



# Ecological intensification of fish production : Fertilization strategies in Africa fish farms

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## INTRODUCTION

- ❖ In fish farms of central Africa, commercial feeds are not easily available.
- ❖ Smallholders rely on various fertilization strategies based on on-farm resources to feed the fishes and ecologically intensify production.
- ❖ In this context ponds receives different types of fertilizers (organics and chemicals).
- ❖ The efficiency of these strategies is not always known owing to the associated risk of eutrophication.
- ❖ The aim of this work was to assess how various fertilization practices would impact fish growth and the physicochemical parameters of the water of 18 ponds of 2.5 Ares inoculated with *Oreochromis niloticus* fry.

## MATERIALS AND METHODS

18 ponds were divided in 6 groups of 3 ponds in randomized blocks and monitored for 45 days, each group receiving a specific treatment: control with no fertilization, CaCO<sub>3</sub>, CaCO<sub>3</sub>+NPK+Urea, NPK + Urea, CaCO<sub>3</sub> + pig manure, and pig manure alone. Parameters measured were physicochemical parameters of water twice a day: Temperature (T), Dissolved oxygen in water (O<sub>2</sub>), pH and Conductivity; Nutrients concentrations in water every three days: ammonium, nitrite (NO<sub>2</sub>) and fish growth.

## RESULTS

- ❖ The growth of *Oreochromis niloticus* was mainly influenced by the combination of CaCO<sub>3</sub> with NPK and urea. Control and CaCO<sub>3</sub> weakly influenced fish growth.
- ❖ All treatments gave dissolved oxygen levels above the optimum of 5 mg/l.
- ❖ Except NPK + Urea and CaCO<sub>3</sub> + NPK + urea treatments, which tend to approach the lethal concentration of nitrite, other treatments have very low concentrations
- ❖ Addition of CaCO<sub>3</sub> played an key role in correcting the pH of pond water.

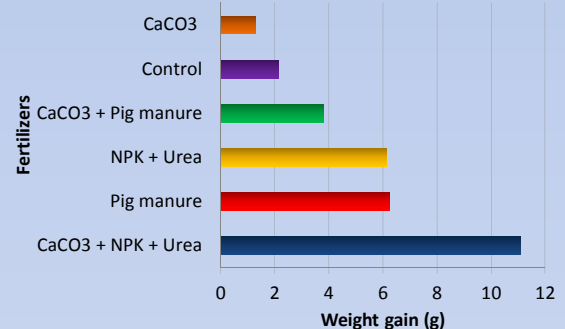


Figure 1. Average weight gain of fish in different fertilizers

Table1. Average nutrient concentration in pond water

Fertilizers/ parameters	CaCO <sub>3</sub>	Control	CaCO <sub>3</sub> + Pig manure	NPK + Urea	Pig manure	CaCO <sub>3</sub> + NPK+ Urea	P value
NO <sub>2</sub> (mg/l)	0.17	0.24	0.25	0.44	0.26	0.28	0.0013
NH <sub>4</sub> <sup>+</sup> (mg/l)	0.13	0.19	0.34	1.33	0.32	0.50	<0.0001

Table2. Average content of physicochemical parameters in pond water

Fertilizers/ parameters	CaCO <sub>3</sub>	Control	CaCO <sub>3</sub> + Pig manure	NPK + Urea	Pig manure	CaCO <sub>3</sub> + NPK+ Urea	P value
pH	13.16	7.63	13.56	7.54	9.27	9.25	0.0842
T (°C)	31.29	28.62	28.83	27.83	28.58	28.69	0.0244
O <sub>2</sub> (mg/l)	11.35	8.84	13.40	7.43	6.13	10.46	<.0001
Conductivity (µs/cm)	745.87	763.88	670.99	1313.57	1378.54	678.39	<.0001

## CONCLUSION

Fertilization strategy seems to be very interesting to farms where fish feeding is rare or very expensive for the ability to generate fish growth and improve water quality. Choice of fertilizers has great importance, because they have very varied effects on the quality of the water and the concentration of the nutrients in the water. With the exception of manure alone, a combination of two or three fertilizers proves to be effective in raising fish; however quantity of fertilizer must remain a primary concern for farmers.