Innovate UK

UKaid
from the British people

Connecting for
Positive Change.

Knowledge Brief 1: Supply and Application of Affordable Feed

Insights from the Global Alliance Africa Aquaculture Knowledge Exchange and Showcase Event

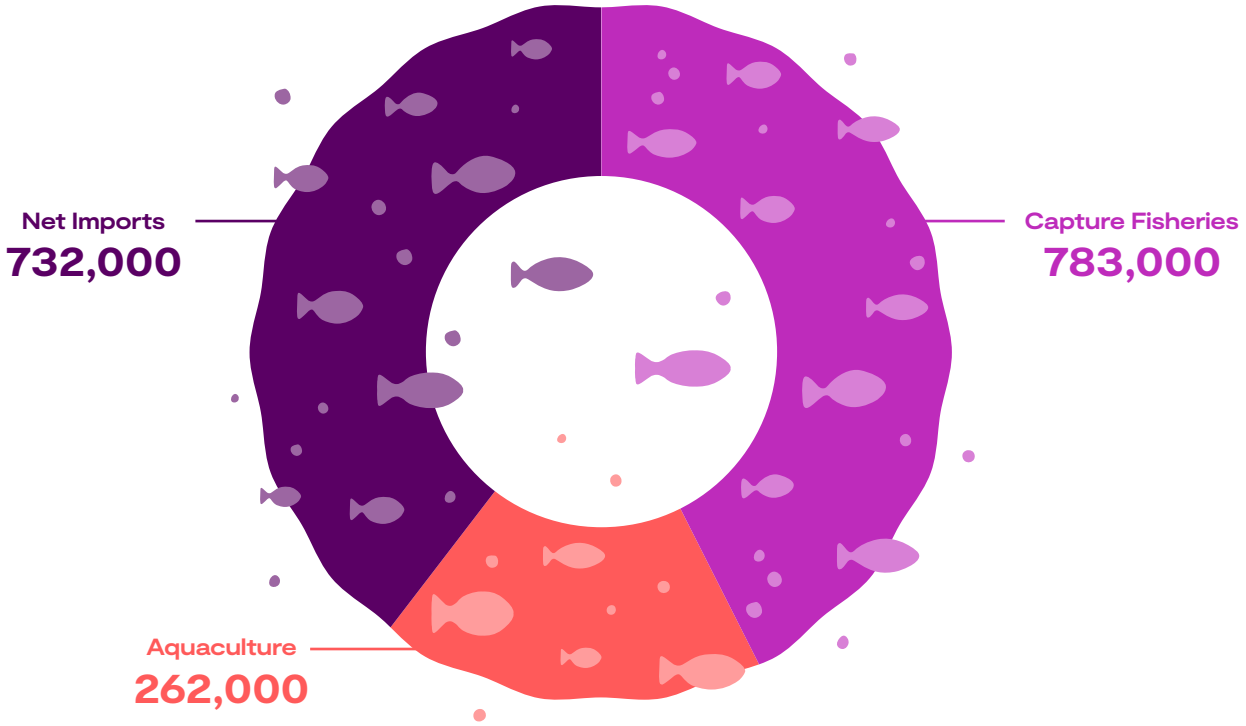
January 2023, Ekiti State, Nigeria

iuk.ktn-uk.org/programme/africa

Introduction

The focus of the Showcase Event was to learn about and create Innovations and technologies to improve the supply and application of affordable and sustainable aquaculture feeds in Ekiti State, Nigeria.

Fish Supply in Nigeria (in tonnes)



By volume, Nigeria is the leading aquaculture country in sub-Saharan Africa. FAO statistical data (FAO, 2023[1]) for 2020 shows that actual fish supply (excluding plants and non-edible fish) in Nigeria to be approximately 1.777 million tonnes per annum.

The demand for fish is high and fish accounts for around 40% of the country's protein intake, resulting in a historic consumption rate of approximately 13.3 kg/capita/annum (Worldfish[2]).

With a current population (Worldometers, 2023[3]) of around 220 million people, maintaining this consumption rate requires a total national fish supply of at least 2.9 million tonnes per annum, which means there is already a deficit of at least 1.1 million tonnes. As it is unlikely that this deficit will be made up from either local catches or imports, the rapid expansion of Nigerian aquaculture is crucial. Sadly, this crucial need is not materialising given a declining trend in aquaculture production since 2016, worsened by a sharp decline of 9.6 % in 2020 (FAO, 2022)[4].

1. www.fao.org/fishery/statistics-query/en/home
2. www.worldfishcenter.org/where-we-work/africa/nigeria
3. www.worldometers.info/world-population/nigeria-population/
4. FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO.

In the Nigerian economy, aquaculture plays a significant role in employment creation, income generation, national development, the supply of nutritional requirements, and in the provision of valuable protein for human consumption. Despite these numerous advantages, the sector is plagued by several challenges.

These challenges include poor fish farming methods, inadequate technical capabilities and skills, the high cost of fish feeds, low levels of access to finance for fish farming projects, inadequate storage, poor cold chains and processing facilities, low quality brood stock, and poor genetic management that impacts on fish growth and the financial viability of fish farms.

Storage

Cold chains & processing facilities

Quality of brood stock

Genetic management

Farming methods

Technical capabilities & skills

Cost of fish feed

Access to finance

Fish farmers, stakeholders, academia, and prospective investors in the fish industry in Nigeria are exploring means to address these challenges that face the fish farming industry. In view of this, Innovate UK KTN , a member of the UK's Innovation Agency, through the Global Alliance Africa initiative organised the Aquaculture Knowledge Exchange and Showcase Event in Ekiti State Nigeria at the end of January 2023 with a view to identify:

i. Current challenges - in aquaculture production, with a focus on fish feed, in Ekiti State;
ii. People affected by such challenges (challenge holders);
iii. Potential providers of solutions to the challenges; and
iv. Various solution formulations.

The Knowledge Exchange consisted of presentations of innovations and technology, followed roundtable discussions on the specified focus area.

Existing Challenges

The problem statement as articulated by those the challenge holders can be summarised as:

The high cost of fish feed is challenging aquaculture production in Ekiti State, Nigeria.

Aquaculture input cost have risen on the back of the challenges indicated above. Three immediate alternatives were identified as available in response to this scenario:

i. The development and supply of alternative protein sources such as Black Soldier Fly (BSF) for aquaculture feeds that are more sustainable and more cost efficient.

ii. The introduction of cost saving technologies that can allow for the production of quality feeds at an affordable price. This includes the adoption of alternative energy arrangements for feed manufacture.

iii. The development of training content, dissemination methods and mentoring programmes around best practices and more efficient feed application at farm level, which will improve on-farm feed conversion ratios, and which will secure more sustainable levels of profit. This in turn will stimulate increased production, resulting in several socio-economic benefits and a contribution to regional and national fish supply.

Presenting Potential Solutions

A diverse group of stakeholders who presented included World Fish, Aller Aqua, Natural Resources Institute University of Greenwich, Skretting and Smart Villages. The relevant innovations and technologies to improve the supply and application of affordable and sustainable aquaculture feeds included:

i. The selection of the right feed types fit for the target species and size classes of fish;

ii. The adoption of best feed application practices, including improved feed handling and storage, and feeding methods;

iii. Training for improvement of essential skills around the monitoring of feed application results, including monitoring and recording of feed conversion ratio;

iv. The use of simulation-driven participatory technology development for feed mills;

v. The adoption of integrated innovation solutions for sustainable community impact in Africa through the use of alternative energy sources for the manufacture of feeds.

Insights & Opportunities

Following the presentations, the Roundtable discussions aimed to contextualise and identify opportunities to adapt and adopt ideas for the benefit of Ekiti State, Nigeria as shown in the table below:

Ekiti Challenges	Challenge details	Solution/ideas	Solution providers / collaborators
1. Feed manufacture and quality	- Performance difference in locally manufactured feed and imported feed. - Limited feed mills / manufacturers. - Poor accessibility to fish feed in Nigeria.	- Develop standards for locally manufactured feed and disseminate information on the calculation of economic feed conversion based on feed quality and price. - Support existing feed mills to serve aquaculture based on the need for sector growth. Encourage adoption of LEAN manufacturing methods. - Support farmer associations to source feed supply information and possible cooperative buying.	- AllerAqua - Skretting - Raanan Feeds - Local feed manufacturers - Farmer associations
2. Feed ingredients	- High cost of ingredients. - Animal protein sources for feeds is a challenge.	- Identify and source cost effective local ingredients. - Develop local alternative proteins, e.g. Black Soldier Fly.	- Universities - Black Soldier Fly solution providers
3. Knowledge gaps	- Feed wastage caused by handling practices. - Uncertainty of feed volumes that need to be applied and application methods. - Limited understanding around feed performance.	- Information at farm level on how better to handle feed in transport and storage. - Training and mentorship on selecting fit-for-purpose feed, calculating feed application rates and best feeding practices. - Training and mentorship on measuring and recording feed performance by means of feed conversion ratios and economic feed conversion ratios.	- Universities - Farmer associations - Government and/or private extension services.
4. Funding	- Poor access to funds for aquaculture value chain development in Ekiti State.	- Engage policy makers and financial institutions. - Encourage fish farmers to form cooperative society/clusters.	- Policy makers/ finance institutions, CAFFAN[5], TADAN[6] - Farmer associations
5. Energy challenges	- The cost of electricity in feed manufacture is high.	- Encourage the use of alternative energy sources.	- Alternative energy solution providers
6. Technology/ technical know-how	- Feed mills are small and use outdated technologies.	- Research into new simulation-driver technologies for feed manufacture.	- Universities - Technology solution providers

5. CAFFAN – Catfish and Allied Fish Farmers Association of Nigeria
6. TADAN – Tilapia and Aquaculture Developers Association of Nigeria

Conclusion & Recommendations

Fish feed is expensive as a result of high manufacturing costs attributed mainly to feed ingredients that are needing to be imported, exacerbated by prevailing high exchange rates. This situation is not sustainable and poses a threat to the essential need for Nigerian aquaculture growth to support food security.

The delegates at the Ekiti Aquaculture Knowledge Exchange & Showcase Event

With a focus on improving supply and application of fish feed, the following recommendations emerged at Global Alliance Africa - Aquaculture Knowledge Exchange and Showcase Event in Ekiti State, Nigeria:

- ✓ Challenge holders (aquaculture practitioners) in the State should be identified and mobilised to cooperate with feed producers, universities, and relevant government agencies to develop a suitable strategy for reducing the cost of fish feed in Ekiti State;
- ✓ Researchers should be involved as a bridge between challenge holders and solution providers;
- ✓ A further symposium should be organized for aquaculture stakeholders in Ekiti State, using the findings of this summit;
- ✓ Appropriate strategies should be devised to ensure that the necessary information and best practices in feed application, which can enhance aquaculture production, are made available to fish farmers in the State;
- ✓ The possibility of engaging private extension workers should be considered, since fish farmers do not enjoy attention from government extension workers who, sometimes, lack extension skills; and
- ✓ IUK KTN should continue to play a valuable role in trying to identify, connect and partner to enable collaborations that provide either solutions for alternative protein supply for fish feeds, or technology and energy solutions in feed manufacture, or solutions in skills development around improved on-farm feed application and monitoring.

Thank you

We would like to thank those who contributed to this brief, specifically Etienne Hinrichsen, Mosunmola Lydia Adeleke and Owoeye Odunayo Afolabi.

Innovate UK KTN
Suite 218 Business Design Centre
52 Upper Street
Islington
London N1 0QH

03333 403251
enquiries@iuk.ktn-uk.org
@KTNUK
ktn-uk.org

Connecting for
Positive Change.