CHAPTER-3

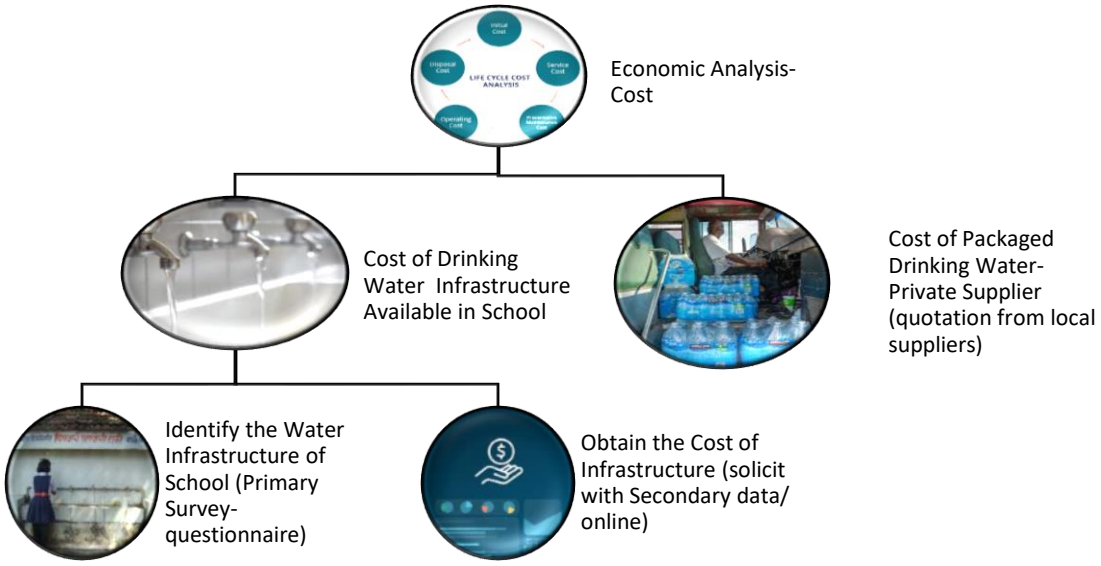
RESEARCH METHODOLOGY

3.1 CONCEPTUAL FRAMEWORK OF THE RESEARCH

After the review of literature, to attain the objective of the research, researcher conducted a survey to analyze the cost of drinking water infrastructure of the selected schools in Vadodara city. The survey of schools was done to identify the major factors constituting the drinking water infrastructure. These factors were classified into fixed and variable factors. After the identification of factors, the cost information was collected. For the cost analysis in the section-I of the chapter 4 and the chapter- 5 is graphically presented in Figure 3.1.

Figure 3.1

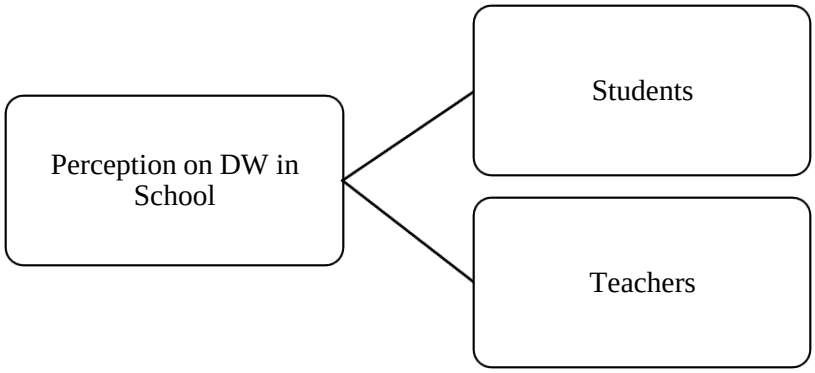
Conceptual Farmwork-I



For section II of the Chapter-4, the researcher approached the school going students and teachers in Vadodara city to give their opinion on selected variables of drinking water (DW) in the schools presented in Figure 3.1a

Figure 3.1a

Conceptual Farmwork-II



3.2 RESEARCH DESIGN

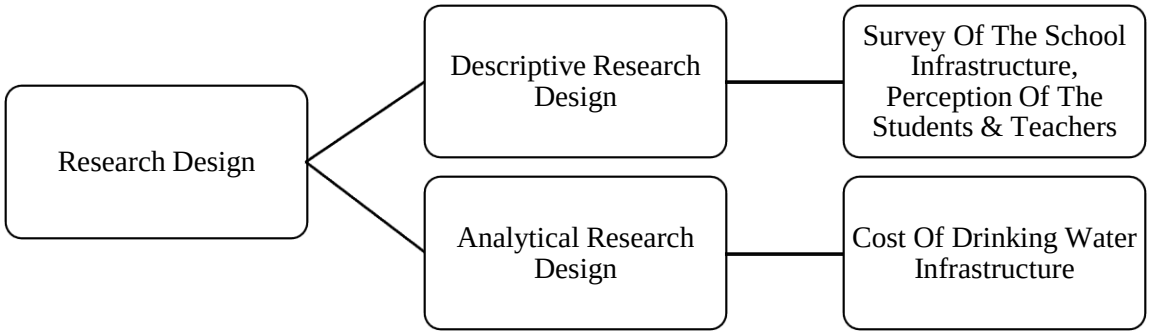
The research design of the study was decided on the basis of the objectives of the Research. The research carried out to collect the information on the following to address the objectives of the research.

The researcher used the Descriptive research design for Drinking Water Infrastructure of the schools, variable of packaged drinking water and Perception of the Students and Teachers on Drinking water parameters to obtaining the fundamental information for establish the connections between the variables.

For the cost of Drinking water infrastructure of the schools, Analytical research design was used for evaluation of information and the fact pertaining to research information.

Figure 3.2

Type Of Research Design



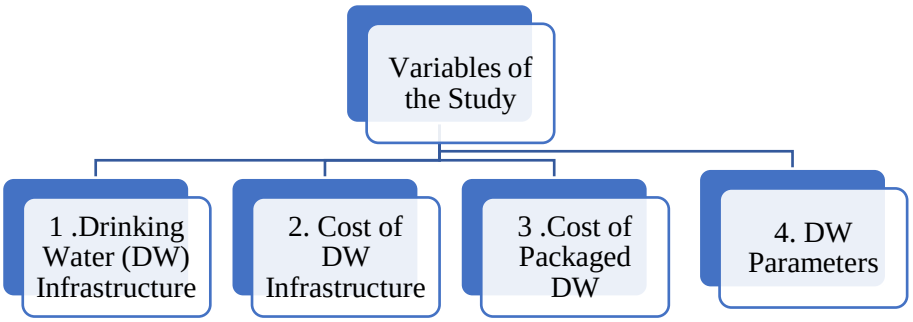
3.3 VARIABLES UNDER RESEARCH STUDY

After deciding upon the research design the researcher has Identified the variable of the research study. Figure 3.3 shows the variables of the study are classified into four ;

- Drinking Water (DW) Infrastructure
- Cost of DW Infrastructure
- Cost of Packaged DW
- DW Parameters

Figure 3.3

Variables Under Study



In Figure 3.4 drinking water infrastructure and Figure 3.5 cost of DW infrastructure has 10 variable classified as fixed and variable factors. Fixed factors include the Water Tanks, Taps, RO System, Water Cooler and water motor and Variable factors includes Labour, Purifier Filter, Electricity, Bleaching Powder. In addition to already mentioned variable, for the cost of DW infrastructure one more variable was added i.e., Municipal Tax.

Figure 3.4

Variables Under Drinking Water Infrastructure

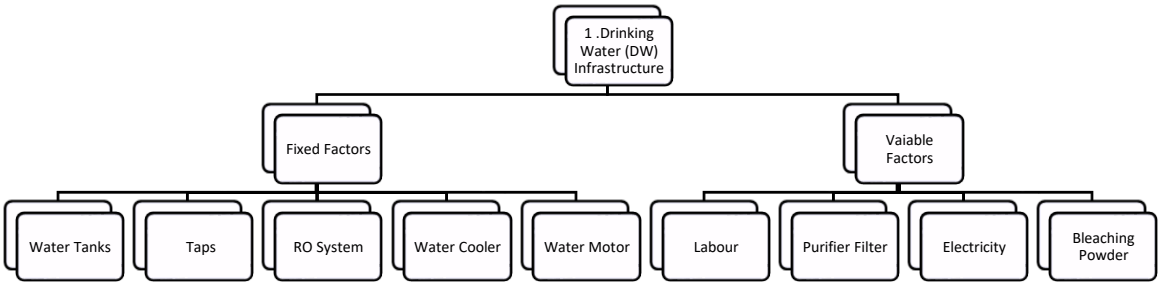
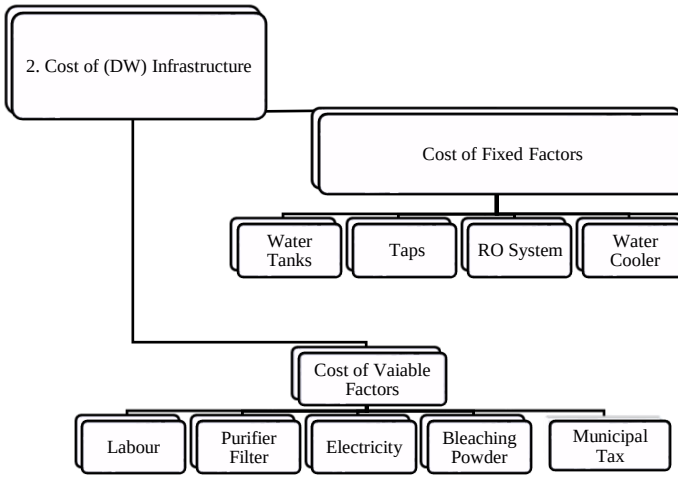


Figure 3.5

Variables Under Cost of Drinking Water Infrastructure



Note.

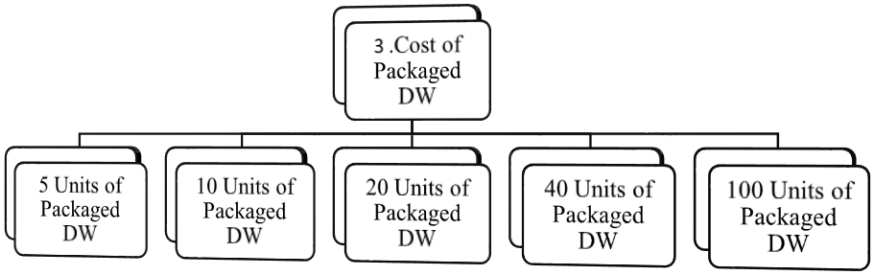
RO System - Reverse Osmosis System

DW- Drinking Water

Figure 3.6 gives the information on variables of the cost of Packaged drinking water from the private local RO water supplier. Six different categories of quantities are under the study i.e., for quantity of 5 units of packaged drinking water, 10 units, 20 units, 40 units, 80 units and 100 units.

Figure 3.6

Variable Under Cost Of Packages Drinking Water

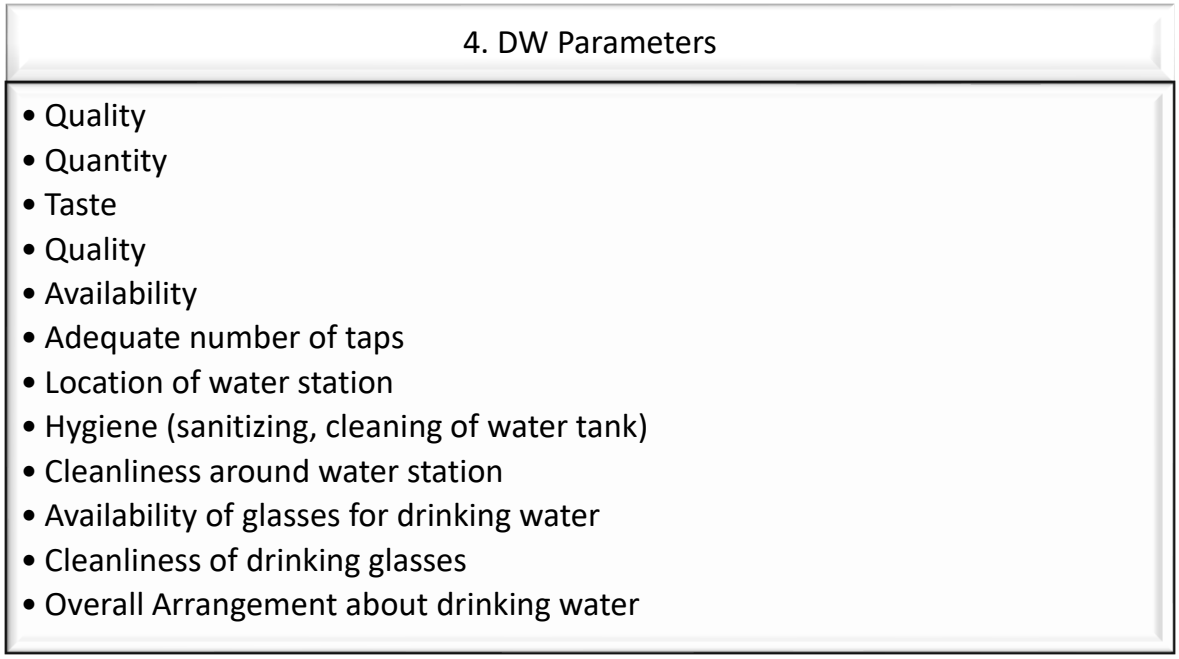


Note.

DW- Drinking Water

For the students' and teachers' perception Figure 3.7 gives the information on variables used i.e., Quality, Quantity, Taste, Quality, Availability, Adequate number of taps, Location of water station, Hygiene (sanitizing, cleaning of water tank), Cleanliness around water station, Availability of glasses for drinking water, Cleanliness of drinking glasses, & Overall Arrangement about drinking water variables for the study

Figure 3.7



3.4 FUNCTIONAL DEFINITION

3.4.1 Economic Analysis

The operational definition under the Economic analysis the researcher has considers the cost analysis of the drinking water infrastructure available in the schools. The cost analysis of the variable under the study are briefly mentioned in Figure 3.6 and 3.7.

3.4.2 Drinking Water

BIS (Bureau of Indian Standards) has set specifications in IS–10500 and subsequently the revised edition of IS 10500: 2012 in Uniform Drinking Water Quality Monitoring protocol. Some parameters apart from those mentioned in IS 10500: 2012 may also be measured if the States deem it necessary. This standard has two limits i.e., acceptable limits and permissible limit in absence of alternate source. If any parameter exceeds the limit, that water is considered unfit for human consumption.

The operational definition in the present study considers the water supplied by VMC after treatment and as per BIS norms and considered as standard drinking water available for drinking.

3.4.4 Institution

Institutions in the present research covers the selected school of Vadodara city falling into the Vadodara Municipal Corporation (VMC) limits.

3.4.5 Stakeholders

The stakeholder in the present research includes the students, teachers, non-teaching staff, VMC and water concerned authorities.

3.4.6 Drinking Water Infrastructure

The operational definition of the drinking water infrastructure consists of the factors which contributes or related directly and indirectly with the drinking water available to its stakeholders.

3.4.7 Drinking Water Infrastructure of Schools

The operational definition of the drinking water infrastructure of Schools includes the Variables under the study in Figure 3.3

3.4.8 Packaged Drinking Water

Water derived from the various sources including surface water, ground water or sea water and subjected to treatment like decantation filtration, demineralization, mineralization and reverse osmosis is defined by Department of Consumer affairs.

3.4.9 Packaged Drinking Water Supplier

The operation definition of packaged water supplier included the local RO water suppliers of the Vadodara city.

3.4.10 Bottled Water

Bottled water included 20 liters of RO treaded water for drinking in plastic container or Water Judge.

3.5 LOCALE OF STUDY

The research study was carried in the Vadodara city of the Gujarat. The research study the variables within the VMC limits of the Vadodara city.

3.6 TIME SPAN

The time period of the research study was between 2018 and 2022.

3.7 METHODS OF DATA COLLECTION

3.7.1 Primary Data

The information on the variables under the study are collected through:

A. Selected schools were approached using Scheduled questionnaire, field observation to collect data on DW infrastructure
B. Multiple instruments used to collect the cost data includes interview on cost of fixed and variable factors of drinking water infrastructure and, field observation for daily wage labour market.
C. Quotation from the supplier on different quantities of packaged bottle
D. Questionnaire filled by the students and teachers for their perception on DW variables

3.7.2 Secondary Data

The information on the variables was also collected through following methods:

A. Online- Government web source- www.Gem.gov.in for obtaining the price of Variable and fixed cost of the drinking water infrastructure, mgvcl.gov.in for the price of electricity charges
B. Public Records - vmc.gov.in for obtaining information on Water Tax variable
C. Business Catalogs

   From the, www.indiamart.com,www.industrialbuying.com, www.amazon.com, www.flipkart.com. For cross validation of cost information.

3.8 POPULATION SAMPLE

A. Population for the present study comprises of selected schools of Vadodara city.
B. Selected Packaged drinking water supplier of Vadodara city.
C. Selected school going students and school teachers of Vadodara city

3.9 SAMPLE UNIT

A. The sample unit of the selected 80 schools of Vadodara city.
B. 11 water suppliers
C. 152 students and 47 teachers

3.10 SAMPLE METHOD AND SAMPLE

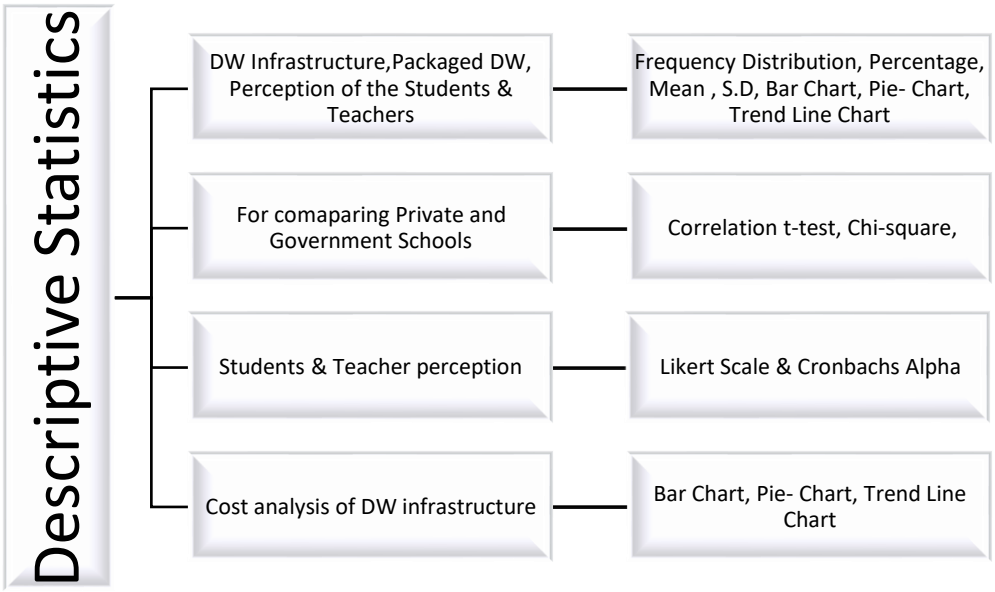
A. The convenient sample method was used to collect the data on DW infrastructure of the selected schools.
B. Interview method was used to obtain the cost on DW infrastructure of the schools
C. Convenient sampling method was used for collecting data on the cost of packaged drinking water from the local Packaged DW suppliers. The objective of the sample collection to know the representative price of the packaged drinking water and not to study the market of packaged drinking water.
D. Convenient sampling method was used to collect the data on students and teachers' perception.

3.11 STATISTICAL TOOL

For attaining the objective of the research Descriptive statistics and Relational statistics. Under the Descriptive statistics the tools used were Frequency Distribution, Percentage, Mean, Standard Deviation, Correlation with hypotheses testing using t-Test, Chi-square and for Drinking water infrastructure variables as shown in Figure 3.8 objective of the research study. Under analytical research design tools used for analysis purpose was the Bar Chart, Pie Chart and Trend line. The research design of the study is presented in the Figure. 3.8

Figure 3.8

Statistical Tools For Research Study



Frequency distribution, percentage, Mean , Standard deviation, Bar Chart, Pie-Chart, Trend line Chart were used to study the DW infrastructure, packaged DW, and perception of students and teachers.

Correlation T-Test & Chi-square were used for comparison between private and government funded schools. Likert scale and Cronbach's Alpha is used to measure the student & teachers' perception.

For the Cost analysis of the DW infrastructure the Bar charts, Pie- chart and Trend analysis were used.

Validation of questionnaire was done with expert and Likert scale questionnaire uses Cronbach's Alpha for internal consistency of Scale.

3.12. LIMITATIONS OF THE STUDY

Every study is inadequate by certain factors. The present study, being a quantifiable one, is exposed to time constraints. Added, the results of the study cannot be generalized due to the

small size of the sample. Thus, more research at a larger scale involving larger number of respondents is required to gain better understanding into the existing research field.

Major limitations of this study are: Proposed research is limited to the selected educational building of Vadodara city in Gujarat state; the size of the sample makes it narrow. Study is time bound and has limited scope and doesn't give a macro view. It may not be suitable to make generalization of the findings. This is mainly because of its limited sample size and study area being limited only to one city in Gujarat. This study is based on primary data generated through scheduled questionnaire, and observation and collected from the respondent at different schools, water supplier as such, its findings depend on the accuracy of data.

The study is based on the response of the school authority and the supplier of Packaged drinking water of Vadodara city given the geographical resources, due to which generalization made may not be wholly true. The Researcher, being an outsider and external analyst, clearly has no access to the internal information. Therefore, it is hard to describe the inside view of schools and quality of water supply in the study, cost information obtained from the various sources. Covid -19 had restricted the data collection sample method and size.

Works Cited:

Kothari, C.R. (2004). *Research Methodology*: *Methods and Techniques* (2nd revised *edition*). New Delhi: New Age International (P) Limited,

Deepak Chawla & *Neena Sodhi*. (2022), *Research Methodology*: *Concepts and Cases*, 2nd Edition, Vikas Publishing House