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INFLUENCE OF ORGANIC MANURE POND FERTILISATION ON THE WATER  
QUALITY AND PRIMARY PRODUCTIVITY OF STOCKED PONDS IN SOROTI  
DISTRICT



BY

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### DECLARATION

I **NASSIMBWA SUMAYA** declare that this dissertation is an affirmation of the research activities I carried out as a partial requirement for an award of a degree in Animal production and management of Busitema University and that this report has never been submitted to any university or other institution of learning for any academic reward.


Signature.......... Date.....4<sup>th</sup>/10/2017.....

The research process up to documentation of this report has been developed under guidance and supervision of an academic supervisor and the approval there after

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Signature.......... Date.....4/10/2017.....



## **DEDICATION**

I dedicate this report to my parents Mr. and Mrs. Kabambwe Ahmadah, for their sacrifices and commitment to keep me in school till this far and for their parental guidance accorded to me will ever remain a memorable contribution to my life.

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## **LIST OF ABBREVIATIONS**

MAAIF;	Ministry of Agriculture, Animal Industry and Fisheries
UBOS	Uganda Bureau of Statistics
UNBS	Uganda National Bureau of Standards
FAO	Food and Agriculture Organisation
WHO	World Health Organisation
ICT	Information and Communication Technology



## ABSTRACT

The study was to determine the relationship between organic manure pond fertilization and water quality as well as primary productivity of ponds in Soroti district by analyzing and comparing the physical and chemical parameters as well as the primary productivity of the water from both organic manure fertilized and unfertilized ponds. A total of seven stocked fish ponds were sampled, of which the four were fertilized using organic manures that is, pond 5, 3, 2 and Ogwete1 while the three were not fertilized that is Obutei, Ogwete 2 and the Campus pond. The water quality parameters tested included temperature in degrees Celsius ( $^{\circ}\text{C}$ ), dissolved oxygen in mg/l, total dissolved solids in mg/l, pH and chlorophyll a concentration in mg/l, as a measure of primary productivity of the pond water. Temperature, pH, total dissolved solids and dissolved oxygen were measured using a multi parameter monitor YSI model 5200A, ammonia concentration was measured using a photometer at a wave length of 640nm while chlorophyll a concentration was determined by laboratory analysis.

The followings readings were obtained; temperature for fertilized ponds ranged from 23 to 28.13 $^{\circ}\text{C}$  while for the unfertilized ponds ranged from 25.5 to 26.63 $^{\circ}\text{C}$ , pH for fertilized ponds ranged from 7.3 to 8.07 while for unfertilized ponds it ranged from 7.15 to 8.31, dissolved oxygen concentration for fertilized ponds ranged from 0.60 to 7.42mg/l while for unfertilized ponds it ranged from 2.05 to 11.4, ammonia concentration for fertilized ponds ranged from 0 to 0.085 while for unfertilized ponds it ranged from 0 to 0.0375, total dissolved solids levels for fertilized ponds ranged from 116.27 to 134.34mg/l while for unfertilized ponds it ranged from 110.885 to 125.07mg/l and chlorophyll a concentration for fertilized ponds ranged from 0.001 to 0.007mg/l while for unfertilized ponds it ranged from 0 to 0.004mg/l

The results showed that organic manure fertilization has an effect of lowering the pond water temperatures and dissolved oxygen content while increasing the primary productivity of ponds. The study also revealed that organic pond fertilization has no significant effect on the pond water total solids, ammonia concentration and pH of the stocked ponds

Therefore further research should be done to determine the effect of organic manure pond fertilization on the water quality and primary productivity of stocked ponds.

## CHAPTER ONE; INTRODUCTION

Uganda produces up to 15 000 tons of fish from aquaculture, including production from open water sources, small-scale fish farmers, emerging commercial fish farmers and stocked community water reservoirs(UBOS,2012). Open Water covers 15.3 percent of Uganda's total surface area and this comprises five major lakes (Victoria, Albert, Kyoga, Edward and George), which are the main contributors to fish catch in the country (FAO, 2009). About 95 percent of the fish catch is from Lakes Victoria, Albert and Kyoga. Although the proportion of fish catch from Lake Victoria declined from 42.2 percent in 2010 to 41.8 percent in 2011, it continues to be the dominant water body in Uganda both in size and contribution to the total fish catch (UBOS, 2012).

There are an estimated 20 000 ponds throughout the country with an average surface area of 500m<sup>2</sup> per pond. Production ranges between 1,500 kg per hectare per year for subsistence farmers to 15,000 kg per hectare per year for emerging commercial fish farmers (UBOS, 2014). With improved market prices for fish, government intervention for increased production and stagnating supply from capture fisheries, aquaculture has begun to attract entrepreneurial farmers seeking to exploit the business opportunity provided by the prevailing demand for fish (FAO, 2017).

Pond fertilization lies in cultivation of various food organisms and their propagation in large quantities in fish ponds to provide fish with abundant natural feeds, by which they can grow faster. The yield of fish pond can be raised therefore fertilization aims to supply phytoplankton with nutrients for photosynthesis and to promote their growth, by which zooplankton and other aquatic animals are fed on for their growth and propagation. Thus the study of the effect of organic manure fertilization on the water quality and primary productivity of stocked ponds in Soroti district

### 1.2 Problem statement

Feed shortages limit fish growth in most fish ponds (Abdallah.M & Muhammad.B, 2016). Increasing the growth of microscopic plants (phytoplankton) is the key to increasing feeds hence fish growth (Joe.T.Lock, 2010). Therefore Applying fertilizers promotes the growth of phytoplankton (the first part of this food chain) thus increasing the primary productivity of the ponds, as well as improving the water quality (Cheruiyot.J.B, 2014). This in turn increases annual fish production due to increased feed abundance as well as better water quality by 100 to 400 percent (Ahmed Mohamed El Otify, 2015).

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