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Transforming Africa's Agriculture through Enhancing Commercialization of Aquacultural Research Products

The case of Mono- Sex Tilapia Fish Technology

By : *FARA, TAAT, CDTO and Aquaculture Value Chain Compact*

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Forum for Agricultural Research in Africa (FARA)
12 Anmeda Street, Roman Ridge PMB CT 173, Accra, Ghana Tel: +233 302 772823 / 302 779421
Fax: +233 302 773676 Email: Website: www.faraafrica.org : www.faradatainforms.faraafrica.org
Join the network: https://faraafrica.community/taat_cdto/join

Design By: FARA Knowledge Management, Learning & Communications Unit (publications@faraafrica.org)

About FARA

The Forum for Agricultural Research in Africa (FARA) is the apex continental organisation responsible for coordinating and advocating for agricultural research-for-development. (AR4D). It serves as the entry point for agricultural research initiatives designed to have a continental reach or a sub-continental reach spanning more than one sub-region.
FARA serves as the technical arm of the African Union Commission (AUC) on matters concerning agricultural science, technology and innovation. FARA has provided a continental forum for stakeholders in AR4D to shape the vision and agenda for the sub-sector and to mobilise themselves to respond to key continent-wide development frameworks, notably the Comprehensive Africa Agriculture Development Programme (CAADP).
FARA's vision is to "Reduced poverty in Africa as a result of sustainable broad-based agricultural growth and improved livelihoods, particularly of smallholder and pastoral enterprises" its mission is the "Creation of broad-based improvements in agricultural productivity, competitiveness and markets by strengthening the capacity for agricultural innovation at the continental-level"; its Value Proposition is the "Strengthening Africa's capacity for innovation and transformation by visioning its strategic direction, integrating its capacities for change and creating an enabling policy environment for implementation". FARA's strategic direction is derived from and aligned to the Science Agenda for Agriculture in Africa (S3A), which is in turn designed to support the realization of the CAADP vision.

Disclaimer

Background

The Forum for Agricultural Research in Africa (FARA), the African Forum for Agricultural Advisory Services (AFAAS), IITA, and WorldFish organized a technical webinar on September 16, 2020, as part of the Technologies for African Agricultural Transformation (TAAT) Program of the Feed Africa initiative funded by the African Development Bank (AfDB).

FARA is leading the enabler compact for Capacity Development and Technology Outreach (CDTO) complementing the commodity compacts, such as the Aquaculture Compact led by the WorldFish by acting as a process facilitator in the delivery of the proven technologies at scale.

FARA has so far done so through training of trainers (TOT) for Innovation Platforms (IPs) facilitators to help establish Innovation Platform (IP) as the main model for implementing TAAT. In addition, the CDTO Enabler Compact is supporting the compacts develop modular outreach materials for scaling of technologies within these local Innovation Platforms (IPs). Instruments have also been developed to assist the IPs identify their capacity development needs.

Brief Overview of the Aquaculture Value chain under TAAT

Aquaculture accounts for more than 43% of global fish supply but only 2% in Africa, mainly from Egypt and Nigeria. Aquaculture Compact has been implementing in 12 targeted African countries: Burundi, Cameroon, Cote d'Ivoire, DRC, Ghana, Kenya, Malawi, Nigeria, Republic of Benin, Tanzania, Togo and Zambia. The main objectives of TAAT Aquaculture Compact are: creating an enabling environment for technology adoption; facilitating effective delivery of technologies to aquaculture value chain actors; and raising aquaculture production and productivity through identification and deployment of appropriate technologies.

The technologies that have been developed and delivered under the compact are: i) fast-growing fish seeds and improved fish rearing system (mono- sex tilapia (Oreochromis niloticus, mass production of fingerlings in hapa (Figure1), fast-growing Clarias gariepinus and hybrid of Clarias (Heteroclarias), In-Pond Race-way System, Cage Culture System, Recirculation System, flow through techniques, Raised Pond Technology, Better Management Practices), ii). Quality low-cost fish feed using locally available raw materials like formulation of low-cost and feed feeding and management techniques and, iii) Improved post-harvest technologies and product development including, solar tent drying techniques, smoking kiln technology and 12 value added fish products. These proven technologies play great role to have access to quality fish seed, low cost fish feed and value added fish products to foster the needed change through farm level productivity, value chain development and improved nutritional diet in Africa.

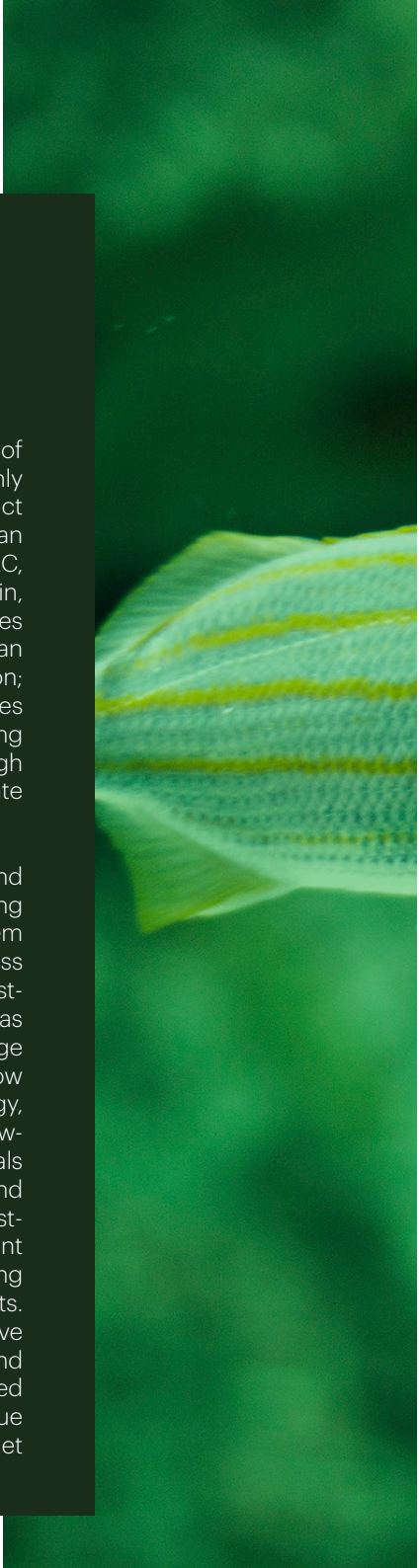

Figure 1: Mass production of all-male tilapia fingerlings in hapa

Business Opportunities Identified in the aquaculture Value Chain

Fish farming involves raising fish in tanks, net enclosures (cages), or earthen ponds. Focusing on increased production of fish improves food security, nutrition, and income via increasing fish consumption; create job opportunities for African women and youth, overcome fish-supply deficits and save foreign currency of the country by reducing current imports of the products. Fish feed production, fingerlings production, input supplies, table size production, fish processing (Figure 2), wholesales, retails and exports are the business opportunities identified in the aquaculture value chain. Local trading, fish processing and value addition are largely dominated by women.

Figure 2. Business Opportunities in the aquaculture Value Chain

The technology with a potential towards commercialization

Tilapia fish is prolific in nature and prevents optimum growth of the fish. Male mono sex tilapia are preferred to females, because female tilapia has low conversion of feed to flesh and metabolic energy is directed towards reproduction. In males, the metabolic energy is channeled towards growth. So, all-male/mono-sex tilapia is preferred for commercial production than female tilapia for the purposes of achieving more productivity in growing tilapia. The male population can be obtained by manual sexing, hormones, YY male technology but the use of hormones has been the most preferred method in commercial production (Figure3).

The benefit of mono sex male tilapia technology includes improved production and productivity of flesh through higher average growth rate, reduced sexual/ territorial behavior, harvesting uniform sized table fish, achieving higher economic value and profitability and improve adoption rate for commercialization.

Figure 3: Mono sex male tilapia

A business path-ways towards commercialization

Fingerlings producers, table size fish producers, input supplies, wholesalers, retailers, exporters, fish processors and value addition as well as consumers are the main actors in the Mono Sex Tilapia value chain. Hence, a business path-ways in the value chain (Figure 4) indicates that, fingerlings producers obtain input from input providers to produce fingerlings, the fish producers produce their fish products using different inputs from input providers as well as from fingerlings producers. Likewise, the fish producers supply their products to the fishmonger, processers and retailers. The fishmongers also supply their products to wholesaler, processor and retailers. Finally the fishmonger, processors and retailers can supply the final fish products to consumers following the aquaculture value chain.

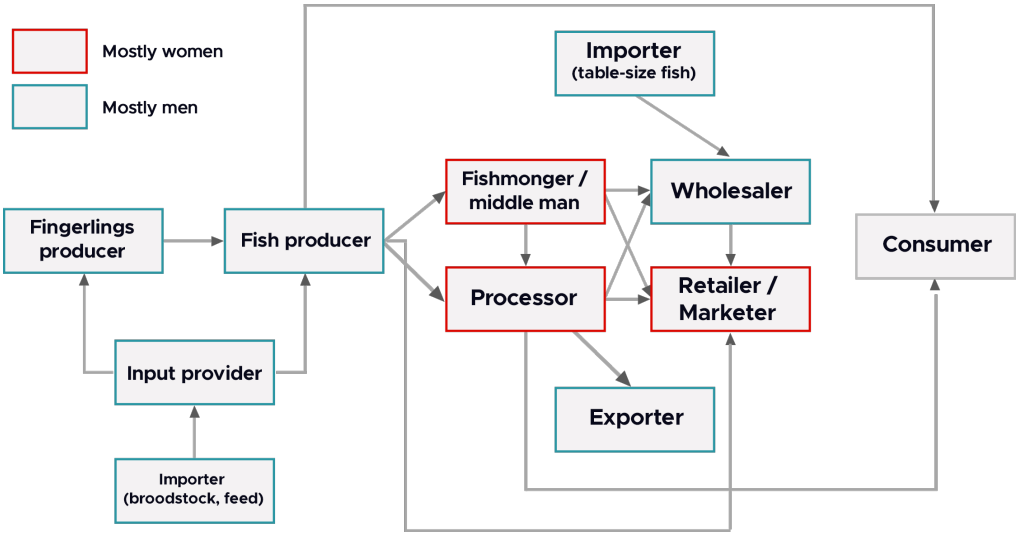

Figure 4. Path-ways towards commercialization

Success Stories from Beneficiaries

1. Djam Wilfred Chiatoh, Nirex Farms Ltd, Yaoundé- Cameroon

Nirex Farm established in 2016 is owned and managed by an experienced young entrepreneur. The farm is newly introduced to apply the mono sex male tilapia technology. Djam Wilfred adopted and produced 230,000 mono sex tilapia in 2019 after receiving technical skills training by professionals on production of mono-sex tilapia fingerlings (Figure 5). Consequently, as a spillover effect, more than 70 fish farmers were trained by Nirex farms, adopted and scaled up mono sex male tilapia thereby earning additional income of USD 27,000. As reported by the manager, sourcing for quality tilapia parent stock is one of the main challenges confronted during the project time.

Figure 5. Djam Wilfred Chiatoh in his fish Farm

2. Tigoi Fish Farm Vihiga County-Kenya

Zinath Deen is the manager of Tigoi Fish farm, which was established in 2012 in Kenya. The farm increased annual production from 120,000 to 360,000 mono sex tilapia fingerlings in hapas due to Aquaculture Compact intervention, and increased annual income from USD 16,649 to USD 49,440 (Figure 6). Tigoi Fish farm played a great role in improving the knowledge and skills of 38 additional new fish farmers including both youth and women to scaling up mono sex male tilapia technology.

Figure 6. Zinath Deen in Tigoi Fish Farm

3. Youth Enterprise- Ibadan Nigeria

The fisheries enterprise of IITA Youth Agripreneurs (IYA) in Ibadan Nigeria is managed by young female entrepreneur called Ohwofasa Faith Oghenefogho. Prior to the Aquaculture Compact intervention, IYA fish enterprise has not produced tilapia since inception but only catfish production. After six months of adopting the mono-sex tilapia technology, the farm produced 10,000 mono sex tilapia fingerlings and earned additional income of USD 625. Besides boosting their benefits from the intervention, the enterprise contributed in provision of training and improving knowledge and skills of more than 30 youths including new entrepreneurs on mono sex Tilapia fingerlings production. Currently, through scaling up of the technology, the trained youths were able to start a new business for production of mono sex tilapia for consumption using cage culture production system (Figure 7).

Fig 7. Ohwofasa Faith Oghenefogho in her fish enterprise

Contact address:

If you are interested to start your business in fish production through Mono Sex Tilapia technology, please contact the following institutions and people:

Prof. Fregene Bernadette (World Fish): B.Fregene@cgiar.org

If you want to learn more about Aquaculture, please visit the following sites:

www.worldfishcenter.org

Acknowledgment:

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