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Short Communication

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Innovative Solution to Tackle the Existing Challenges on Aquaculture for Blue Economy Development in Tanzania

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ABSTRACT

Tanzania is endowed with a variety of natural resources including a 1,424-kilometre coastline, lakes, rivers, dams and catchment land, coupled with conducive weather, provide opportunities in blue economy development.

Blue Economy refers to all economic activity relating to oceans, and coasts, lakes, rivers including aquaculture, capture fisheries, renewable and marine energy, transport and engineering, just to mention few.

Need for Developing Aquaculture Sector

Aquaculture is the fastest-growing food production sector in the world. The world needs aquaculture or fish farming to help meet the ever-growing demand for fish and provide people in developing countries with healthy protein, while reducing the pressure on wild fish. Fish is an important source of essential nutrients for Tanzania, currently contributing to about 27% of the animal protein consumed and about 2.9% to the GDP. But on the other hand, the current per capita consumption of 8.5 kg in Tanzania is well below the global average of 20.5 kg, which could have a negative impact on the development of healthy lifestyles and food security. The low per capita consumption can be attributed to population growth outpacing the growth in fish availability as supply from capture fisheries has been declining over the years. The fish demand gap is estimated to be approximately 300,000 tonnes and it is envisaged that aquaculture production is a critical option to bridging the demand gap and raising the national per capita fish consumption to the global recommended consumption.

Aquaculture Potential and Constraints in Tanzania

Fish Farming in Tanzania is growing steadily although current production stands at only 2% of total fish production. There is a potential to increase production through cage farming in lakes, land-based ponds and domestic hatcheries scheme. Certainly, with available fish farming methods more capital investment is needed to scale up the productivity of aquaculture industry in Tanzania.

With all the exisisting potential for aquaculture in Tanzania, there are bottlenecks that if not adequately addressed may hamper aquaculture development. The main constraints affecting earthen pond-based fish farming are shortage of water supply to fish ponds, high cost of inputs, lack of proper knowledge on fish farming, lack of good quality fish feeds and fingerlings, low profitability, slow growth of the cultured species and theft of fish. Other potential looming threat is climate change.

Tanlapia IPRS Case Study

For Tanzania to fully utilize the potential available in Blue Economy and become the leading provider of fish and 'aquatic food products' in East and Central Africa, and to grow and shape the market in the region there is a need of exploring and investing in innovative technology.

Tanlapia Limited, a private owned company operates large-scale commercial tilapia farm in Bagamoyo along the Ruvu river

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catchment. It is the largest land-based fish farm in operation since 2020. Realizing the available potential and challenges facing the aquaculture industry in Tanzania, Tanlapia Limited decided to invest in Tilapia Fish Farming by adopting the state-of-the-art fish production system known as In Pond Raceway System (IPRS). This is a super- intensive production system inverted by the University of Auburn through the support of USSEC (United State Soy Export Council).

In-Pond Raceway Systems are an advanced approach to pond aquaculture that combines the management benefits of confining fish in a small portion of the pond with the production capacity of a flowing water system. IPRS creates a flowing "river in the pond" and allows the water to mix and move as it would in a riverine system. This flowing water significantly increases the pond's production potential. To create the flowing water, the IPRS utilizes components that when combined, mix and move the water in a circular pattern around a dividing partition (baffle) in the pond, effectively recycling and refreshing the water and preventing discharge into the local environment.

Aerial view of IPRS at Tanlapia Fish Farm (© Adshape Media)

Advantages of IPRS

This system lowers per unit production costs, reduces risk and significantly improves yield. IPRS operate with simplicity and in harmony with nature to offer greater predictability and profit potential than conventionally operated ponds. The IPRS technology offers the potential to double, or even triple, yields beyond traditional pond expectations (up to 70-80 tons per hectare in tropical climates) with no discharge of water or waste into local waterways. IPRS is a more manageable, controllable approach allowing high yields and reduce environmental impact.

Alignment of IPRS to Blue Economy Objectives

IPRS technology is therefore, in line with Blue Economy which seeks to promote economic growth, responsible production and consumption, social inclusion, preservation and improvement of livelihoods while at the same time ensuring environmental sustainability of ecosystems. The technology offers a promising diversification option, especially in a time when markets are becoming increasingly demanding, production costs are rising, and finished product prices remain low.

Tanlapia Production, Market and Opportunites

Tanlapia constructed and operates two IPRS ponds together with semi intensive hatchery production ponds. The curret fry production is 2.5 million per month for internal use and some for sell. The current fish production stands at 30 MT Per month and the farm provides employment to 60 local residents who are mostly youth and women engaged in construction, pond management and processing. Fish harvested from the farm are sold to local residents and supplied to Dar Es Salaam at an affordable price to fish vandor and hotels. Future plans include increasing production of tilapia to help minimize the nation fish deficit which currently stand at 300,000 MT, and create job opportunities along the fish farming value chain. Currently, most of the convertion farming system does not produce large amount of fish per unit area to meet the increasing demand of fish.

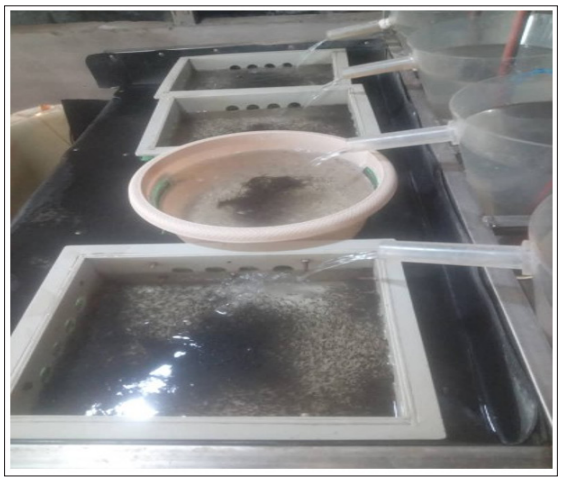

Figure 1: Incubation area (© farida buzohera ,hatchery and semi intensive Production Manager)

Building Resilience to Climate Changes

Climate Change is another looming threat to aquaculture industry. During the last three years Tanlapia experienced two impacts of Climate Change: draught and floods. Draught in 2021 to 2022 affected productivity of some fish farms in the Ruvu River basin as there was a ban of withdrawing water from Ruvu River. Early February to March 2024, coastal area recieved significant amount of rains which also affected production at Tanlapia due to damage of ponds and other important infrustructure. Tanlapia also lost brooders stock and fingelings during these floods. Unlike floods, draught did not affect production in IPRS due to the fact that the system does not exchange water as is the case in convertional semi intesive pond aquaculture, making the IPRS technology ideal in adapting to climate change impacts.

As an adaptation measure all hapas (nets) for raising brooders and fingerling are now installed on a foating cages made of plastic barrel and bamboo. This innovation has reduced the risks of floods damaging hapas (nets) as shown in the photo below.

Figure 2: Brooder and Fingelings Floating Hapanet at Semi Intensive Ponds (© Jonax Basit: Farm Production Manager)