance, but there is no significant difference between Lakshmi Nagar, Radha Nagar and New Colony. Evidently, Hastinapuram differs significantly from other areas in Chromepet with respect to Groundwater Perception, but

Lakshmi Nagar, Radha Nagar, Nemilichery and New Colony do not significantly differ at 5% level of significance. Also, Radha Nagar significantly differs from other areas in Chromepet, with respect to Environmental Perceptions and Rainwater Harvesting at 5% level of significance; The mean of the number of cans bought before pandemic is greater than the mean of the number of cans bought after the pandemic, hence we can say that the residents' of Chromepet bought less number of cans after COVID -19 which indicates that they had less access to pure water for consumption after the pandemic; While correlating the water perception with environmental factors, Rainwater harvest and water scarcity, water perception is inter related.

- When it comes to health, economy and clean access of water to the consumers, due to economic factors according to this study, access to clean water and health too takes a back seat.

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