STUDIES ON THE WATER QUALITY OF TWO SELECTED PONDS OF CHENNITHALA PANCHAYATH, ALAPPUZHA DISTRICT, KERALA

Project Submitted to the University of Kerala in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science

By

A. NIVEDA KRISHNA 25019101001

JOSHNA JOSE 25019101006

SHEENA JEESON 25019101011

ANASWARA ASHOK 25019101017

DEVIKA D. K. 25019101021

SREYA SURESH 25019101030

Department of Zoology

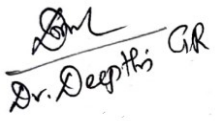
Bishop Moore College

Mavelikara

May, 2022

CERTIFICATE

This is to certify that this project entitled **Studies on the Water Quality of Two Selected Ponds of Chennithala Panchayath, Alappuzha District, Kerala** is an authentic record of the work carried out by **A. NIVEDA KRISHNA**, **JOSHNA JOSE, SHEENA JEESON, ANASWARA ASHOK, DEVIKA D. K., and SREYA SURESH,** B.Sc. Zoology (VI Semester) student under my supervision and guidance and that no part of this report has been submitted earlier for any other degree or diploma.



Dr. DEEPTHI G.R.
(Supervising Teacher)

Head of the Department
Department of Zoology

Examiners

1.

2.

DECLARATION

I .....do hereby declare that this project entitled **Studies on the Water Quality of Two Selected Ponds of Chennithala Panchayath, Alappuzha District, Kerala** is the bonafide work carried out by me under the supervision and guidance of Ms. Somi Cherian, Assistant Professor, Department of Zoology, Bishop Moore College, Mavelikara for the partial fulfillment of the requirements for the degree of Bachelor of Science and that no part of this project work has been submitted earlier for award by any other degree, diploma or recognition of any university.

Name……

Candidate code……

ACKNOWLEDGEMENT

It is with great pleasure that I sincerely place on record my deep sense of gratitude to Dr. Deepthi G. R., Assistant Professor & Head, Department of Zoology, Bishop Moore College, Mavelikara for suggesting the topic and for the guidance I received throughout the course of this work.

I express my sincere thanks to Dr. Jacob Chandy (Principal & Associate Professor in Zoology), Dr. Reeja Jose and Ms. Somi Cherian of the Dept. of Zoology for the valuable help during the project period.

I extend my special thanks to Mrs. Shinu Kurien and Mrs. Amrutha Susan Varghese, and Mr. Thomas Laboratory staff for her assistance during the course period.

I express my thanks to all my team members and friends for their co-operation.

Finally I thank God Almighty for all the blessings.

CONTENTS

Page No.

INTRODUCTION

The water is one of the most important compounds of the ecosystem and is the most abundant physical substance and transparent liquid on earth. Water is the foundation of all form of life. Living things exist on the earth because of this is only planet that has the existence of water. Water is an essential natural resource for life of human beings, plants and animals. All processes of life are directly or indirectly connected to water therefore human beings cannot survive much longer without water, as water plays a central and critical role for every cell and organ system in the human body to function properly. Water is responsible for every activity in human body. In developing countries safe and sufficient drinking water supply is a crucial issue in rural and in many urban areas (Dahiya and Kaur,1999). In rural areas groundwater is a reliable and finite source of water. The most common sources of water for irrigation and various purposes are surface water and groundwater. Ground water and surface water are interconnected. The surface water is present in the form of oceans, rivers, lakes, ponds and streams on the earth's surface and the groundwater present below the earth's surface in porous soils and rocks.

Water is indispensable and one of the precious natural resources of this planet (Shahnawaz and Singh,2009). Though the surface of the earth is consisting mostly of water, small part of it is usable, which makes this resource limited. This limited resource, therefore, must be used with care. The suitability of water must be checked before use as it is required for different purposes. Also, the sources of water must be monitored regularly to check whether they are healthier. Poor condition of water bodies acts as not only the indicator of environmental degradation, but also a threat to the ecosystem. In industries, improper quality is hazardous and may cause severe economic loss. It affects all

form of life directly or indirectly (Ramesh *et al*., 2013). Thus, the quality of water is very important in many aspects like both environmental and economic. Thus, water quality analysis is essential for using it for many purposes. water quality analysis is now consisting of some standard protocols. There are several guidelines for sampling, preservation and analysis of the samples. Water Quality can be defined as the chemical, physical and biological characteristics of water, according to the use.

Water is the most abundant commodities in nature but the most misused one. Water quality refers to the suitability of water for different uses according to its physical, chemical, biological, and organoleptic (taste-related) properties. It is especially important to understand and measure water quality as it directly impacts human consumption and health, industrial and domestic use, and the natural environment. Contaminants that may be in untreated water include microorganisms such as viruses, protozoa and bacteria; inorganic contaminants such as salts and metals; organic chemical contaminants from industrial processes and petroleum use; pesticides and herbicides; and radioactive contaminants. Water quality depends on the local geology and ecosystem, as well as human uses such as sewage dispersion, industrial pollution, use water bodies as a heat sink, and overuse (which may lower the level of the water). The quality of water can be influenced by various pollutants such as, chemical, biological and physical. Microorganisms, infections, substantial metals, nitrate and salt have discovered their way into water supplies (WHO,2007). The water contamination happens when a waterway is unfavorably influenced because of the expansionof a lot of materials to the water (Atta and Razzak, 2008).

The storage and movement of water between atmosphere, biosphere, lithosphere and the hydrosphere are the hydrological cycle. Water compartments are a large area where water is stored. Water is stored in

various global compartments. The major water compartments on earth are Oceans and seas, Glaciers, Ice and Snow, Groundwater, Rivers and streams, Springs, Ponds and lakes, wetlands and atmosphere. In the hydrological cycle, processes like evaporation, condensation, precipitation, deposition, runoff, infiltration, sublimation, transpiration, melting and groundwater flow occur (Gebbie, 2000). The oceans water evaporated in the atmosphere and the maximum amount of evaporated water returned to the oceans by way of precipitation but remaining amount of evaporated water is transported to areas over landmasses where precipitation occurs by climatic conditions. Precipitated water moves as groundwater flow and runoff into rivers, lakes, ponds and oceans (Mitra,1998). A pond is a small area of fresh water. It is different from a river or a stream because it does not have moving water. The bottom of pond is usually covered with mud and Plants grow along the pond edge. Some ponds are formed naturally and some other ponds are man-made. Pond is a reservoir of rainwater. Pond is smaller than lake and lake is deeper than a pond. Pond , which hold water for few months of the year or throughout the year and acts as one of the major water resources. Pond water has prime importance for human society besides its habitats that have been used since time immemorial as a traditional source of water supply in India. However, the water of the ponds, lakes and river are polluted mainly due to discharged waste water from residential areas, sewage outlets, solid wastes, detergents, automobile oil wastes, fishing facilities and agricultural pesticides from farmlands. Water pollution concerns within the rural and municipal areas are therefore not limited to potable water criteria but include the effects on general health of humans, livestock, agriculture and aquatic life. The seasonal variations in different physico-chemical parameters of water from ponds and other reservoirs were studied and analyzed the water quality by various

workers, as reported from different regions of India and abroad.

Water pollution is a major global problem. When the pollution originates from a single, identifiable source is known as a point source of contamination. Various types of point-source contaminants found in waters such as industrial, agricultural, and of urban sources. Point sources of pollution from agriculture may include animal waste storage and cleaning areas for pesticides, fertilizers. Municipal point sources include wastewater treatment plants, landfills (Datta and Tyagi, 1996). Due to all of these activities, hazardous substance may include in the raw material. Non-point sources pollutionoccurs over extensive areas. When water moves over and through the ground it can pick up natural contaminates, synthetic contaminates depositing them into rivers, wetlands, lakes and underground water (Nirmala *et al*., 2012). Non-point sources contamination also occurs by sediments, seepage of septic tanks and use of fertilizers. Irrigated agriculture is a significant source of groundwater non-point contamination.

Water is the most important component of rice cultivation. Agriculture discharge occurs over a large area as non-point sources pollution; therefore, its management and treatment are more difficult. Agricultural discharges contribute to degrade both ground and surface water (Ramappa and Suresh, 2000). Chemicals from fertilizers, pesticides, insecticides, farm waste, plants and animal debris, inorganic material and manure slurry are reported to cause huge pollution to surface and groundwater. Fertilizer pollution is difficult to regulate and reduce. It contains high levels of nitrogen and phosphorous with smaller amounts of potassium. Nitrogen fertilizers containing nitrates can contaminate groundwater easily because nitrates are highly soluble in water. Rainwater runoff brings fertilizers into rivers, streams, lakes and oceans

(Sharma *et al*., 2002; Deshpande and Aher, 2012). Due to fertilizer pollution biggest change occurs in algae populations (Algal blooms). The excessfertilizer use runs off into waterways, they cause algae blooms (Pradhan,2001).

Water quality indicates the relation of all hydrological properties including physical, chemical and biological properties of water bodies. Hence water quality assessment includes physicochemical and biological parameters that reflect abiotic and biotic status of ecosystem. Water pollution is loss of potency of water because of addition of excess of materials that are harmful for humans, plants, animals and aquatic life. Water quality affected by sedimentation, surface runoff, erosion, temperature, pesticides, deterrence. The major physicochemical parameters are PH, turbidity, total suspended solid, total alkalinity, electrical conductivity chloride ion concentration, total hardness, biological oxygen demand, chemical oxygen demand, total organic carbon, sulphate, nitrate and phosphate. Water quality is determined by comparing physicochemical characters of water sample with water quality guidelines and standard. Increasing human population growth, industrial and agricultural activity expansion and climatic change cause major alteration to hydrological cycle. Most prevailing water quality problem is eutrophication, a result of high nutrition load which impairs beneficial use of water. Major nutritional sources include agricultural runoff, domestic sewage, industrial effluent and atmospheric input from fossil fuels burning and burning bushes.

The goal of water quality standard is to protect public health and environment and to maintain standard of water quality consistent with its designated uses. Water quality assessment provide the baseline information on water safety. Ambient water quality standards are registered for protecting water bodies with

regard to type and water usage in country. Water quality testing is an important part of environmental monitoring. When water quality is poor it affects surrounding ecosystem. Water quality monitoring help to predict and learn from natural processes in the environment and to determine human impact on ecosystem. These measurement efforts can assist in restoration projects or ensure environment standard to meet. Water quality monitoring helps humans to safe to drink as well as marine and wildlife. Water quality important to understand the environmental impacts and not to harm aquatic life. Water quality monitoring is important to keep planet healthier and sustainable. Water quality testing can provide valuable data on condition of particular water body and to need special treatment before use. In recent years the water resources are depleting at an alarming rate due to careless misuse, consequently need of water resource management and protection strategies are on prime interest (Srivasthava and Sinha, 1994; Cristina *et al*., 2012).

Surface water shows more vulnerability towards pollution, mainly due to easy access for disposal of pollutants and waste water. This is most important tools of the environment and an integral part of the biological cycle. The addition of various kinds of pollutants and nutrients through the agency sewage, industrial effluents, agricultural runoff etc. in to the water bodies brings about a series of changes in the physicochemical and characteristics of water, which have been the subject of several investigations (Mahananda,2010). Ponds and tanks are recognized to be environmental indicators of the strength of a city and their pollution levels. The quality of surface water is governed by the natural processes and different human activities.

Agricultural pressures on water quality come from cropping and livestock systems and aquaculture, which have all expanded and intensified to meet increasing food demand related to population growth and changes in dietary

patterns. The global growth of crop production has been achieved mainly through the intensive use of inputs such as pesticides and chemical fertilizers. The trend has been amplified by the expansion of agricultural land, with irrigation playing a strategic role in improving productivity and rural livelihoods while also transferring agricultural pollution to water bodies. Water pollution from agriculture has direct negative impacts on human health; for example, the well-known blue-baby syndrome in which high levels of nitrates in water can cause methaemoglobinemia – a potentially fatal illness – in infants. Pesticide accumulation in water and the food chain, with demonstrated ill effects on humans, led to the widespread banning of certain broad-spectrum and persistent pesticides (such as DDT and many organophosphates), but some such pesticides are still used in poorer countries, causing acute and likely chronic health effects. Aquatic ecosystems are also affected by agricultural pollution; for example, eutrophication caused by the accumulation of nutrients in lakes and coastal waters has impacts on biodiversity and fisheries. The livestock sector is growing and intensifying faster than crop production in almost all countries. Agricultural systems have expanded and intensified in response to the ever-increasing demand for food. In absolute terms, land clearing and agricultural expansion have contributed to higher pollutant loads in water, but probably the biggest impacts have been caused by certain unsustainable patterns of agricultural intensification. The overuse and misuse of agrochemicals, water, animal feeds and drugs designed to increase productivity have resulted in higher pollution loads in the environment, including rivers, lakes, aquifers and coastal waters.

Surface water bodies have an effect on the groundwater board and subsurface water values of the close aquifers due to the presence of direct contact between the surface and ground water. The pond water has the main important

role in the environmental bio-monitoring due to the reasons such as groundwater recharge, bases of water surface and discharge for irrigation, nourishment, overflow control and preservation, regeneration, environment change for biological cycles, persistence of fishes and animals, precipitation harvesting. The ecological condition of any water resources mainly depends upon the nature of that resources and its occurrence to the various ecological factors. Hence, the surface water value be determined by not only on systematic procedures but also on human activities special effects. The quality of water also shows the relation of physical, chemical and biological properties and reactions as like the surface water. The water quality design contains the study of physico- chemical and biological factors that reproduce the biotic and abiotic grade of the environment. The Water quality index is an important tool that deals with a nominal number that denotes definite place and time, also based on some of the water quality factors. Water is most specious and precious factor for the survival of living organisms. Due to the increasing population and human activities, the sewage and municipal wastage are responsible for pollution of lentic and lotic water bodies.

The main purpose of water quality analysis is environmental monitoring. The change in water quality affects the living beings in itself and around its surroundings. Water quality monitoring helps researchers to determine the impacts ecosystem restoration. Some hazardous metals, radioactive metals can cause severe effects on life of human beings as well so a well monitored water quality analysis is essential in such cases. Steps for water analysis are 1) Selection of parameters, 2) Selection of methods, 3) Precision and accuracy of method, 4) Proper sampling, 5) Proper labelling, 6) Preservation, 7) Analysis and 8) Reporting. Water quality analysis is to measure the required parameters of

water, following standard methods, to check whether they are in accordance with the standard.

The physiochemical parameters of the pond have been shown to influence rate of biodegradation in the pond. Temperature has a direct effect on important factors such as growth, oxygen demand, food requirements and food conservation efficiency. The total suspended solid and total dissolved solid play important role in determining the solid particle present in water. Determination of pH value is very important as it gives idea about certain treatment. Another quality parameter of significance is chloride concentration, which show the pollution from household thrashes, human fecal matter and urinary discharges. Estimation of dissolved oxygen is a key to test in water pollution and waste treatment process control. Dissolved oxygen is required for respiration of aerobic microorganism as well as other multicellular organisms (Padhy *et al*., 2019). Lime leaching out of concrete pond is mainly responsible for increasing alkalinity while respiration, nitrification decrease or consume alkalinity. Increase in phosphate of village pond may be attributed to high organic load of the ponds causing higher level of BOD. COD is used to measure the content of organic matter of the pond water. The increased demand for water as a consequence of population growth, agriculture and industrial development has made the environmentalist to determine the physical, chemical and biological features of all water resources (Jeyabhaye,2008). Water quality parameter furnish the basis for judging the suitability of water for its designated uses and for improving the existing conditions (Shinde *et al*.,2010). The ecological behavior of ponds changed by a number of physical, chemical, factors, such as climate, geological differences etc. (Solanki *et al*. 2007). Physiochemical parameters play a vital role in determining the distribution pattern and quantitative abundance of organisms inhabiting a particular aquatic ecosystem.

Freshwater ecosystem is a subset of Earth's aquatic ecosystems. It can be divided into lentic and lotic ecosystem. They include lakes, ponds, rivers, streams, springs, bogs, and wetlands (Wetzel Robert, 2001). All lentic habitats, such as ponds, lakes are extremely important as they are enriched with other natural resources too. These water bodies were used by mankind for domestic, agricultural and industrial purposes. Due to industrialization, increase in population, use of fertilizers in the agricultural fields and other anthropogenic activities make water highly polluted with harmful contaminants. Among another freshwater resources ponds are useful in many ways and it is one of the methods of artificial infiltration of underground water.

Ponds are small bodies of freshwater with shallow and still water, marsh and aquatic plants. They can be further divided in to four zones: vegetation zone, open water, bottom mud and surface film (Cleg ,1986). Ponds may either natural or artificial. Ponds are frequently manmade or expanded beyond their original depths and bounds by anthropogenic causes. Among their many uses, ponds provide water for agriculture, livestock and communities, aid in habitat restoration, serve as breeding grounds for local and migrating species, and are components of landscape architecture, flood control, general urbanization, mitigate particular pollutions and greenhouse gasses, and support wide varieties of organismal ecosystems. Ponds are important hotspots of biodiversity. Collectively they support more species than any other freshwater habitat (Cereghino *et al.,*2008) They often contribute more to regional biodiversity than the rivers or another habitat. Ponds are easily disrupted by human activity. The pond water is polluted mainly due to the discharge of wastes from residential area, sewage outlets, solid wastes, detergents and automobile oil waste (Bhuiyan and Gupta, 2007). Physico-chemical parameter analysis of any aquatic ecosystem is necessary because their hydrochemistry affects its biota to a great

extent. Water quality influences the existences of aquatic organisms (Jyotsna ,2014). The physico-chemical characteristics of pond water have a direct impact on prevailing organisms as well as human being using such water. The study of different water quality parameters helps in understanding the metabolic events of the aquatic system. Certain parameters such as temperature, pH, transparency, salinity, ammonia, carbon dioxide, dissolved oxygen, and chemical oxygen demand are necessary for the proper understanding of flora and fauna and their abundance and distribution with time. The changes in these parameters provide valuable information on the quality of water, the sources of the variations and their impacts on the functions and biodiversity of the pond. The lack of information on the natural values of these ponds and the inappropriate management measures results in their deterioration or even disappearance. The study highlights the need for revitalization of natural fresh water ecosystems.

The soil on the bottom of a pond acts as a source of nutrients and also buffers water in aquaculture. The soil also acts as a biological filter, adsorbing organic remains of feed, fish excrements, and algal products. The important bottom soil fertility indicators in freshwater ponds are nitrogen concentration, C/N ratio, organic matter content, and dissolved phosphorus. Boyd (2008) found the condition of the pond bottom and the exchange of substances between soil and water can strongly influence the water quality of the fishponds. Thus, the soil directly affects water quality, nutrient availability, and fish productivity in aquaculture.

Literature overview reveals that no specific work has been done so far to evaluate the qualitative aspect of pondwater of Chennithala region of Alappuzha District for various purposes. Thus, present research work has under taken to investigate the physicochemical characteristics of pondwater

of this area.

OBJECTIVES

The main objectives of the study were

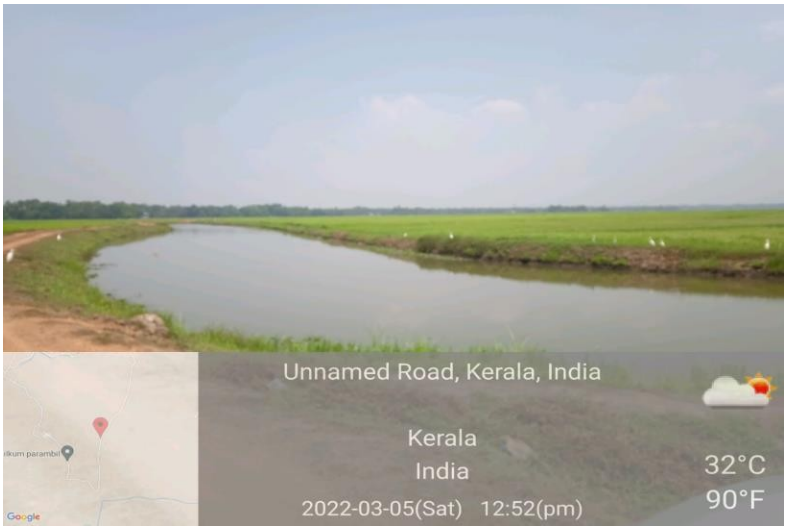
- to analyze the Physico chemical parameters of soil and water of two different ponds in Chennithala region of Alappuzha district, Kerala and
- to study the effect of agriculture practice on the quality of pond water.

MATERIALS AND METHODS

STUDY SITES

Two ponds located near paddy fields of Chennithala panchayath of Alappuzha district are selected as study sites.

POND1



POND 2

SAMPLE COLLECTION AND ANALYSES

In order to assess the water quality of the study areas, water and soil samples were collected during February - April, 2022. Physico chemical parameters like Temperature, pH, Dissolved Oxygen and Carbondioxide were analyzed in chemical laboratory within 6 hours of their collection. Water samples were collected in 500 ml wide mouthed polypropylene bottle for analyzing water quality. Analyses of physical parameters like Temperature and pH were done in the field using thermometer and pH indicator papers. Dissolved Oxygen and Carbondioxide were estimated by following the standard methods of APHA (2005). Soil Analysis was carried out for various parameters such as pH, Organic carbon, phosphorus and nitrogen using Soil Testing Kit.

Dissolved oxygen in water

The Winkler Method is used to determine the concentration of dissolved oxygen in water samples. The dissolved oxygen in the sample is then "fixed" by adding a series of reagents (KI and $MnSO_4$) that form an acid compound that is then titrated with a neutralizing compound ($Na_2S_2O_3$) that results in a colour change. The point of colour change is called the "endpoint," which coincides with the dissolved oxygen concentration in the sample.

Carbon dioxide in water

The 40ml sample water is pipetted out in a conical flask. A few drops of phenolphthalein were added to it. Then titrated the sample against .01 N NaOH solution taken in the burette. The end point was marked by the appearance of pink colour.

Organic carbon in soil

A full spoon of soil was taken in a mixing bottle and added 5 ml of organic carbon reagent - 1 and mixed well. 5 ml of organic carbon reagent - 2 was added very slowly and mixed well and allowed to stand for 10 minutes to complete the reaction. Transfer the supernatant liquid into a test tube and compared with the organic carbon colour chart.

pH of soil

Transferred 10 c.c of soil into the soil mixing tube and 25 ml of pH reagent – 1 was added, then shaked well for 5 minutes. A pinch of decolourizer was added into it and shaked well. Filter the soil mixture into the colour developing bottle using funnel and filter paper. To the clear filtrate 4-5 drops of pH reagent -2 was added. Wait for another 2-3 minutes, then compared the colour developed with the pH colour chart.

Nitrogen in soil

Transferred 5 c.c of the soil in the soil mixing tube and 25 ml of nitrogen reagent -1 was added and shaked well. Add a pinch of decolouriser was added into it and mixed again. Filter the soil mixture into the colour developing bottle using funnel and filter paper. To the clear filtrate, 2 drops of nitrogen reagent -2 was added for developing colour. Then the colour was compared to the nitrogen colour chart.

Phosphorous in soil

Transferred 5 c.c of the soil into the soil mixing tube and 25 ml of phosphorous reagent-1 was added. Then mixed well and wait for 15 minutes. A pinch of decolouriser was added into it and mixed. Filter the soil mixture into the colour developing bottle using funnel and filter paper. To the filtrate, add 2 ml of phosphorous reagent-2 and mixed well. Wait for 1-2 minutes for colour developing. Then the colour was compared to the phosphorous colour chart.

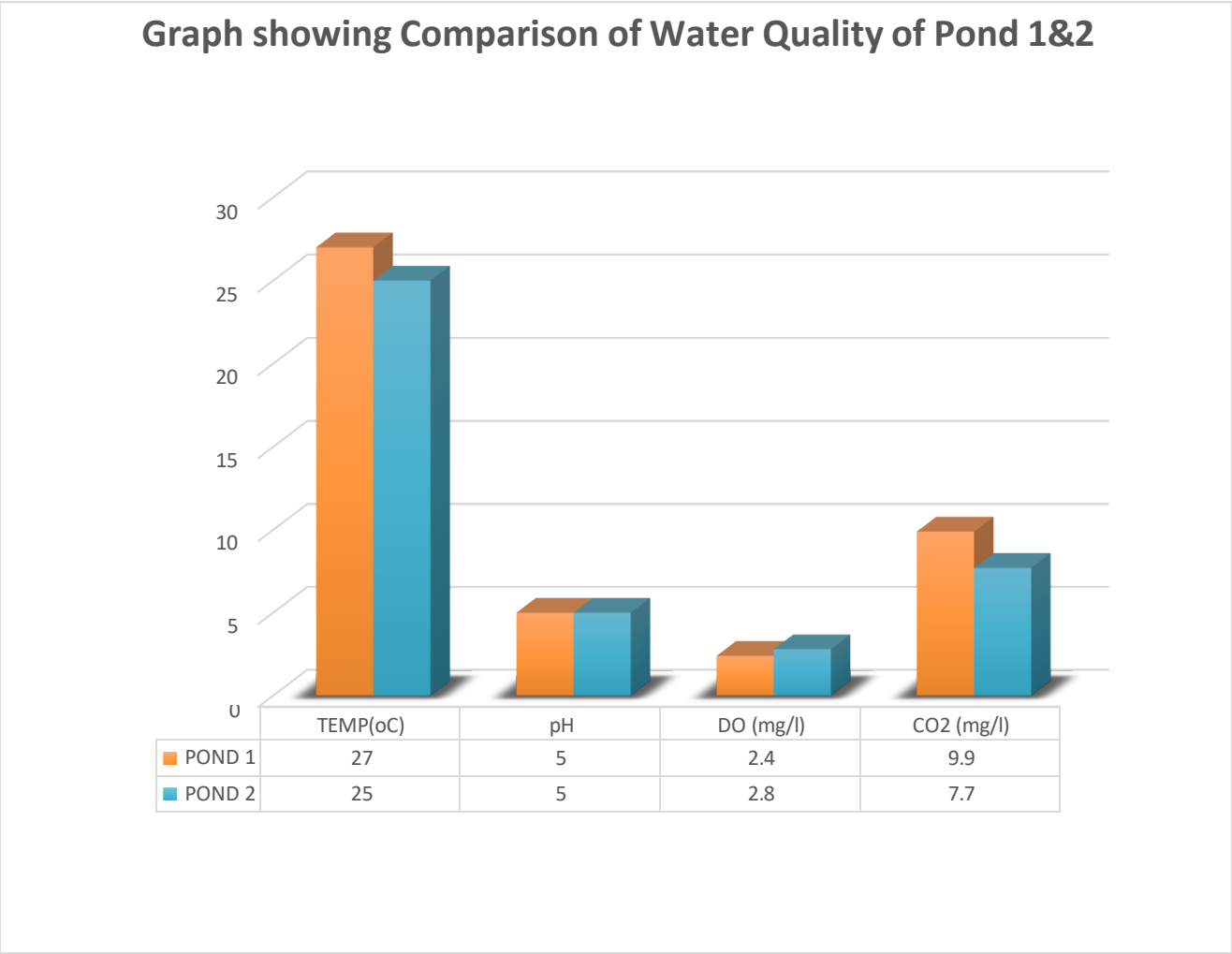
RESULT AND DISCUSSION

The results of the analysis of selected physicochemical parameters of water and soil of the two study sites (Pond 1 and Pond 2) were given in the Table 1.

Table 1- WATER QUALITY AND SOIL QUALITY OF PONDS 1&2

SAMPLE SITES	**POND 1**	**POND 2**
WATER QUALITY		
TEMPERATURE(^oC)	27	25
pH	5	5
DO (mg/l)	2.4	2.8
CO_2 (mg/l)	9.9	7.7
SOIL QUALITY		
pH	5	5
ORGANIC CARBON	<0.5% (Low amount)	0.5- 0.75% (Medium amount)
NITROGEN	<50 kg/Acrc (L_1 level)	151- 200 kg/Acrc (M_2 level)
PHOSPHORUS	8- 10 kg/Acrc (M_2 level)	15 kg/Acrc (H_2 level)

A comparative study of the selected water quality parameters like temperature, pH, Dissolved oxygen and carbon dioxide of the two ponds was also done and represented in the graph shown below.



Temperature:

Temperature is one of the most important factors in the aquatic environment. It affects the physical and chemical properties of water and also affects the aquatic vegetation,

organisms and their biological activities. Temperature values in the ponds in the study area ranged from 25to 27°C.

pH:

The pH (Potential Hydrogen) of a solution refers to its hydrogen ion activity and is expressed as the logarithm of the reciprocal of the hydrogen ion activity at a given temperature. The average value of pH in pond water samples of the study area was 5. Slight deviation towards acidity in some samples can be attributed to the anthropogenic activities in the study area.

Dissolved oxygen

The presence of dissolved oxygen is essential to maintain the higher forms of biological life and to keep proper balance of various pollutions thus making the water bodies healthy. The chemical and biochemical process undergoing in water body are largely dependent upon the presence of oxygen. Estimation of dissolved oxygen is a key test in water pollution and waste treatment process control. The permissible value recommended for DO is 5mg/L as per Indian standard. In the present investigation dissolved oxygen ranged from 2.4 – 2.8mg/l. Ponds in the study showed low DO which may be due to the decreased solubility of oxygen at higher temperature.

Carbondioxide Carbon dioxide concentrations in ponds highest when dissolved-oxygen concentrations are lowest. In the present investigation carbon dioxide ranged from 7.7 – 9.9mg/l.

Freshwater is one of the basic needs of mankind and is essential for the existence of all forms of life. Ponds are an integral component of the hydrological system and perform diverse role in biosphere. Ponds are of immense significance to human civilization as they are sources of water for domestic, agriculture and industrial purposes etc. Now a days we can see that the world's pond ecosystem is in danger. It is threatened by many

factors. These include a variety of anthropogenic activities, which entail urgent need for research and education programs to create awareness in the society for their protection and conservation.

Ponds are the most important surface water resources which greatly support biodiversity, serve as sites of rainwater harvesting, ground water recharging, and support livelihood of many communities directly as drinking water or indirectly as in irrigation. The benefit of pond is not just the beauty it brings but also water conservation, irrigation, habitation of different varieties of creatures *etc*. Ponds are very much helpful in maintaining the ecological equilibrium of an area. Collectively, they support more species, and more scarce species, than any other freshwater habitat. Ponds were a part of our culture. Through the conservation of ponds, the habitats and biodiversity will be protected, thereby a large variety of biological treasures. Moreover, it is helpful to make awareness among people about the importance in the protection of our environment. Conservation of ponds is by now an acknowledged solution to the water scarcity and ground water depletion.

Water scarcity has emerged as one of the most prominent issues faced in the world. Though Kerala is known for its water bodies, there are many people struggling to meet their water needs and left agriculture due to water scarcity. Conserving the ponds can definitely help us with the rise in water demand. Ponds are also able to provide sustainable solution to pollution and water management issues. Ponds are identified as good sources for denitrification, sedimentation, removal of phosphorous, nitrogen and sediments from surface water. Besides, ponds support the ground water table too, which may benefit the community and nature especially during summer seasons.

Pollution is a major threat to most of the ponds, especially while they are in an abandoned condition. Many of the ponds are left uncleaned mainly due to management issues. Studies conducted by Non-Governmental Organizations shows that nearly 40% of

village ponds in India have been filled up for residential or office purposes in last 100 years. Though ponds are small in size, but large in numbers are the main source of water harvesting. Their unique biodiversity and specific ecosystem functions make them most important. Many efforts have been taken by the government as well as the local community to renovate many of the ponds to meet the community needs. Lack of water resources is one of the reasons of the reduction in agriculture in our locality. When these ponds were ignored, that led to algal blooming and eutrophication. By renovating the ponds, it can be expected that ground water recharge will occur and thus, become a solution for water needs of the society.

Restore the pond from eutrophication and pollution: Retain its ecological importance to provide sustainable use pattern. The study aims at restoring the ecological importance it had in the past and provide a sustainable environment ahead. Surendran and Rajan (2021) studied physico-chemical parameters of four different ponds in Manathana region of Peravoor panchayat, Kannur district in Kerala and highlights the point that anthropogenic pressure makes responsible for causing destructive nature of ponds as in the present study.

In crop production, water pollution from nutrients occurs when fertilizers are applied at a greater rate than they are fixed by soil particles or exported from the soil. Excess nitrogen and phosphates can leach into groundwater or move via surface runoff into waterways. Phosphate is not as soluble as nitrate and ammonia and tends to get adsorbed onto soil particles and enter water bodies thorough soil erosion.

Sediment in river systems is a complex mixture of minerals and organic matter, potentially including physical and chemical pollutants. Particles of clay and silt in sediment can adsorb many types of chemicals on their surfaces, including nutrients, heavy metals and persistent organic pollutants. Sediment, therefore, is a key means by which such pollutants are transported to water bodies. Nitrogen concentration

exceeding 5 milligrams per litre of water indicate pollution from human and animal waste or fertilizer runoff from agricultural area.

As a first step towards effective water-quality management, it is necessary to know the current status of water quality and the spatial and temporal distribution patterns of any contaminant emissions, loads and concentrations in water environments. For example, if pollutant loads exported to a given water body are high, identifying where, when and by whom the pollutant sources are emitted is necessary to ensure appropriate responses. So, the present study was conducted in order to evaluate the water quality parameters as the bad water quality like high temperature and poor oxygen level may provide sufficient environment for the growth of opportunistic pathogens and affect the biodiversity of ponds. So good management practices are necessary to control the disease and increase the productivity rate.

CONCLUSION

The present study was under taken to study the quality of water samples of two ponds connected with paddy fields of Chennithala Panchayath of Alappuzha District with special reference to physicochemical properties of water and soil. So as to evaluate the water quality of the study areas, water and soil samples were collected during February - April, 2022. Physico chemical parameters like Temperature, pH, Dissolved Oxygen and Carbondioxide were analyzed in chemical laboratory within 6 hours of their collection. Organic carbon, pH, Nitrogen and Phosphorous in soil were also analysed. Temperature values in the ponds in the study area ranged from 25to 27°C. The average value of pH in pond water samples of the study area was 5. In the present study dissolved oxygen ranged from 2.4 – 2.8mg/l. In the present investigation carbon dioxide ranged from 7.7 – 9.9mg/l. The present study was conducted in order to evaluate the water quality parameters as the bad water quality like high temperature and poor oxygen level may provide sufficient environment for the growth of opportunistic pathogens and affect the biodiversity of ponds. So good management practices are necessary to control the disease and increase the productivity rate. The poor quality of water indicate pollution from human and animal waste or fertilizer runoff from agricultural area. Thus, this study can offer the requisite information for the authority to protect and conserve these small water bodies.

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