



# KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

## FRESH WATER AQUACULTURE

# FACT SHEET

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*Estimate of Nitrogen and Phosphorus loading from Nile tilapia (*Oreochromis niloticus* L) cage culture in Lake Victoria, Kenya: A way to increased sustainability*



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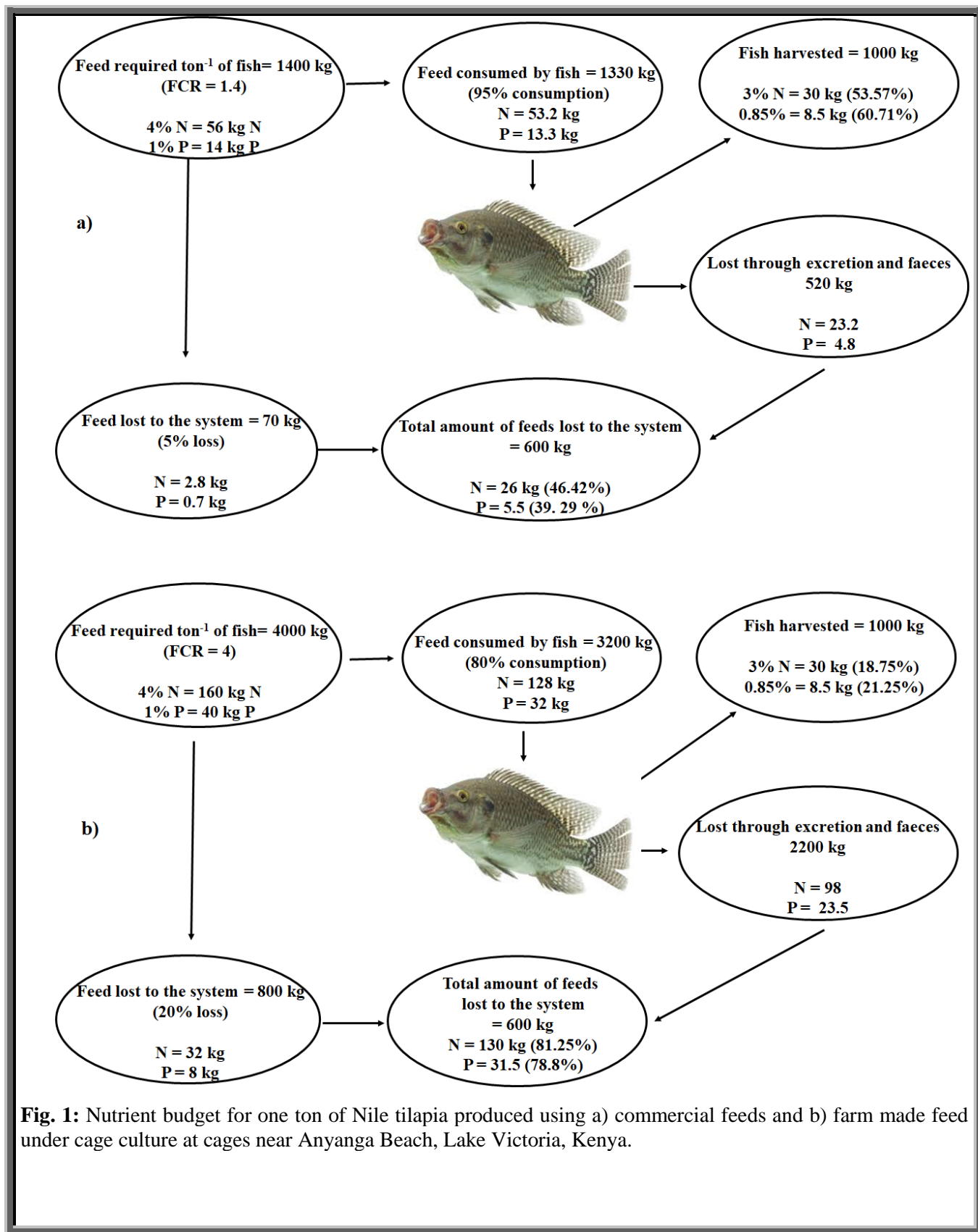
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### **Background information**

- ❖ Being an essentially open system, cages are usually characterized by a high degree of interaction with environment and cage systems are highly likely to produce large bulk of wastes that are released directly into the environment.
- ❖ Large-scale cage aquaculture development in freshwater lakes such as L. Victoria, systems that are already under high environmental stress, is highly questionable.
- ❖ Sustainable cage fish culture and the development of sustainable blue economy will depend on understanding the nutrient loads of cage farms in fresh water aquaculture, since every ecosystem has a maximum assimilative capacity, which is determined by the maximum acceptable environmental impacts.
- ❖ Furthermore, reducing environmental footprint of cage culture operations requires estimation of the amount of waste associated with such systems and its management.
- ❖ Yet, the fate and quantitative contribution of the new N and P sources emanating from feed wastage in cage fish culture in African inland waters is scarce.
- ❖ We sought to estimate the nutrient load in the waste released into aquatic environments based on the feeding of Nile tilapia (*Oreochromis niloticus*, L.) with backyard pelleted and extruded feed.

### **Results**

- More N (130.0) and P (31.5) was provided through the feed (as  $\text{kg ton}^{-1}$  fish produced) when the fish were fed pelleted than extruded feed (Figure 1).
- More N (30) and P (8.5) was retained in extruded feed (as  $\text{kg ton}^{-1}$  fish produced) than in pelleted fed fish (Figure 1).
- As a result, about double the amount of N (81.3%) and triple the amount of P (78.8%) were released into the environment when the fish were fed the pelleted feed (Figure 1).



**Fig. 1:** Nutrient budget for one ton of Nile tilapia produced using a) commercial feeds and b) farm made feed under cage culture at cages near Anyanga Beach, Lake Victoria, Kenya.

### ***Conclusion and recommendations***

- ❖ The use of extruded commercial feed in the cage culture of tilapia is preferential to using artisanal feed as it produced less environmental impact.
- ❖ Extruded feed should be used for farming tilapia in cages for environmental reasons.