



*KENYA Aquaculture without Frontiers – Farmer to Farmer Brief
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Background

Lukas Manomaitis (ASA-IM Technical Director- Aquaculture) and I participated in USAID/Farmer to Farmer program to visit some fish farms around Lake Victoria (Kisumu) and to provide useful input/suggestions to improve practices and productions. This brief document supplements a detail trip report prepared by Lukas. Throughout the farm visits and discussions with farmers, Lukas focused on feed and feeding while I focused on general aquaculture and seed production. Since the trip logistics, schedules detailed in Lukas's report, this brief will outline some of my own personal impressions (derived from discussions with key informants and farm visits) and suggestions for future actions.

General Impressions

Despite government policy to promote aquaculture around Lake victoria by constructing a large number of small size ponds throughout the region (45,000 ponds of around 200-300 m²), aquaculture is seemingly is at its early stages of development. Clearly, improvements are needed in all aspects of production if it is to become a viable commercial activity in Kenya.

Since the population around Kisumu and the lake area are big fish consumers, there is a ready market locally. Given Nairobi market is accessible at relatively short distance, potential to develop small to medium-scale farm operation is high.

Access to quality water and temperature variability are two main concerns. While farms along the lake can access water of adequate quality for fish farming, temperatures vary from 17 to 30 °C depending on the season and the time of day.

Nile tilapia and Clarias Catfish are the primary species cultured, although we only observed Tilapia in the farms visited. Growth rate by each farm varied, but they are generally low (200-400g in 8-13 months) compared with the Asian systems. This problem could be addressed through, stock improvements, adjusting stocking and harvesting cycle and improving feed and feeding. Discussions with farm operators/ technicians suggested that they needed more knowledge on culture species and production processes.

Specific suggestions/recommendations were provided through dialogue and discussion to those farms visited. Following is a brief background, problems identified and some of the possible solutions:

Thinqbator (Mr. Otineo Okello, owner/manager)

This farm uses recirculating system for producing seed and uses this to stock his own ponds and sells the remaining. This is a capital, energy and labor intensive indoor recirculating system not suitable for Kenya context. System like this to be viable in Kenya requires sustained high market price of tilapia.

Problems: 1) unstable productions (high/unknown mortality), 2) low growth 3) high operational cost, 4) quality and quantity of water

Recommendations:

- 1) Think carefully, whether RAS makes economic sense in this context. Consider the cost and reliability of electricity, labor and brood and feed compare against sale price of seed.
- 2) Keep a better record of: brood stock, fry produced (health and % survival), feed and ration.
- 3) Acquire a faster growing stock and keep from mixing with existing stocks
- 4) Improve technician's (David) capacity in tilapia seed production. Provide training opportunities to learn from working systems.
- 5) Monitor the quality of water throughout the year.

Dominion Farms in Saiya (Chris Abir, Director)-

This is a multi-faceted large-scale farm with multiple field crops, livestock and aquaculture. Why and how this type of farm is set up in the middle of rural Kenya is not clear to us. Given the scale of operation, providing concrete recommendation on the operation and practices was also rather difficult. The time we were there was short and I was not well prepared to advise on the kinds of input they needed in order to improve practices and productions.

I provided a brief morning training session on fish seed quality. Clearly, there are huge knowledge deficit among the 4 staff that worked with me, even those with a degree on aquaculture from Moi University.

Problems (perceived by the working staff)

- 1) Low growth rates of tilapia (13 months to reach 400-500g)
- 2) High mortality of fry in earthen ponds
- 3) Lack of control over the process since only the fry was collected.
- 4) Lack of data of the operation
- 5) Predation (upwards of 50% loss)
- 6) Quality of water (flushing is a common practice)
- 7) Lack of basic and practical knowledge of key staff

Recommendations:

- 1) Acquire a starting stock from well-performing and known stock. Preferably, from locations that have particularly fast growing and improved lines (GIFT Chitralada etc.).

Growth is a function of everything (genetics, food, water quality). Genetic quality of the stock seems questionable. No technician seemed to know where the current stock came from, how long they have been in the farm, and how the stocks have been managed. Of course, the tendency to sell or stock the larger fingerlings and use the remaining for broodstock could select for slower growing (smaller average size) population.

- 2) Use larger ponds to stock fry. Tiny ponds ($>2\text{m}^2$) used with shallow depth could result in rapid temperature fluctuation since the temperature in the evening drops significantly. If the tank mortality is higher (near 100%), then better to keep them in the tank until stocking size.
- 3) Rather than relying on collecting fry from the brood stocked ponds, experiment with collecting eggs from the females, incubating and producing fry using simple procedures. This will require more care and labor, but provide much more predictable results. Current production of less than 16 fingerlings per female less than acceptable. Consult a Tilapia Fingerling Production manual (AIT). AIT's AARM Hatchery also runs a number of trainings in Tilapia fingerling production (two-weeks long) and could be a good venue for the four senior staff.
- 4) Collect and keep organized hatchery and production data (technical and financial). This will provide opportunity for quick identification of problem and determination of management interventions. When asked some basic hatchery data, they were not available.
- 5) Use of running dogs, and plastic lines across the ponds could limit the amount of predation. Since the site is located in reclaimed wetland, both resident and migrant birds are a major problem and cannot be avoided.
- 6) Stop continuously flushing the pond system. Constant flushing brings in wild fish, predators and diseases into the system. It also removes nutrients for plankton growth and other WQ stability of a pond.
- 7) Train and educate the key staff on 1) biology of the cultured animals and 2) latest production practices. Again, there a number of good tilapia production training programs and any good program would give the basics needed to construct and operate a good hatchery and production facility.

Holy Will Farm- Kendu Bay (Henry and Enos)-

This is a small facility consisting of 5 ponds. Apparently, this is the property of a self-help Widow women's group. Some of these ponds were donated by AWF.

Henry, the manager did not identify any particular problems he faced, but we could observe a few that could be addressed quickly.

Problems (observed):

- 1) Seepage of water on the outside base of the pond dyke
- 2) High risk of contamination- Open water inlet canal passes through the cornfield.
- 3) Ponds were fertilized, but not green- possibly because of open water inlet, pond seepage and macrophytes on and around the pond banks).

Recommendations:

- 1) Move clay-soil from the opposite end the pond after harvest or borrow from nearby site to stop the water from leaking.
- 2) Install a Pipe water from the river rather than the drainage canal
- 3) Close the inlet, improve seepage, manually remove macrophytes and fertilize ponds until green.

Jewlett Frams Enterprises - Kendu Bay (Mr. Enos Were and Mrs. Jedida Ware-managers/owners)

This is a mid-large size farm that produces fingerlings and food fish for commercial purpose. The upper farm is situated in the hills (rain/spring fed) and lower ponds is adjacent to the lake. The farm claims to produce sex-reversed tilapia (one of two suppliers in the area).

Enos is a well-trained aquaculturist/entrepreneur and knows what his limitations are and is gradually working to solve them. As an aquaculture consultant, both, he and his wife travel throughout Africa advising on aquaculture operations.

Problems:

In order to stay competitive, he needs to diversify his products (i.e., improve brood/seed quality, higher and consistent sex reversal, red tilapia etc.). He also expressed the concern over slower growing stock and would like to carryout farm :

Recommendations:

- 1) Make good use of the hatchery facility and control of fingerling production by setting-up egg incubation system.
- 2) Bring in well performing stocks from within the region or abroad with varying temperature and evaluate growth in the farm.
- 3) Enroll in a tilapia seed production short course at the Asian Institute of Technology or similar institution to learn about the hatchery set-up and seed production procedures commonly used in Asia.
- 4) Perform trials with red tilapia by acquiring stocks from various locations and carryout farm experiment to examine growth rates seed production potential.

Reflections:

Despite the short duration visit without the prior experience in Kenya and limited preparation, the interaction with farmers and entrepreneurs was extremely positive. While we learned about aquaculture along the Lake Victoria and Kenya, we were also able to share our Asia-specific experiences with various stakeholders we came in

association with. Lukas and I made an excellent team, one focusing on feed and the other on seed. For greater impact of such visits in the future, organization of hands-on training, workshops and planned presentations is recommended.

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