

**PRELIMINARY STUDY ON THE VARIATIONS OF SURFACE  
WATER QUALITY OF BATTICALOA LAGOON NEAR URBAN  
AREAS OF BATTICALOA DISTRICT**

**BY**

**MENHA VEERASENAN**



FAG379



Project Report  
Library - EUSL

**Department of Agricultural Engineering**

**Faculty of Agriculture**

**Eastern University, Sri Lanka**

**2014**

DEAN  
Faculty of Agriculture  
Eastern University, Sri Lanka

PROCESSED  
Main Library, EUSL

## ABSTRACT

Batticaloa lagoon is an inland body of water plays a significant role to uplift the standard of living of people, especially fishing community in Batticaloa district. However, lagoon water pollution has become a growing menace to human society and natural ecosystems in recent decades. Hence, it is vital to understand the spatial and temporal variability of pollutants within aquatic systems. Therefore, this study aimed to investigate the preliminary study on variations of surface water of Batticaloa lagoon. This study was carried out from November, 2013 to June, 2014. Batticaloa lagoon was divided into three divisions based on the major pollution source of Batticaloa lagoon. Twenty sampling points were randomly selected from these divisions and water samples were taken monthly. Physico-chemical parameters such as temperature, pH, EC and TDS were measured at sampling points while TSS, TS, DO, BOD, phosphate, nitrate and turbidity were measured at laboratory. Data were analysed statistically to interpret the results. Results showed that all the quality parameters tested except turbidity exceed the standard levels for aquatic life while DO falls within the acceptable range. There were high range in tested parameters, temperature ranged between 27.2°C to 32.5°C, pH 6.4 - 9.2, EC 600µS/cm - 1700µS/cm, TDS 296mg/l - 873mg/l, TSS 13mg/l - 35mg/l, phosphate 0.19mg/l - 0.76mg/l, nitrate 0.97mg/l - 2.60mg/l, DO 4.64mg/l - 7.12mg/l, BOD<sub>5</sub> 4.13mg/l - 8.66mg/l and turbidity 6.6NTU - 13.9NTU. Phosphate and nitrate levels significantly ( $p < 0.05$ ) varied among the divisions. Further, temperature, pH, EC, TDS, TS, DO and phosphate were high during dry period while TSS, BOD, nitrate and turbidity were high during wet period.

## TABLE OF CONTENTS

ABSTRACT	iv
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
ABBREVIATIONS	xii
CHAPTER 1	1
1.0 INTRODUCTION	1
CHAPTER 2	6
2.0 LITERATURE REVIEW	6
2.1 Site description	6
2.2 Definition of lagoon	6
2.3 Classification of lagoon	7
2.4 Importance of lagoon	7
2.4.1 Lagoons and estuaries improve livelihood of societies	8
2.4.2 Lagoons are highly productive systems	8
2.4.3 Lagoons conserve coastal biodiversity	9
2.4.4 Lagoons purify waste water naturally	9
2.4.5 Lagoons are important for recreation	9
2.5 Potential pollution sources	10
2.6 Seasonal changes on water quality	13
2.6.1 Temperature	14
2.6.2 pH	15

2.6.3	Electrical Conductivity (EC)	18
2.6.4	Total Dissolved Solids (TDS)	18
2.6.5	Phosphate	19
2.6.6	Nitrate	21
2.6.7	Dissolved Oxygen (DO)	22
2.6.8	Biological Oxygen Demand (BOD)	25
2.6.9	Turbidity	26
2.7	Water quality assessment methods	27
2.7.1	Preservation and storage of collected sample	28
2.7.2	Laboratory analysis procedure	28
<b>CHAPTER 3</b>		<b>33</b>
3.0	MATERIALS AND METHODS	33
3.1	Description of study area	33
3.2	Site selection and sampling	34
3.3	Analysis of water quality parameters	35
3.3.1	Temperature	35
3.3.2	Electrical Conductivity, Total Dissolved Solid and pH	35
3.3.3	Dissolved Oxygen and Biological Oxygen Demand	35
3.3.4	Total Solid and Total Suspended Solid	36
3.3.5	Turbidity	37
3.3.6	Nitrate and Phosphate	37
3.4	Data Analysis	37
<b>CHAPTER 4</b>		<b>38</b>
4.0	RESULTS AND DISCUSSION	38
4.1	Temperature	38

4.2	pH	41
4.3	Electrical Conductivity (EC)	43
4.4	Total Dissolved Solids (TDS)	44
4.5	Total Suspended Solids (TSS)	46
4.6	Phosphate concentration	47
4.7	Nitrate concentration	49
4.8	Dissolved Oxygen (DO)	50
4.9	Biological Oxygen Demand (BOD)	51
4.10	Turbidity	52
5.0	CONCLUSION AND RECOMMENDATIONS	56
6.0	REFERENCES	57
7.0	APPENDIX	67