FACT SHEET

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SHOULD AFROTROPICAL FARMERS' USE CAGES OR PONDS FOR GROW-OUT OF NILE TILAPIA?

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Introduction

- According to recent statistics, aquaculture production in Kenya increased between the years of 2018 and 2020 (Figure 1) and this has been linked to the adoption of cage fish farming technology in Lake Victoria.

- Although intensive cage fish farming is increasingly becoming popular in Sub-Saharan Africa, semi-intensive pond culture remains the primary method of tilapia production in Africa

- In Kenya and Sub-Saharan Africa (SSA) in general, pond productivity is low.

- As a result, the aquaculture sector is characterized by continuous exit of old practitioners and entry of new/suspecious adopters.

- Nevertheless, supportive government policies continue to drive the growth of aquaculture sector in Kenya

- Support for new fish farms may help aquaculture in Kenya flourish, but if the enterprise is not viable or promotes ethical business conduct, it is of little use

- As fish farming begins to take root in Kenya, several questions will need to be addressed, among them:

  - ✓ Can aquaculture gain impetus without subsidy in Kenya?
  - ✓ Is grow-out pond farming of tilapia economically sustainable?

- We compare the economics of grow-out and fingerling production of Nile tilapia in ponds vs. grow-out of tilapia in cages

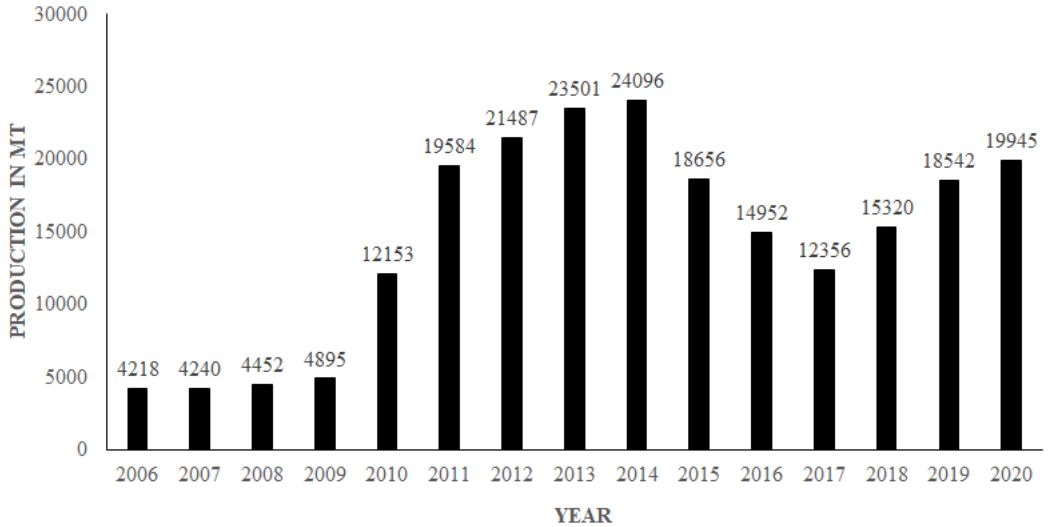

Figure 1: Trends in aquaculture production in Kenya 2006-2020 (KNBS, 2021)

Profitability of cages and ponds for grow-out of Nile tilapia in Kenya

- Table shows the productivity of cages vs. ponds for grow-out of Nile tilapia in Kenya
- Grow-out of Nile tilapia in ponds and cage systems is lucrative to operate in the short-term as indicated by the positive returns above variable costs
- LDHV cages are superior to ponds for growing tilapia because they offer almost 11 times more profit per kilogram of fish produced
- However, investment costs for cages appear to be higher than those for ponds. This might prevent it from being adopted, especially by smallholder farmers.

Table 1: Productivity of grow-out ponds and cages in Kenya

Parameter	Pond	LDHV cage
Volume of common facilities (m^3)	450	8
Cost/cubic metre	1.29	20.3
Body mass of stocked Nile tilapia (kg)	0.005	0.015
Stocked biomass kg/m^3	0.015	1.9
Survival (%)	80	91
Biomass harvested per cubic metre (kg)	0.7	51.2
Production duration (months)	8 to 12	6 to 8
Production cycles per year	1	2
Average farm gate price (USD)	3	3
Gross profit above variable costs (USD)	36.1	806.5
Profit margin per kg of fish above variable costs (USD)	**0.18**	**1.97**

Nuts and bolts of production facility put to use in Kenya

- According to table 1, the size of fish stocked in cages is around three times that of fish in ponds; fish in cages would grow to market weight more quickly than fish in ponds.
- Nile tilapia takes12 months to reach table size (500 g) in pond systems. The fish would require 6 to 9 months in cages to reach the same weight
- With good management practices, cage farmers—unlike pond farmers—can have two production cycles each year.
- In Kenya, it has been estimated that 4000 fingerlings m^{-3} are generated every 30 days when ponds are used for Nile tilapia spawning: each female tilapia has a fecundity rate of about 1050 eggs per 30 days
- After a year, pond farmers stocking roughly 4 fish m^{-3} would only get less than 2.5 kg m^{-3}.

- Pond farmers who produce fingerlings would make over USD 180 m^{-3} $month^{-1}$ in contrast to those who produce table size fish and only make less than USD 10 m^{-3} after more than 10 months (Figure 1), based on the lowest price of fingerlings in the Lake Victoria basin of 0.05 USD and the highest farm-gate price of tilapia of 3.57 USD

- With proper husbandry, cages seem to me more productive for grow-out of tilapia as compared to grow-out ponds (Figure 1)

- Nonetheless, Ponds appear to be more lucrative for tilapia fingerling production than for grow outs (Figure 1)

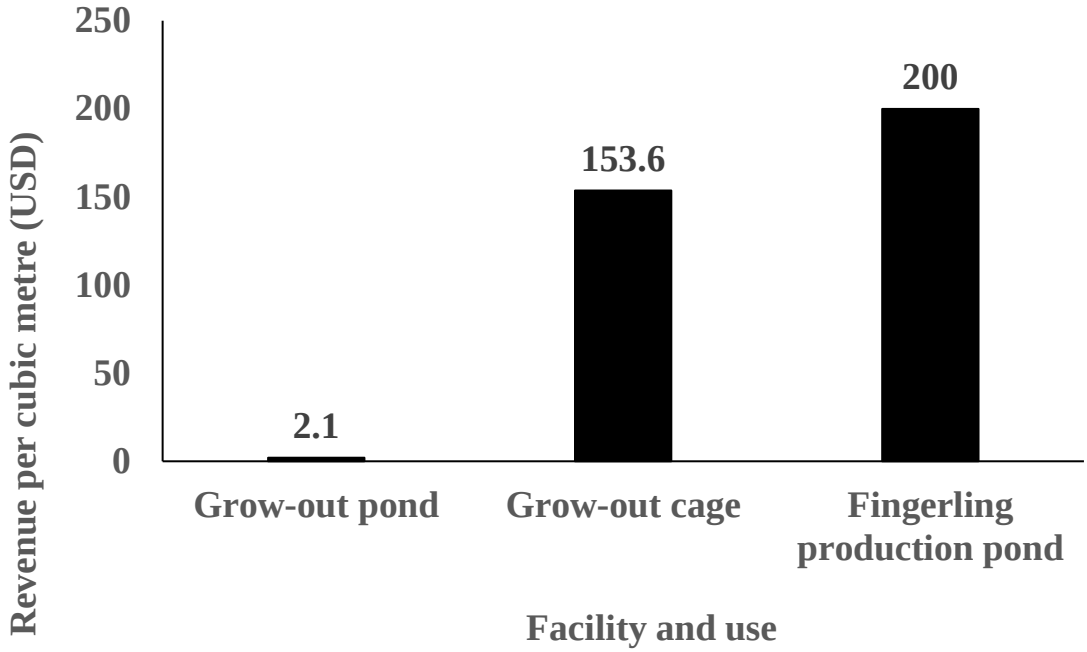

Figure 1: Revenue per cubic metre of production facility put to use

Conclusion and recommendations

- Pond systems are better for producing fingerlings than table-sized fish in Kenya.

- Low pond productivity/un profitability seems to be more of a management issue than facility problem

- LVHD cages are better for grow-out tilapia farming in Kenya than ponds, even though investment cost seems higher.

- Pond aquaculture can do better in Kenya if management is improved