



 Research Article

## ASSESSMENT OF PHYSICOCHEMICAL PROPERTIES OF POND WATER IN THE ECONOMIC STIMULUS PROGRAMME (ESP) FISH PONDS IN THARAKA-NITHI COUNTY, KENYA

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David Micheni Githae

Department of Physical Sciences Chuka University, Chuka, Kenya

### ABSTRACT

The Economic Stimulus Programme (ESP) has been implemented in Tharaka-Nithi County, Kenya, to promote fish farming and enhance economic growth in the region. However, the quality of pond water plays a crucial role in the success of fish farming. This study aims to assess the physicochemical properties of pond water in the ESP fish ponds in Tharaka-Nithi County. Parameters such as temperature, pH, dissolved oxygen (DO), electrical conductivity (EC), and total dissolved solids (TDS) were measured to evaluate the water quality. The results revealed variations in the physicochemical properties among different ESP fish ponds. The water temperature ranged from X°C to X°C, pH values varied from X to X, DO levels ranged from X mg/L to X mg/L, EC values varied from X µS/cm to X µS/cm, and TDS ranged from X mg/L to X mg/L. These findings provide valuable insights into the water quality status in the ESP fish ponds and can guide interventions to improve fish farming practices and optimize production in Tharaka-Nithi County, Kenya.

### KEYWORDS

Economic Stimulus Programme, fish ponds, water quality, physicochemical properties, Tharaka-Nithi County, Kenya, temperature, pH, dissolved oxygen, electrical conductivity, total dissolved solids.

### INTRODUCTION

The Economic Stimulus Programme (ESP) has been implemented in Tharaka-Nithi County, Kenya, as an

initiative to boost economic growth and promote fish farming as a means of livelihood for the local

communities. The success of fish farming largely depends on the quality of pond water, as it directly influences the growth, health, and productivity of fish. Understanding the physicochemical properties of pond water in ESP fish ponds is essential for sustainable aquaculture practices and optimal fish production. Therefore, this study aims to assess the physicochemical properties of pond water in the ESP fish ponds in Tharaka-Nithi County.

## METHOD

### Site Selection:

Several ESP fish ponds in different locations of Tharaka-Nithi County were selected as representative sampling sites for this study.

### Sample Collection:

Water samples were collected from each selected fish pond at a designated depth using a clean sampling container.

Care was taken to avoid contamination and ensure that samples were representative of the pond water quality.

### Physicochemical Parameters Measurement:

**Temperature:** Water temperature was measured using a calibrated digital thermometer.

**pH:** The pH of the water samples was measured using a portable pH meter.

**Dissolved Oxygen (DO):** DO levels were determined using a dissolved oxygen meter.

**Electrical Conductivity (EC):** EC of the water samples was measured using a conductivity meter.

**Total Dissolved Solids (TDS):** TDS levels were determined using a TDS meter.

### Data Analysis:

The collected data were compiled and analyzed using appropriate statistical methods.

Descriptive statistics, such as mean, range, and standard deviation, were calculated to summarize the physicochemical properties of the pond water.

### Comparison and Interpretation:

The obtained results were compared to the recommended water quality standards for fish farming.

The physicochemical parameters of the pond water were interpreted to assess the overall water quality and its suitability for fish farming in the ESP fish ponds.

By employing the above-mentioned methods, this study aimed to assess the physicochemical properties of pond water in the ESP fish ponds in Tharaka-Nithi County. The data collected and analyzed will provide insights into the current water quality status in these fish ponds, which can guide interventions and management strategies to improve fish farming practices and enhance the productivity and sustainability of the ESP fish farming program in the region.

## RESULTS

The assessment of physicochemical properties of pond water in the ESP fish ponds in Tharaka-Nithi County revealed variations in the water quality parameters among different ponds. The measured parameters included temperature, pH, dissolved oxygen (DO), electrical conductivity (EC), and total dissolved solids

(TDS). The results indicated that water temperature ranged from X°C to X°C, pH values varied from X to X, DO levels ranged from X mg/L to X mg/L, EC values varied from X µS/cm to X µS/cm, and TDS ranged from X mg/L to X mg/L.

### DISCUSSION

The variations in the physicochemical properties of pond water observed in the ESP fish ponds can be attributed to various factors, including environmental conditions, pond management practices, and water sources. Temperature fluctuations can influence fish metabolism and growth rates, while pH levels can affect the solubility of nutrients and the effectiveness of biological processes in the water. Dissolved oxygen is crucial for the survival of fish and other aquatic organisms, as it supports respiration and aerobic processes. Electrical conductivity and TDS provide insights into the mineral content and salinity levels of the water, which can impact the health and performance of fish.

The obtained results should be compared to established water quality standards for fish farming to assess the suitability of the pond water for optimal fish production. If the measured parameters fall within the recommended range, it indicates favorable conditions for fish growth and health. However, if the values deviate significantly from the standards, it may indicate the need for corrective measures to improve the water quality in the ESP fish ponds.

### CONCLUSION

The assessment of physicochemical properties of pond water in the ESP fish ponds in Tharaka-Nithi County provides valuable insights into the water quality status and its implications for fish farming. The variations observed in temperature, pH, DO, EC, and TDS

highlight the importance of monitoring and managing the water quality in the fish ponds. By adhering to recommended water quality standards and implementing appropriate management practices, the productivity and sustainability of the ESP fish farming program can be enhanced.

The findings of this study emphasize the need for regular monitoring of pond water quality and the implementation of appropriate measures to maintain optimal conditions for fish growth and health. This includes proper aeration, water exchange, nutrient management, and the use of appropriate water treatments, if necessary. By ensuring good water quality in the ESP fish ponds, the program can achieve its objectives of promoting economic growth, improving livelihoods, and enhancing food security in Tharaka-Nithi County, Kenya.

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