

A STUDY OF WATER QUALITY STATUS OF MAJOR LAKES IN TRIVALLUR DISTRICT

Submitted in partial fulfillment of the requirements for the award of Bachelor of
engineering degree in civil engineering

by

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DEPARTMENT OF CIVIL ENGINEERING

SCHOOL OF BUILDING AND ENVIRONMENT

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC | 12B Status by UGC | Approved by
AICTE JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

May - 2022



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **BEVAN.D (38200016)** and **KUMARASKANDHA.J (38200018)** Who completed the project entitled "**A STUDY OF WATER QUALITY STATUS OF LAKES IN TRIVALLUR DISTRICT**" under our supervision from December 2021 to April 2022.

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Submitted for Viva voce Examination held on _____

DECLARATION

We KISHORE BEVAN.D (38200016) and KUMARASKANDHA.J (38200018) hereby declare that the Project Report entitled "A STUDY OF WATER QUALITY STATUS OF MAJOR LAKES IN TRIVALLUR DISTRICT" done by me under the guidance of Ms.ESHANTHINI.P is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in Civil Engineering

DATE: 20/04/2022

PLACE: CHENNAI

1. 

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SIGNATURE OF CANDIDATE

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ABSTRACT

Lakes are an important inland water eco system which provides many ecosystem services like fresh drinking water, water for irrigation, domestic purpose and industrial application. Thiruvallur is a fast developing district of Tamilnadu, giving it a special industrial and commercial important. The development, urbanization and load of the various pollutant sources leads to deterioration of lake water quality. This study was initiated to assess the water quality in the ten important lakes of Thiruvallur district and deriving the Water Quality Index (WQI) using by WAM method. Water quality can be assessed by The Physio-Chemical and Biological parameters like pH, Electric conductivity, TDS, Total Hardness, Calcium, Magnesium, Chloride, Sulphate, Total Coliform And E. Coli. The waterquality index was classified into five categories such as Excellent, good, Moderate , very poor and poor. This study shows that, with the exception of some parameters, most of the parameters used to assess water quality were within the accepted Bureau of Indian Standards (BIS) standards and the WQI was ranged from excellent to good for all the ten Lakes in Trivallur District, hichshows the lake water is fit for human consumption.

Keywords: Lake water, Physio-chemical parameters, Water Quality Index and Bureau of Indian Standards.

TABLE OF CONTENTS

CHAPTER No.	TITLE	PAGE No.
	ABSTRACT	v
	LIST OF SYMBOLS AND ABBREVIATIONS	vii
	LIST OF TABLES	viii
	LIST OF FIGURES	viii
1	INTRODUCTION	1
	1.1 GENERAL	1
2	LITERATURE STUDY AND METHODOLOGY	3
	2.1 LITERATURE REVIEW	3
3	AIM AND SCOPE	7
	3.1 OBJECTIVES	7
	3.2 SCOPE	7
4	MATERIALS AND METHODS	8
	4.1: EXPERIMENTAL PROCEDURE	8
	4.2 STUDY AREA	9
	4.3 SAMPLE COLLECTION	15
	4.4 SELECTION OF PARAMETERS	24
	4.5 ANALYSIS OF PARAMETERS	24
	4.6 ANALYSIS OF WATER QUALITY BY WQI	29
	4.6.1 Methodology in Calculation of WQI Using WAWQI Method	29
5	RESULT AND DISCUSSION	30
6	CONCLUSION	38
	REFERENCE	39

LIST OF SYMBOLS AND ABBREVIATIONS

Acronyms

pH

EC

TDS

TH

Ca

Mg

Cl

So₄

WQI

μmhos/cm

mg/l

Expansions

potential of hydrogen

Electric conductivity

Total Dissolved Solids

Total Hardness

Calcium

Magnesium

Chloride

Sulphate

Water Quality Index

micromhos per centimeter

milligrams per liter

LIST OF TABLES

TABLE. No	TITLE	PAGE.No
4.2	Sampling Locations	9
5.1	Water Quality Index (WQI)	29
5.2	Analysis Of Parameters	30
5.3	Calculation Of WQI Alamathi Lake	30
5.4	Calculation Of WQI Ambattur Lake	31
5.5	Calculation Of WQI Avadi Lake	31
5.6	Calculation Of WQI Cholabaram Lake	32
5.7	Calculation Of WQI Palavedu Lake	32
5.8	Calculation Of WQI Poondi Lake	33
5.9	Calculation Of WQI Puzhal Lake	33
5.10	Calculation Of WQI Retteri Lake	34
5.11	Calculation Of WQI Vepampattu Lake	34
5.12	Calculation Of WQI Viliinjibakkam Lake	35
5.13	Biological Characterization	35
5.14	Analysis Of E.coli	36

LIST OF FIGURES

FIGURE. No	TITLE	PAGE. No
4.1	Flow Chart	8
4.2	Water Bodies Of Tiruvallur District	9
4.3	Alamitha Lake	10
4.4	Ambattur Lake	10
4.5	Avadi Lake	11
4.6	CholavaramLake	11
4.7	Palavedu Lake	12
4.8	Poondi Lake	12
4.9	Puzhal Lake	13
4.10	Vililjiyambakkam Lake	13
4.11	Retteri Lake	14
4.12	Vepambattu Lake	14
4.13	Collection Of Water Sample InAlamathi Lake	15
4.14	Collection Of Water Sample In Ambattur Lake	16
4.15	Collection Of Water Sample InAvadi Lake	17
4.16	Collection Of Water Sample InCholavaram Lake	18
4.17	Collection Of Water Sample InPalavedu Lake	19
4.18	Collection Of Water Sample InPoondi Lake	20
4.19	Collection Of Water Sample InPuzhal Lake	21
4.20	Collection Of Water Sample InVilinjiyambakkam Lake	22
4.21	Collection Of Water Sample InRetteri Lake	23
4.21	Collection Of Water Sample InVeppambattu Lake	23
4.22	Analysis Of Ph	24

FIGURE. No	TITLE	PAGE. No
4.23	Analysis Of Ec	25
4.24	Analysis Of Tds	25
4.25	Analysis Of Th	26
4.26	Analysis Of Calcium	26
4.27	Analysis Of Magnesium	27
4.28	Analysis Of Chloride	27
4.29	Analysis Of Sulphate	28
4.30	Analysis Of Total Coliform	28
4.31	Analysis Of E.coli	28
5.1	Analysis Water Qulity Index	37

CHAPTER 1

INTRODUCTION

1.1 GENERAL

Lakes are inland bodies of water that are important in many industries, including agriculture, animal production, forestry, industrial activity, hydropower generation, fishing, and other creative endeavours. Even though there is water everywhere, there is no potable water to drink. Rapid urbanisation, population growth, industrialization, and other factors, particularly in developing nations like India, have impacted the quantity and quality of groundwater as a result of the exploitation of water sources. The water is currently contaminated and unfit for drinking (or) cultivation. Agricultural, domestic, and industrial waste, pesticides, and other pollutants are major polluters of water bodies. Water-borne diseases include diarrhoea, dysentery, cholera, and typhoid, as well as chemical diseases like fluorosis and methemoglobinemia. Because polluted drinking water can cause a range of waterborne diseases, it is critical to monitor the quality of drinking water at regular intervals. Water quality is critical to maintaining a healthy ecosystem. Water is used to dilute and to remove municipal and industrial pollutants, cooling, irrigation, power generation, and local recreation in industrial societies. Evaporative losses are caused by actual water diversions and procedures. Large amounts of lake water used for cooling by industry and utilities, for example, may raise lake temperatures near effluents enough to induce excessive evaporation. When specific types of cooling towers are used, even more losses occur. Some of the water that evaporates will remain in the lake basin, while others will be lost.. Human and animal consumption, irrigation, and industrial use are all major uses of water (ENVIS). There are 39,202 lakes in this state. The Public Works Department, as well as local authorities like as Corporations, Municipalities, Panchayat Unions, and other departments, are in charge of these bodies of water. Tiruvallur is a district in Tamil Nadu's southern state that is rapidly developing. Tiruvallur is a town in Tamil Nadu, close to Chennai, that is well-known for its industrial and economic importance. Tiruvallur Lakes serve as a vital source of water for Chennai. Tourists go to the lakes of Avadi, Poondi, and Puzhal, which are among Tamil Nadu's most well-known. The important rain-fed reservoirs of Puzhal,

Poondi, and Solavaram Lakes are used to supply water to Chennai. The water quality and suitability for human consumption may be determined by investigating the nature, biological, and physio-chemical characteristics of water samples collected from Tiruvallur district's major lakes (WQI). The water quality index (WQI) is a useful instrument for detecting contamination in bodies of water.

CHAPTER 2

LITERATURE STUDY AND METHODOLOGY

2.1 LITERATURE REVIEW

First and foremost, many books and journals were gathered for reference and reviewed before to beginning project work in order to gain an understanding of

how the project should be carried out. Alternative building blocks are introduced in this project. As a result, the fundamental and crucial features of water quality of major lakes in Tiruvallur district were investigated initially.

Nelson Akawoet al., (2021), The quality of water of the anthropogenically-laden Anwai-river within the Asaba-capital territory of Delta State, Nigeria, was assessed using pH, electrical conductivity (EC), total dissolved solids (TDS), biochemical oxygen demand (BOD), dissolved oxygen (DO), turbidity, phosphates, nitrates, total hardness (TH), and coliforms in Stations 1(Otulu), 2(Isele-asagb). Aside from TDS, turbidity, and TH, there are a few other factors to consider. The weighted arithmetic waterquality index at the three stations was 86.83, 75.02, and 81.27, respectively, despite the individual physiochemical-based water qualities being below the WHO recommended drinking water levels.

Lokesh et al., (2021), On the river Kabini stretch at Nanjangud, Karnataka, India, two sample sites N1 and N4a were chosen. Water Quality Indexes of 75.3 and 95.3 at stations N1 and N4a, respectively, indicating that the riverKabini's water quality along this stretch is "extremely bad," according to this study's analysis of 20 years of data (2000–2019). This analysis will aid policymakers in determining the best way to protect the river from anthropogenic degradation in the future.

Sivakumar et al., (2018), Groundwater had become critical for human life all across the world. Its fitness for human eating is determined by its physical, chemical, and bacteriological qualities. Groundwater samples were obtained at the Ponneri Taluk, Thiruvallur district of Tamilnadu, during the south west monsoon season. pH, TDS, cations such as Ca, Mg, Na, and K, anions such as Cl, SO₄,

HCO₃, and NO₃, and PO₄ are among the physicochemical parameters. The drinking water quality index is used to assign a classification to the water (DWQI). Piper plot was used to investigate the geochemistry.

Satish Chandra Dendukuri et al., (2017), The research is focused on the water quality metrics in Vijayawada, Andhra Pradesh's Krishna district.. Physico-chemical parameters such as pH, Total Dissolved Solids (TDS), Cl, SO₄, Na, K, Ca, Mg, and Total Hardness are used in this study to estimate the quality of the water in the study area (TH). The purpose of this study is to determine the suitability of water for drinking purposes using an estimated Water Quality Index (WQI).

Durgadevagi et al., (2016), Groundwater is a major source of drinking water in Tamil Nadu, particularly in rural areas. The overuse of groundwater for industrial purposes has become a major issue. As a result, determining the quality of groundwater is critical. the results were compared to BIS standards. GIS was used to create a spatial distribution map of these groundwater quality metrics, which was then merged with WQI.

Rajamanickam et al., (2016),The water quality of eight important lakes (i.e., Ooty, Kodaikanal, Yercaud, Pulicat, Poondi, Red Hills, Veeranam, and Porur) in Tamil Nadu State is monitored on a monthly basis by the Tamil Nadu Pollution Control Board (TNPCB) under the Monitoring of Indian National Aquatic Resources (MINARS) programme, which is sponsored by the Central Pollution Control Board (CPCB). According to the monitoring report, the lakes are typically satisfying the criteria for a Class-C drinking water source when treated according to CPCB's recommendations.

Madan Kumar et al., (2012), In Chennai, evaluate the quality of the groundwater using the water quality index. The city of Chennai was divided into

three zones based on the legislative constituency, and nine groundwater samples were collected and evaluated for physiochemical parameters from each of these three zones. The groundwater quality condition of Chennai city varied from outstanding to good, and the groundwater is fit for human consumption based on all nine components of the water quality index, according to this study.

MophinKaniKani et al., (2011), The river Tamirabarani is a perennial river in India that supplies water to two main districts in Tamil Nadu, India (Tirunelveli and Thoothukudi). The threat of pollution is increased along river bank habitations due to significant anthropogenic activities, urbanisation practises, irrigational, and livestock operations. The Water Quality Index (WQI) values have a substantial negative correlation with physicochemical parameters, according to a correlation research. The index function makes it simple to evaluate data, which improves the efficacy of management techniques aimed at restoring the river's originality.

Shweta Tyagi et al.,.. WQI, on the other hand, displays the combined impact of many water quality metrics and disseminates water quality data to the general public and policymakers. Despite the lack of a universally recognised composite water quality index, certain countries have utilised and continue to use aggregated water quality data to produce water quality indices. The WQI criteria for the acceptability of drinking water sources have been reviewed in an attempt to improve them.

AnusuyaDevi et al.,(2010), The impact of environmental elements on water quality at Poondi reservoir in Tamilnadu's Tiruvallur district was investigated using the water quality index (WQI).. During this examination, it was discovered that the quality of water of the Poondi reservoir could be classified based on the water quality index. Water quality levels were found to be under threat to a modest degree, however they were near to the ideal limits.

CHAPTER-3

AIM AND SCOPE

3.1 OBJECTIVES:

1. To collect the water samples from major lakes in thiruvallur district.
2. Analyse the samples for different physio- chemical and biological parameters.
3. Evaluation of the quality of water by Water quality index and Biological Characterization.

3.2 SCOPE:

1. To provide the information necessary to protect the environment from the harmful biological impacts of various chemical contamination.
2. The application of mathematical and modeling techniques in water treatment
3. To ensure that specialised water uses, such as drinking water abstraction, are protected by chemical and ecological compliance. Determining the lake's status
4. To implement measures to improve the environmental state of the waterbody.

CHAPTER 4

MATERIALS AND METHODS

4.1: EXPERIMENTAL PROCEDURE

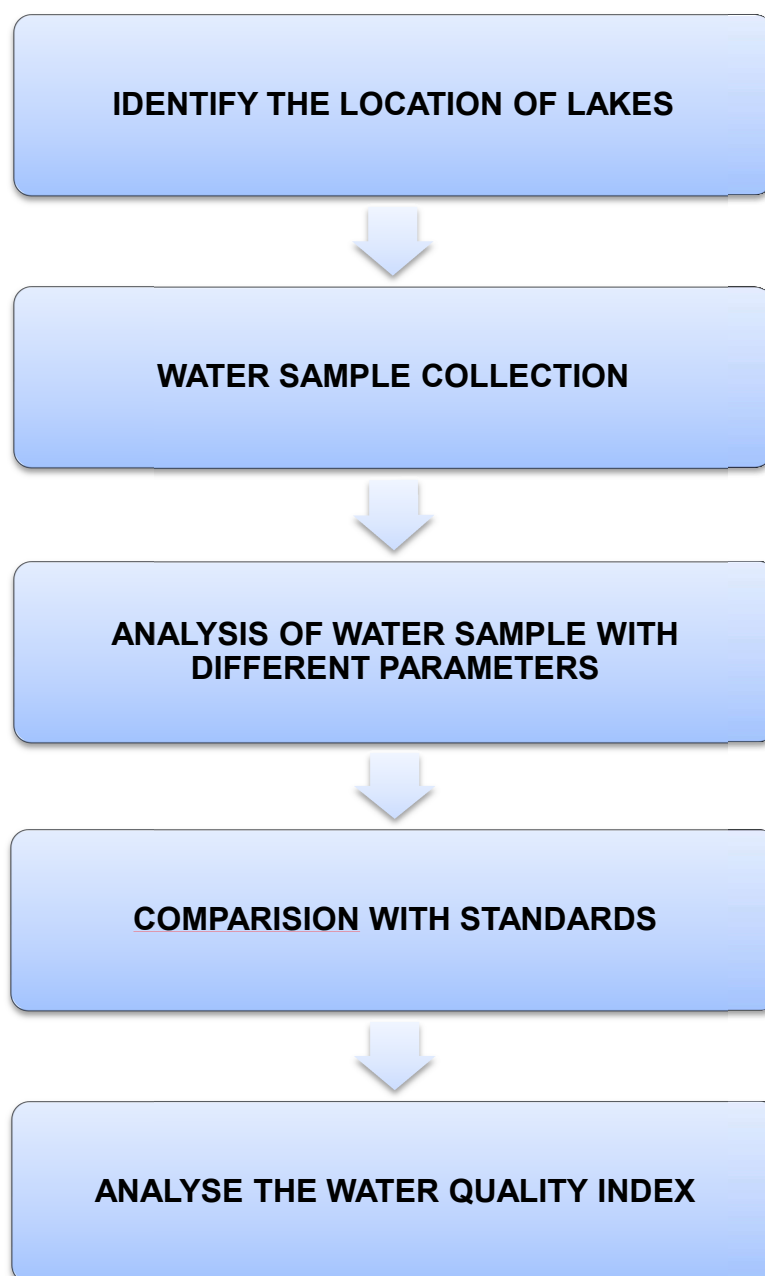


Figure 4.1:Flow Chart

4.2 STUDY AREA

The purpose of this study was to evaluate the quality of ten important lakes in the Tiruvallur District. The investigation was carried out by selecting ten major lakes in Tiruvallur district. The water samples are collected from ten different lakes.

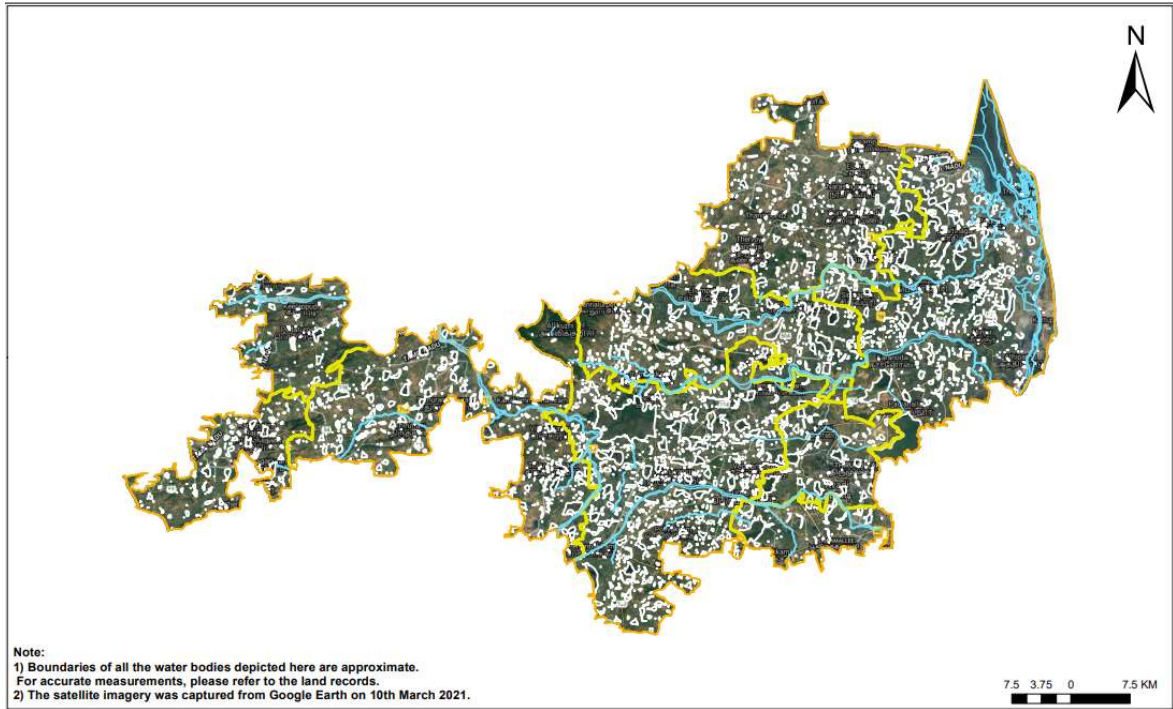


Figure 4.2: Water Bodies Of Tiruvallur District (Source Tiruvallur District Administration)

Table 4.2: Sampling Locations

S.No	LOCATION	LATITUDE	LONGITUDE
1.	Alamathi	13.20747°	80.19855°
2.	Ambattur	13.11492°	80.14154°
3.	Avadi	13.11015°	80.10794°
4.	Cholavaram	13.24369°	80.15838°
5.	Palavedu	13.14394°	80.04807°
6.	Poondi	13.21024°	79.87285°
7.	Puzhal	13.16867°	80.18971°
8.	Retteri	13.22145°	80.15450°
9.	Veppambattu	13.13113°	80.00504°
10.	Vilinjyambakam	13.20756°	80.109812°



Figure 4.3: Alamathi Lake



Figure 4.4: Ambattur Lake

Alamathi Lake is located at: RedhillsTiruvallur High Road, Alamathi Lake, Ponneri 600052, Tamil Nadu. Ambattur Lake is also an important supply of water in Chennai, reaching its peak volume during the monsoon. This lake, located in Avadi, is a famous tourist destination in Chennai.



Figure 4.5: Avadi Lake



Figure 4.6: Cholavaram Lake

Avadi lake was 2.64 kilometres long and covered an area of 8 acres. [3] It is commonly acknowledged that it has never dried up in many years. Long previously, this lake was said to be a supply of water for the production of farmland. Cholavaram Lake was constructed during British administration, before to 1877. The lake is one of Chennai's major water sources.



Figure 4.7: Palavedu Lake



Figure 4.8: Poondi Lake

Poondi Lake, also known as Sathyamoorthy Reservoir, is a reservoir in Tamil Nadu's Tiruvallur district that spans the Kotralai River. It serves as an important water source for Chennai.



Figure 4.9: Puzhal Lake



Figure 4.10: Viliinjiyambakkam Lake

The Puzhal reservoir is constructed in 1876 in Puzhal Town. Since two shutters have been placed in their place, these stone weirs are now water-retaining structures. To supply drinking water to Chennai and to store Krishna River water collected from Andhra Pradesh, the water reservoir's storage capacity was extended to 3,300 mcft and the depth to 21.20 ft in 1997. Viliinjiyambakkam Lake is a monsoon-filled rain-fed reservoir in Avadi, Chennai, India. The lake covers a total area of 37 acres.



Figure 4.11: Retteri Lake



Figure 4.12: Vepambattu Lake

The Public Works Department looks after Retteri Lake, a major water source in the area. The lake has rescued the city on multiple occasions, particularly during the city's terrible drought, and has even assisted citizens in neighbouring places by providing water from the lake. The lake's health is crucial for the region's groundwater recharge and availability.

4.3 SAMPLE COLLECTION

The procedure of collecting water sample is to rinsing the bottle and cap three times with sample water and fill the bottle to within one to two inches from the top few feet from the edge of the lake, submerge the bottle 1/2 to 1 foot below the surface to completely fill the bottle and cover it tightly.

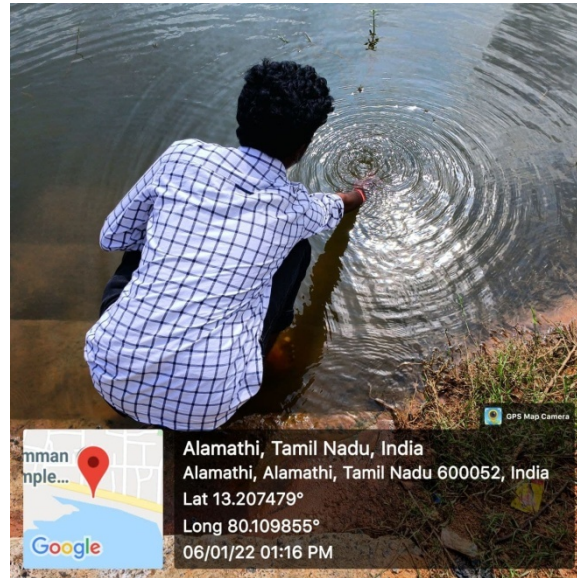


Figure 4.13: Collection Of Water Sample In Alamathi Lake

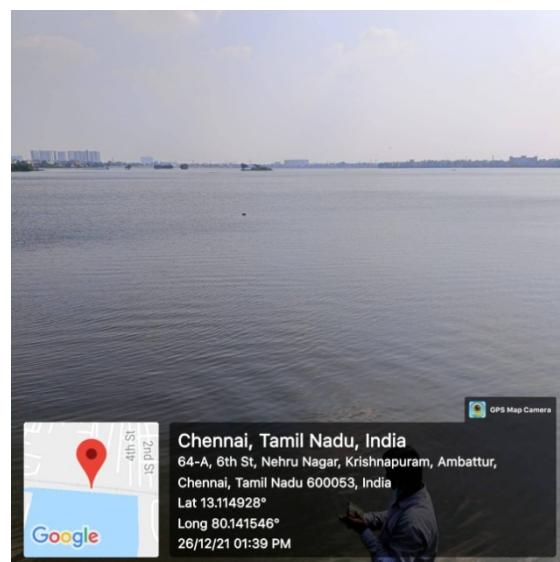
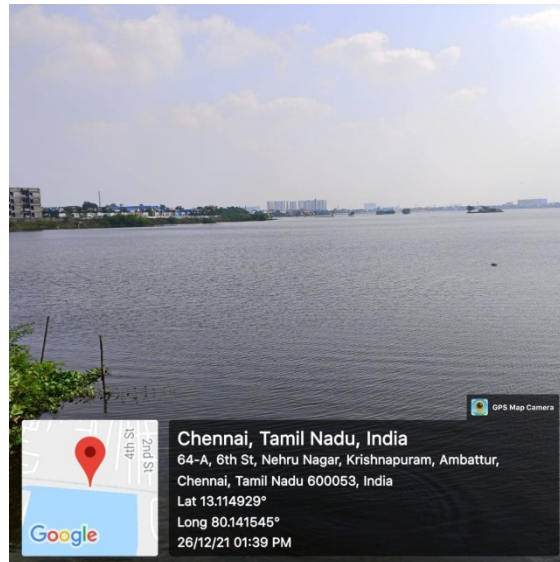


Figure 4.14: Collection Of Water Sample In Ambattur Lake

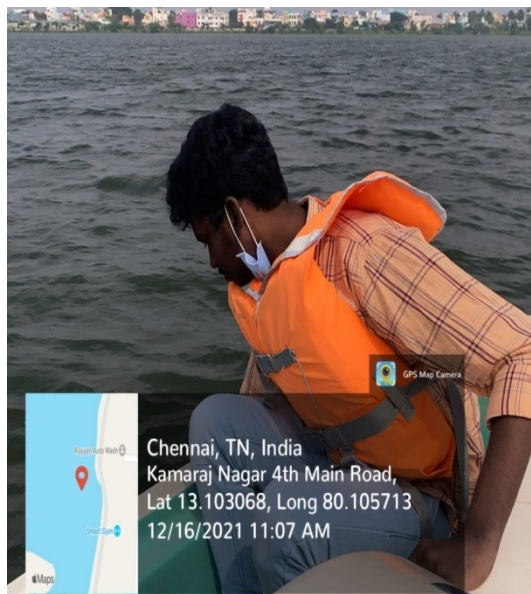
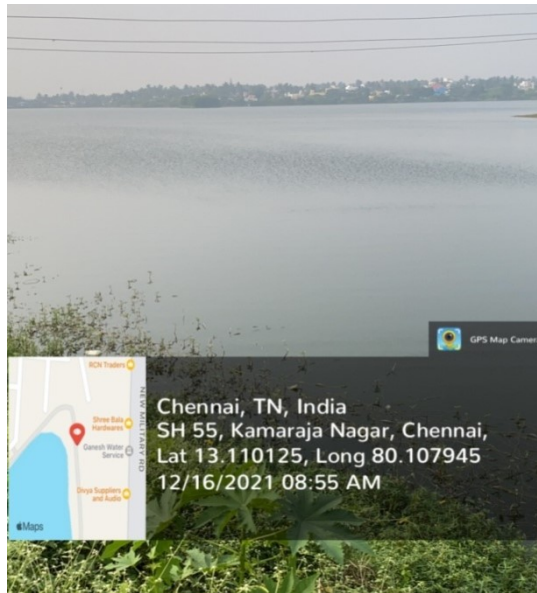


Figure 4.15: Collection Of Water Sample In Avadi Lake



Figure 4.16:Collection Of Water Sample In Cholavaram Lake

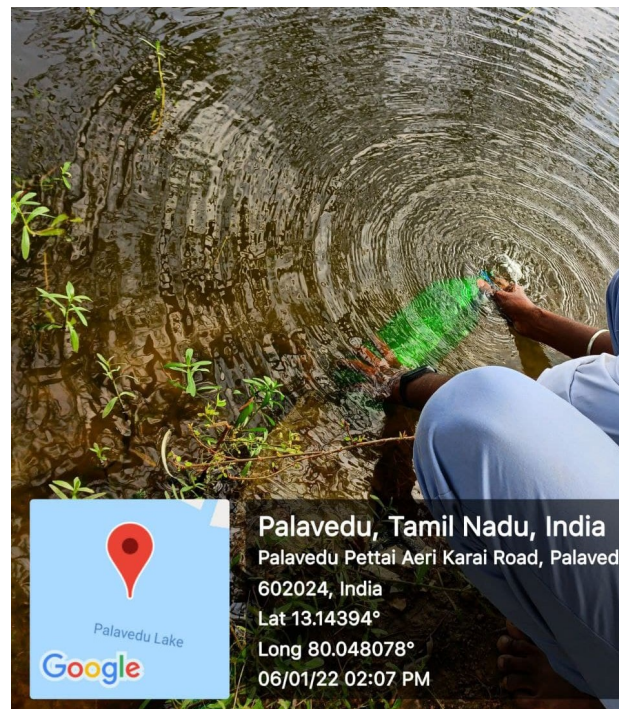
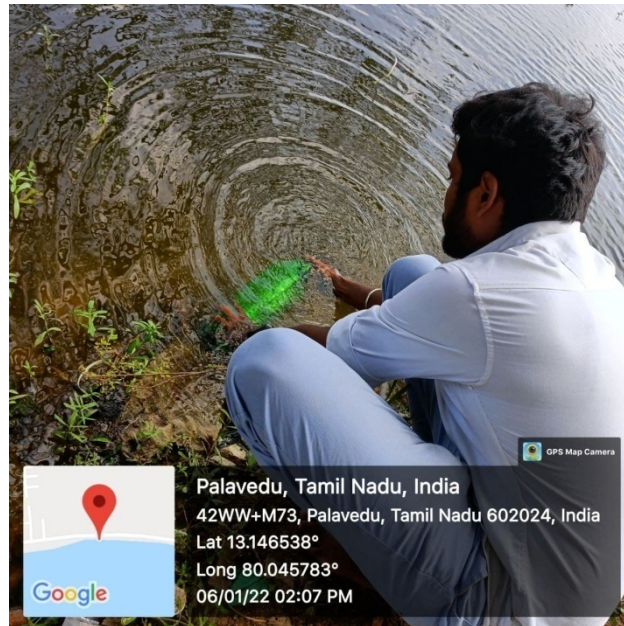


Figure 4.17: Collection Of Water Sample In Palavedu Lake

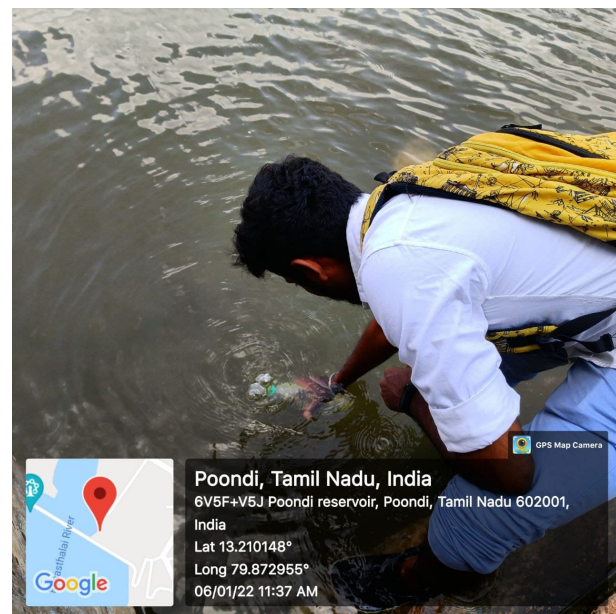
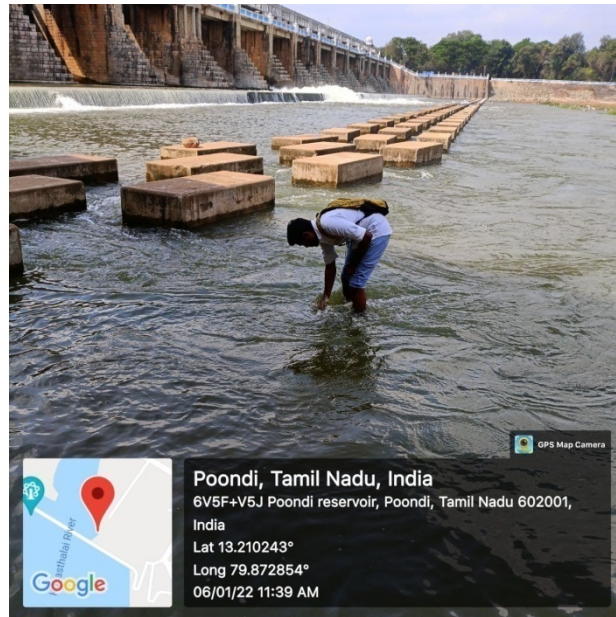


Figure 4.18: Collection of Water Sample In Poondi Lake

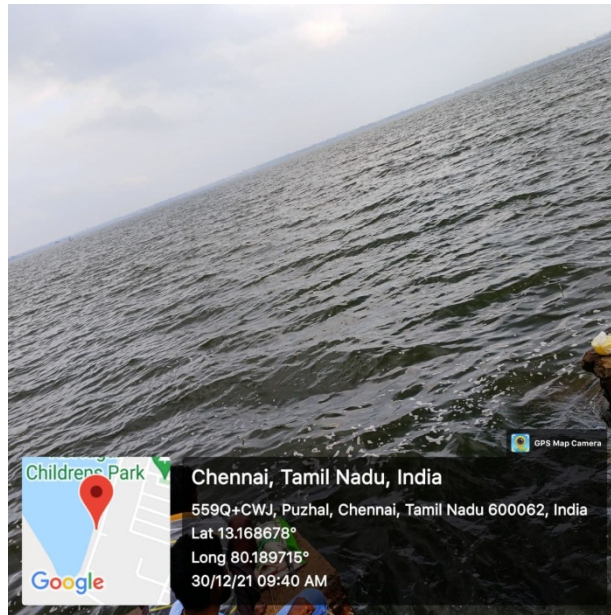


Figure 4.19: Collection of Water Sample InPuzhal Lake

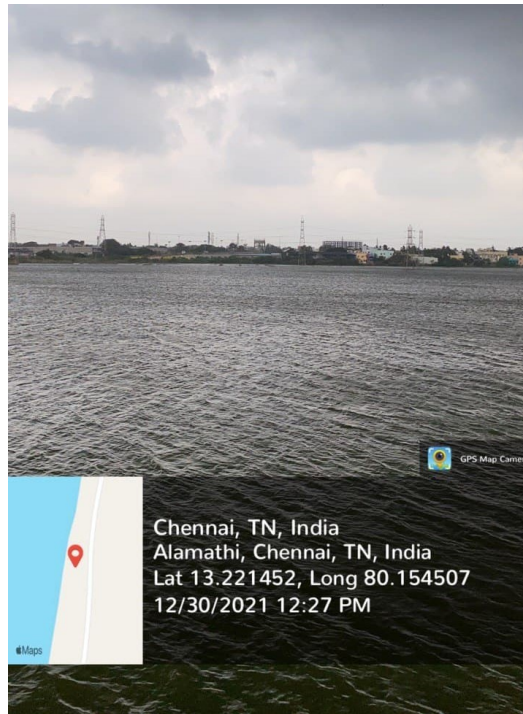


Figure 4.20: Collection Of Water Sample In RetteriLake

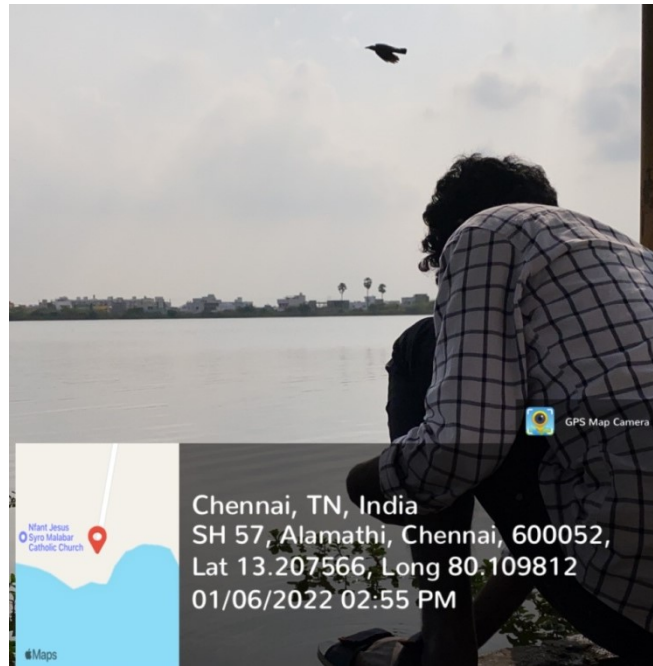


Figure 4.21: Collection Of Water Sample In Vilingiyambakkam Lake

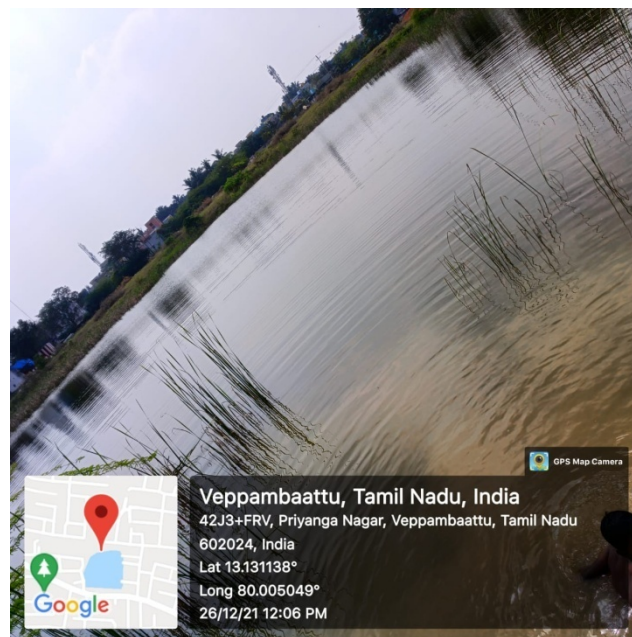


Figure 4.22: Collection Of Water Sample In Veppambattu Lake

4.4 SELECTION OF PARAMETERS

The evidence of high Industrial development and organic pollution in the major lakes of Tiruvallur district is considered as a basis of selecting the water quality parameters viz. pH, electrical conductivity, Total dissolved solids, Total hardness, Calcium, Magnesium, Chloride, Sulphate, total coliform and E. coli as significant indicator parameters of surface water quality in the present study

4.5 ANALYSIS OF PARAMETERS

The collected water samples are analyzed for the parameters including pH, Conductivity, E. coliform, Total coliform, Chlorides, Total Hardness, Calcium, Magnesium, Sulphate and Total Dissolved Solids as per APHA 23rd Edn: 2017. The WQI has been calculated by using the standard of drinking water quality recommended by the World Health Organization.

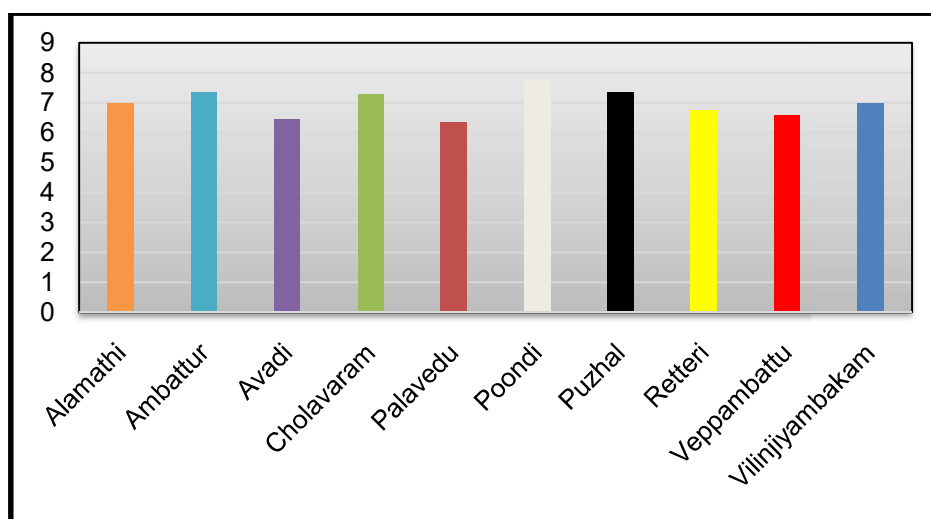


Figure 4.23: Analysis Of pH

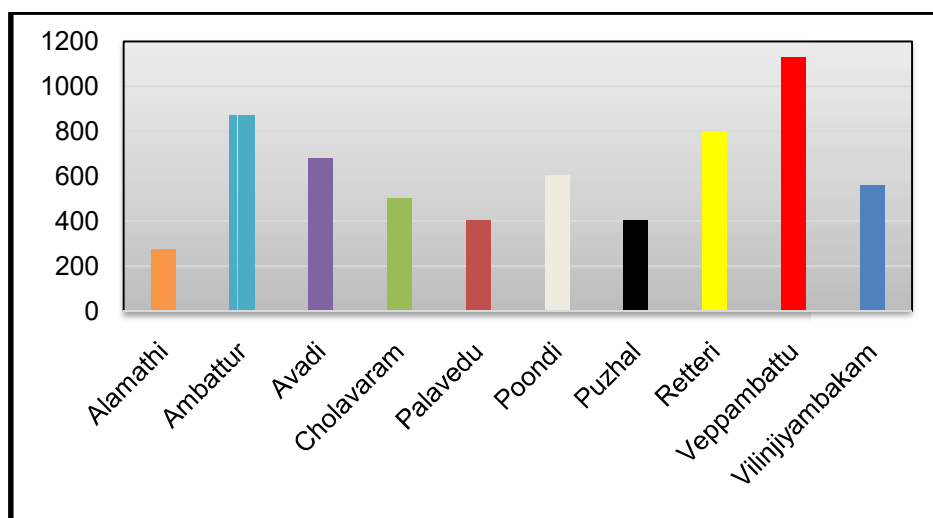


Figure 4.24: Analysis Of Electrical Conductivity

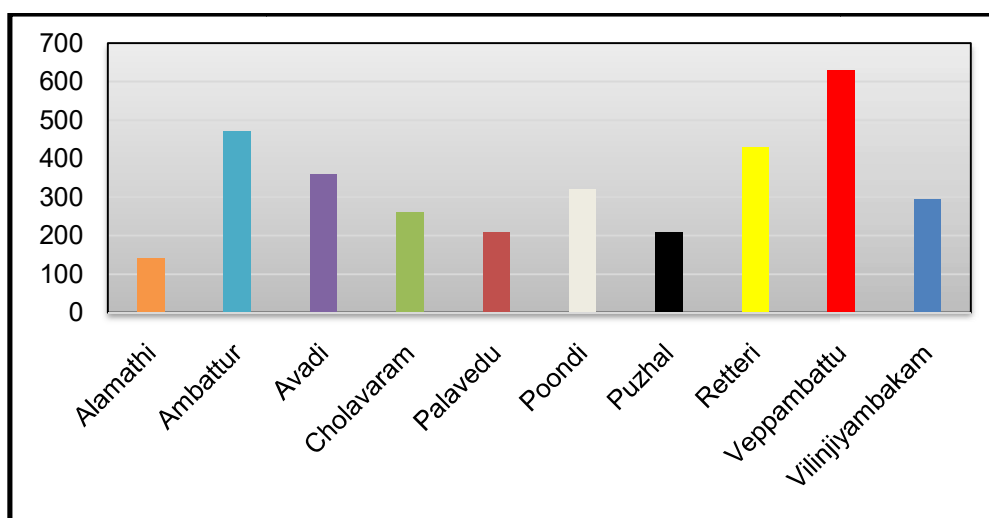


Figure 4.25: Analysis Of TDS

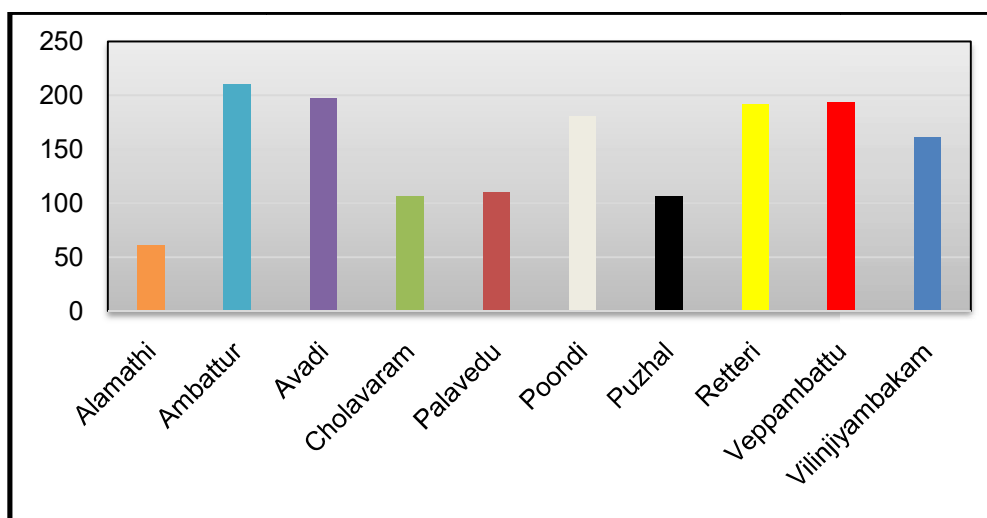


Figure 4.26: Analysis Of Total Hardness

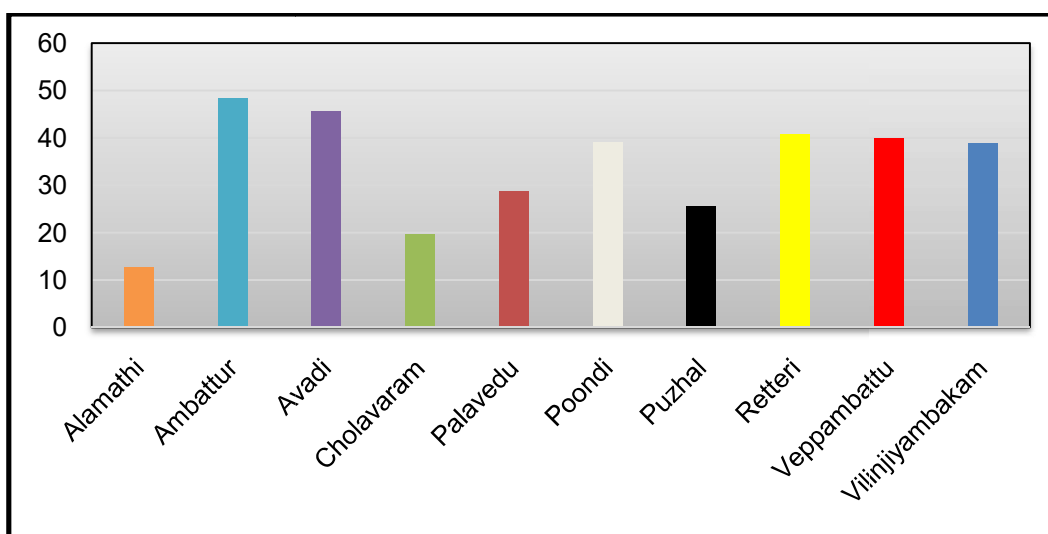


Figure 4.27: Analysis Of Calcium

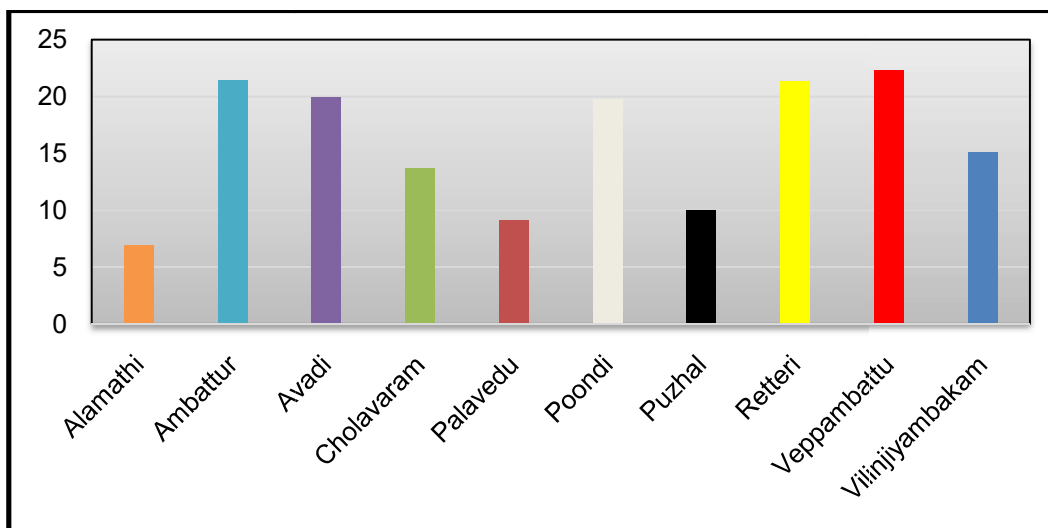


Figure 4.28: Analysis Of Magnesium

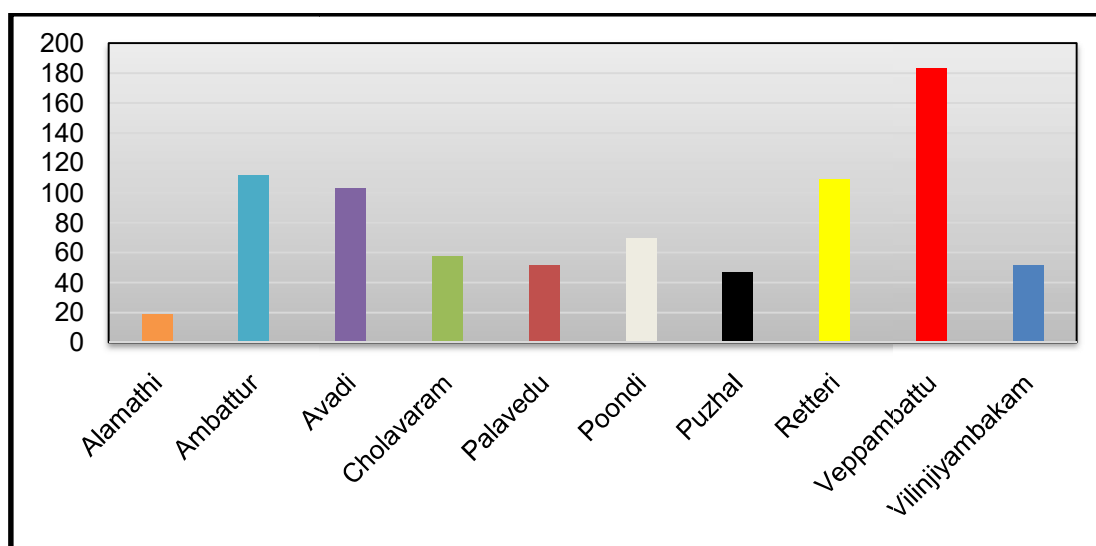


Figure 4.29: Analysis Of Chloride

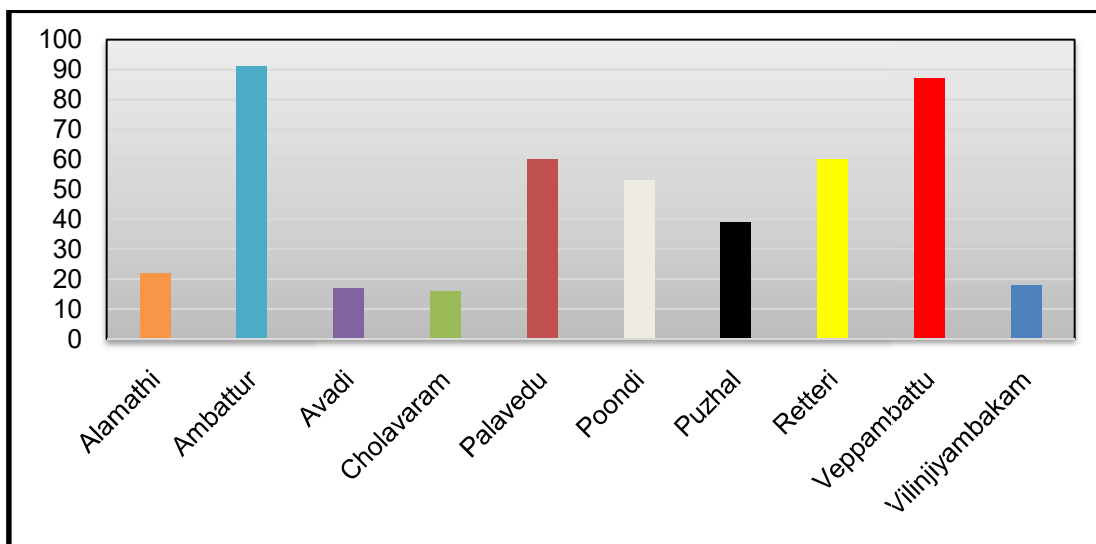


Figure 4.30: Analysis Of Sulfates

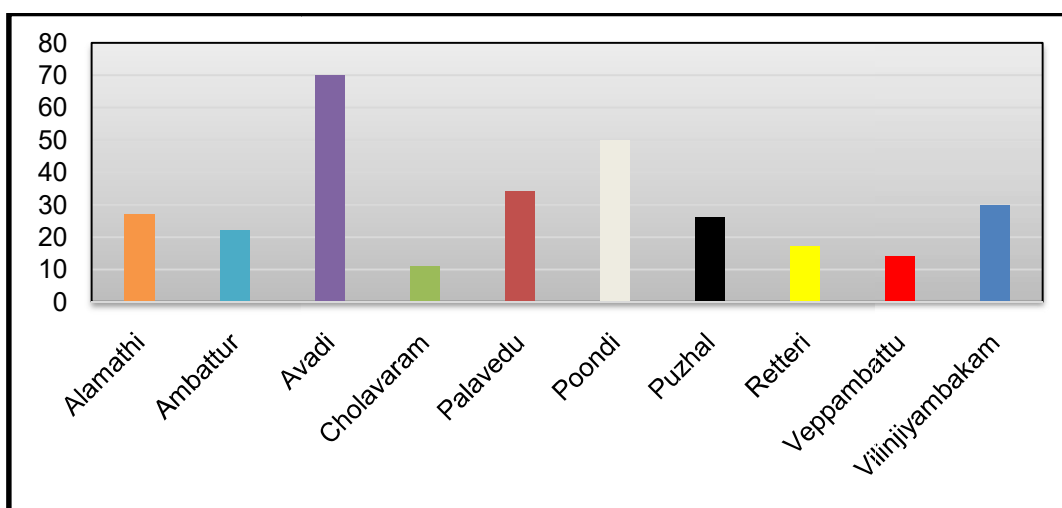


Figure 4.31: Analysis Of Total Coliform

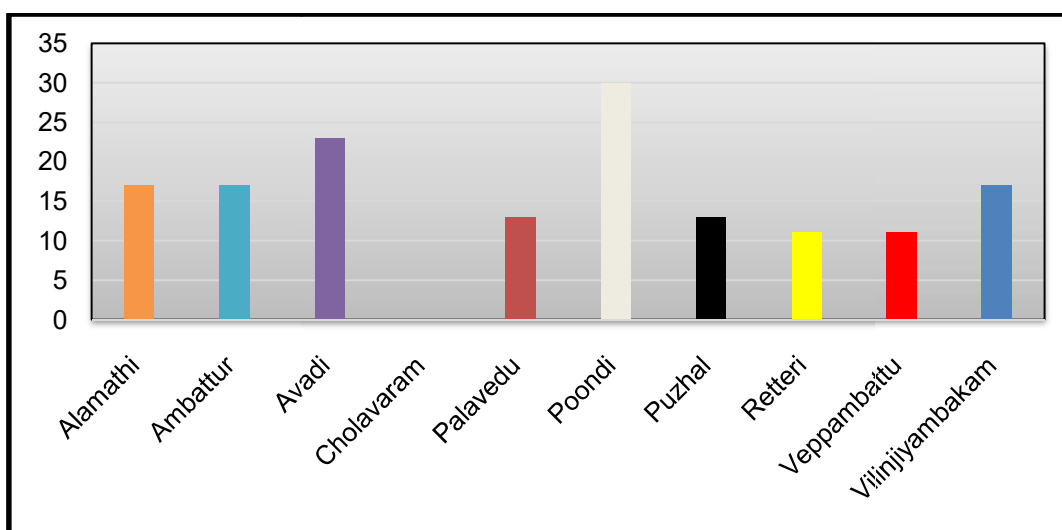


Figure 4.32: ANALYSIS OF E. coli

4.6 ANALYSIS OF WATER QUALITY BY WATER QUALITY INDEX METHOD

In this study, the weighted arithmetic mean method for WQI is used. Weighted arithmetic water quality index method classified the water quality according to the degree of purity by using the most commonly measured water quality variables. The method has been widely used by the various scientists. Water quality index by weighted arithmetic mean method WQI_A can be found out by the following formula:

$$WQI_A = ((\sum w_n \cdot q_n) / \sum w_n).$$

4.6.1 Methodology in Calculating WQI Using WAWQI Method

Step 1: Collect data on several physio-chemical of water quality parameters.

Step 2: Using the formula, find the value of the proportionality constant "K".

$$k = (1 / (1 / \sum_{i=1}^n 1 / s_i)).$$

Step 3: (q_n) is the quality rating for n^{th} parameters,) where there are n parameters. This is calculated using formula,

Step 4: The unit weight for the nth parameters is calculated using formula. $W_n = (k / s_n)$.

Step 5: Using the formula, $WQI = ((\sum w_n \cdot q_n) / \sum w_n)$. calculate the Water Quality Index (WQI).

CHAPTER 5

RESULTS AND DISCUSSION

The pH of water can impact the solubility (amount that could be dissolved in water) and biological availability (amount that can be used by aquatic life) of chemical elements such as nutrients (phosphorus, nitrogen, and carbon) and heavy metals (lead, copper, cadmium, and so on. pH is a measurement of an aqueous solution's acidity or basicity. Analysis of pH is less than 8, 6.5-8.5 is the acceptable limit of pH (As Per IS 10500:2012).

Electrical conductivity is a measurement of a material's ability to pass an electric current flow. Electrical conductivity varies from one material to the next, based on their ability to conduct electricity. Veppambattu lake as higher EC.

Drinking water with a TDS level of less than 600 mg/L is generally considered to have acceptable palatability. TDS levels more than 1200 mg/L in drinking water are undesirable to most people.

A hardness test is used to evaluate the concentration of hardness minerals in water.

Calcium has a crucial function in the health of bodies of water as well. The amount of calcium and magnesium in drinking water determines how hard it is. It's calculated as the amount of calcium carbonate that could be made from calcium and magnesium in solution.

Table 5.1: Water Quality Index (WQI)

Water Quality Index Level	Water Quality Status
0-25	Excellent Water Quality
26-50	Good Water Quality
51-75	Poor Water Quality
76-100	Very Poor Water Quality
>100	Unsuitable for drinking

Table5.2: Analysis Of Parameters

Sampling Location	pH	EC µmhos/cm	TDS mg/l	TH mg/l	Ca mg/l	Mg mg/l	Cl mg/l	So4 mg/l
Alamathi	7	275	140	61	12.8	6.90	19	22
Ambattur	7.35	870	470	210	48.40	21.40	112	91
Avadi	6.44	679	360	197	45.6	19.9	103	17
Cholavaram	7.28	500	260	106	19.6	13.7	58	16
Palavedu	6.34	404	210	110	28.8	9.12	52	60
Poondi	7.74	604	320	180	39.2	19.7	70	53
Puzhal	7.34	404	210	106	25.6	10	47	39
Retteri	6.75	800	430	191	40.8	21.3	109	60
Veppambattu	6.58	1130	630	193	40	22.3	183	87
Vilinjyambakkam	7	558	296	161	39	15.1	52	18

Table 5.3Calculation Of WQI Alamathi Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	558	1.86	186	1.62312
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	296	0.592	59.2	0.309964
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	161	0.536666667	53.66666667	0.46832
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	39	0.52	52	1.815102
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	15.1	0.503333333	50.33333333	4.392314
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	52	0.208	20.8	0.217812
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	18	0.09	9	0.117807
		0.18198			0.476412915					24.03607

Table 5.4 Calculation Of WQI Ambattur Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7.35	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	870	2.9	290	2.530671
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	470	0.94	94	0.492172
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	210	0.7	70	0.610852
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	48.4	0.645333333	64.53333333	2.252588
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	21.4	0.713333333	71.33333333	6.224869
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	112	0.448	44.8	0.469134
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	91	0.455	45.5	0.59558
		0.18198			0.476412915					28.26749

Table 5.5 Calculation Of WQI Avadi Lake

PARAMETERS	Sn	1/Sn	E 1/Sn	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	6.44	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	679	2.263333333	226.3333333	1.975087
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	360	0.72	72	0.376983
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	197	0.656666667	65.66666667	0.573037
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	45.6	0.608	60.8	2.122273
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	19.9	0.663333333	66.33333333	5.788546
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	103	0.412	41.2	0.431436
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	17	0.085	8.5	0.111262
		0.18198			0.476412915					26.47025

Table 5.6:Calculation Of WQICholavaram Lake

PARAMETERS	Sn	1/Sn	E 1/Sn	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7.28	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	500	1.666666667	166.6666667	1.454409
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	260	0.52	52	0.272265
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	106	0.353333333	35.33333333	0.308335
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	19.6	0.261333333	26.13333333	0.912205
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	13.7	0.456666667	45.66666667	3.985079
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	58	0.232	23.2	0.242944
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	16	0.08	8	0.104717
		0.18198			0.476412915					22.37158

Table 5.7:Calculation Of WQIPalavedu Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	6.34	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	404	1.346666667	134.6666667	1.175162
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	210	0.42	42	0.219907
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	110	0.366666667	36.66666667	0.31997
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	28.8	0.384	38.4	1.340383
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	9.12	0.304	30.4	2.652841
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	52	0.208	20.8	0.217812
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	60	0.3	30	0.39269
		0.18198			0.476412915					21.41039

Table 5.8: Calculation Of WQIPoondi Lake

PARAMETERS	Sn	1/Sn	E 1/Sn	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	$Vn/Sn \times 100 = Qn$	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7.35	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	870	2.9	290	2.530671
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	470	0.94	94	0.492172
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	210	0.7	70	0.610852
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	48.4	0.645333333	64.53333333	2.252588
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	21.4	0.713333333	71.33333333	6.224869
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	112	0.448	44.8	0.469134
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	91	0.455	45.5	0.59558
		0.18198			0.476412915					28.26749

Table 5.9:Calculation Of WQIPuzhal Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	$Vn/Sn \times 100 = Qn$	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7.35	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	404	1.346666667	134.6666667	1.175162
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	210	0.42	42	0.219907
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	106	0.353333333	35.33333333	0.308335
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	25.6	0.341333333	34.13333333	1.191451
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	10	0.333333333	33.33333333	2.908817
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	47	0.188	18.8	0.196869
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	39	0.195	19.5	0.255249
		0.18198			0.476412915					21.34742

Table 5.10:Calculation Of WQIRetteri Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	6.75	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	800	2.666666667	266.6666667	2.327054
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	430	0.86	86	0.450285
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	191	0.636666667	63.66666667	0.555584
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	40.8	0.544	54.4	1.898876
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	22.3	0.743333333	74.33333333	6.486662
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	109	0.436	43.6	0.456568
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	60	0.3	30	0.39269
		0.18198			0.476412915					27.65935

Table 5.11:Calculation Of WQIVepampattu Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	6.58	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	1130	3.766666667	376.6666667	3.286963
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	630	1.26	126	0.65972
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	193	0.643333333	64.33333333	0.561402
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	40	0.533333333	53.33333333	1.861643
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	22.3	0.743333333	74.33333333	6.486662
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	183	0.732	73.2	0.766531
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	87	0.435	43.5	0.569401
		0.18198			0.476412915					29.28395

Table 5.12: Calculation Of WQI Vilinjibakkam Lake

PARAMETERS	Sn	1/Sn	$\sum 1/Sn$	$K=1/\sum 1/Sn$	$Wsn=K/Sn$	Ideal Value	Vn (result)	Vn/Sn	Vn/Sn X100 Qn	WnQn
pH	8.5	0.117647	0.38198	2.617935424	0.307992403	7	7	0.49	49	15.09163
Electric conductivity	300	0.003333	0.38198	2.617935424	0.008726451	0	558	1.86	186	1.62312
TDS	500	0.002	0.38198	2.617935424	0.005235871	0	296	0.592	59.2	0.309964
Total Hardness	300	0.003333	0.38198	2.617935424	0.008726451	0	161	0.536666667	53.66666667	0.46832
Calcium	75	0.013333	0.38198	2.617935424	0.034905806	0	39	0.52	52	1.815102
Magnesium	30	0.033333	0.38198	2.617935424	0.087264514	0	15.1	0.503333333	50.33333333	4.392314
Chloride	250	0.004	0.38198	2.617935424	0.010471742	0	52	0.208	20.8	0.217812
Sulphate	200	0.005	0.38198	2.617935424	0.013089677	0	18	0.09	9	0.117807
		0.18198			0.476412915					24.03607

Table 5.13: Biological Characterization Of Water Sample

LAKE	MPN of Total coliform (per 100ml)
Alamathi	27
Ambattur	22
Avadi	70
Cholavaram	11
Palavedu	34
Poondi	50
Puzhal	26
Retteri	17
Veppambattu	14
Vilinjiyambakam	30

Table 5.14: Analysis Of E.coli

LAKE	MPN of E.coli (per 100ml)
Alamathi	17
Ambattur	17
Avadi	23
Cholavaram	0
Palavedu	13
Poondi	30
Puzhal	13
Retteri	11
Veppambattu	11
Vilinjyambakam	17

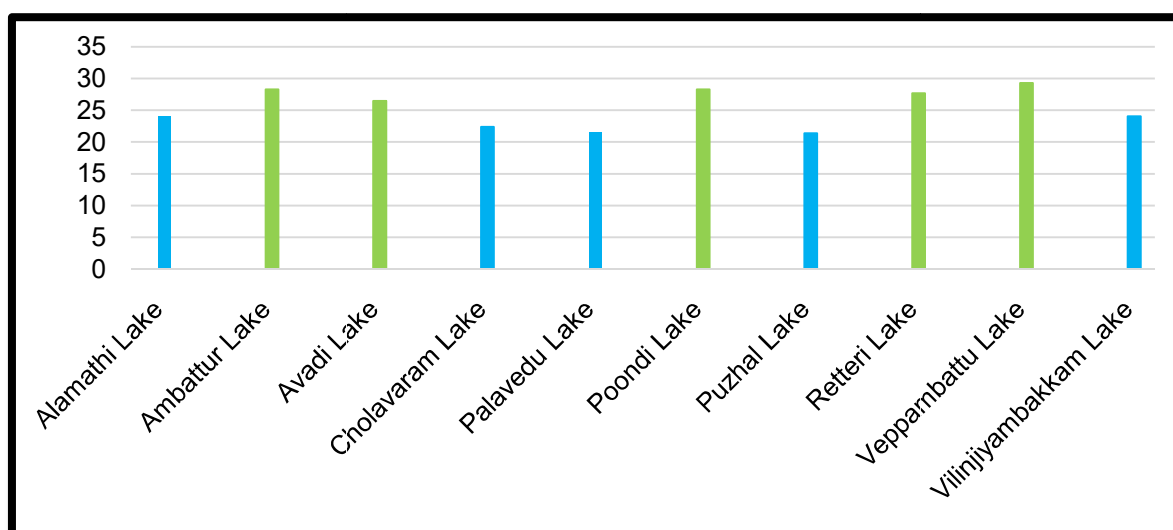


Figure 5.1: Analysis Water Quality Index

CHAPTER 6

CONCLUSION

The study indicates that the water quality index of Alamathi lake, cholavaram lake, palavedu lake, puzhal lake, vilinjiyambakkam lake as WQI level of 0-25 (excellent water quality) and ambattur lake, avadilake, poondi lake, retteri lake and veppambattu lake as WQI level of 26-50 (Good water quality). The coliform and E.coli counts continue to be the major water quality issues. WQI has certain drawbacks. It may not have sufficient information about the current state of the water bodies. The current water quality condition of the lakes is suitable for drinking, according to the WQI, but the biological features of the lakes indicate that it is not suitable for drinking, thus the water should be thoroughly treated before use. The following actions will help to preserve and restore the lake's quality. (i) By intercepting pollutants at the place of origin, pollution can be avoided. (ii) Steps should be taken to monitor the level of pollution in the lake, as well as actions to reduce the lake's contamination. Long term water quality monitoring will give little more surety of potable water on this water body. (iii) For varied sorts of waste created during pilgrim season, a proper collection and management system is required. The study's results are expected to be useful tools for the public and water quality management.

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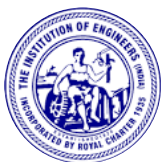
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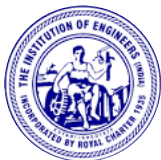
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