

**Physio-Chemical Properties of Water in the Shores of Lake Victoria: A Case Study in  
Namayingo District**

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**Declaration**

I, Okuku Filex, declare that this research work is my original work unless otherwise cited where it has been; the case reference has been stated. This work has not been submitted for any academic award in any institution.

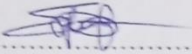
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### Approval

This research work has been submitted for examination with the approval of the supervisor.

Signed  .....

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## **Dedication**

I dedicate this work to my beloved parents, Mr. Okello Charles Wafula and Ms. Taaka Mary who have struggled much to educate me up to this level.

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## **List of Acronyms and Abbreviations**

pH:	potential of Hydrogen.
COD:	Chemical Oxygen Demand.
BOD:	Biological Oxygen Demand.
UNBS:	Uganda National Bureau of Statistics.
US:	United States.
NCBI:	National Center for Biotechnology Information.
PFASs:	Polyfluoroalkyl Substances.
NEMA:	National Environmental Management Authority.
DNA:	Deoxyribonucleic Acid.
WHO:	World Health Organization.
TDS:	Total Dissolved Solids.
EC:	Electrical Conductivity.
TSS:	Total Suspended Solids.
TS:	Total Solids.
DW:	Distilled Water.
NWSC:	National Waters and Sewerage Cooperation.
WWTP:	Waste Water Treatment Plant.

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## **Abstract**

Water is one of the most valuable resources that is found on planet earth. It's a fundamental compound to all forms of life, every living thing needs water not just for drinking or cleaning purposes but for general life existence. This study was conducted in Namayingo district, Bukana Sub- County in eastern Uganda, neighboring the Republic of Kenya in the east and southeast and the Republic of Tanzania in the south. The physiochemical properties of water (pH, DO, BOD, conductivity) was measured by different methods which includes pH meter, winkler method, and conductivity meter, several samples were collected from three different sites for experimentation and that is Atega landing site, Buduma fishing site and Namavundu fishing site. During the study, it was found out that the water in these three different sites have slightly distinct values which are in the range of, pH 8.5-9.1, DO 6.0-6.8 and BOD 5.6-6.0 and conductivity 1110-1370  $\mu\text{S}/\text{cm}$ . These deviates from recommended values by World Health Organization which is in the range of 50-100  $\mu\text{S}/\text{cm}$  for ground, surface and drinking water (seen in Table 2), and BOD value of less than 5 (<5). This shows clearly that water of Lake Victoria in Namayingo District is not safe for human consumption since its values of physiochemical properties are different from the ones recommended by WHO. This challenge can be addressed through different methods like sensitization and setting up strict laws and others to improve on water quality.

## **CHAPTER ONE: Introduction**

### **1.1 Background**

Water contains hydrogen and oxygen atoms combined in the chemical structure linked by the hydrogen bonds, undergoing topological reformation. The water quality depends on the place and time variation, most of the earth's water is salty which cannot be used by human beings domestically and few fresh water sources available are highly susceptible to the pollution from anthropogenic sources which degrades its quality hence rendering it harmful for domestic and fish existence (Boyd, 2019). And water being the major constituent of earth's hydrosphere and fluid in the bodies of all living things where it acts as a solvent. Therefore, life in all forms depends on water and the earth cannot continue in the absence of water (Haltiner, 1999).

The domestic water suppliers are of the fundamental requirements for human life and without water life cannot be sustained for days and in addition, lack of access to adequate safe water suppliers can lead to the diseases. Children bear the greatest health risk associated with poor water and sanitation, for example Diarrhea is attributed to poor water supply, sanitation and hygiene, accounting for 1.73 million deaths each year for poor water quality effects and contribute over 54 million Disability Adjusted Life Years, a total equivalent to 3.7% of the global burden of diseases (Sobsey, 2002).

Human activities such as urbanization, industrial production, population growth, industrialization, agricultural production and many others has affected the quality of Waters in most of fresh water sources, this has made pollution of water to become a worldwide problem which has continued to influence the health of many people in the world (Zhou & Khu, 2014). Water pollution occurs when pollutants are discharged directly or indirectly into water sources without adequate treatment to eliminate harmful chemical and physical compounds deposited, for example human wastes from septic tanks in the fray on the waters of Lake Victoria which is always emptied into the waters, hence resulting into the contamination and pollution of waters. The water pollution affects aquatic lives living in this water bodies and influencing the variation of fish species in the lake.

Due to the increased food shortage in the Naming and people living around the shores of lake they decided to engage in agriculture like crop production farming using different types of fertilizers to enhance their yields, and lack of toilets by most people in the area have left many releasing their human wastes in water. This has severely affected the chemical and physical properties of waters and has caused the imbalances in the aquatic organism's structure and functioning, thus making water more dangerous to whole community and other living

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