Sustainable aquaculture for income, food and nutrition in Nigeria

Operational Plan 2023

WorldFish

CGIAR

Goal

WorldFish contributes to the following goal of the intervention pillar on Fisheries and Aquaculture, Marine and Inland Fisheries Development of the Nigeria new Agricultural Technology and Innovation Policy 2022–2027: Innovative approaches to encourage massive fish production, with active private sector participation to meet local protein needs, substantially reduce fish imports, improve climate resilience, empower the country's base of smallholders, and create no fewer than 500,000 new jobs along the value chain.

Our program organization

The WorldFish program in Nigeria is organized around four main research pathways (Figure 1). The first three are the agreed-upon impact areas of WorldFish, which align with our adopted goal from the Nigeria new Agricultural Technology and Innovation Policy 2022–2027 of the Federal Ministry of Agriculture and Rural Development (FMARD). The fourth places a deliberate emphasis on integrated planning and partnerships. Although WorldFish has many partners in Nigeria, we particularly integrate our research and partnerships with the FMARD to support its policy goal and across bilateral and CGIAR initiatives.

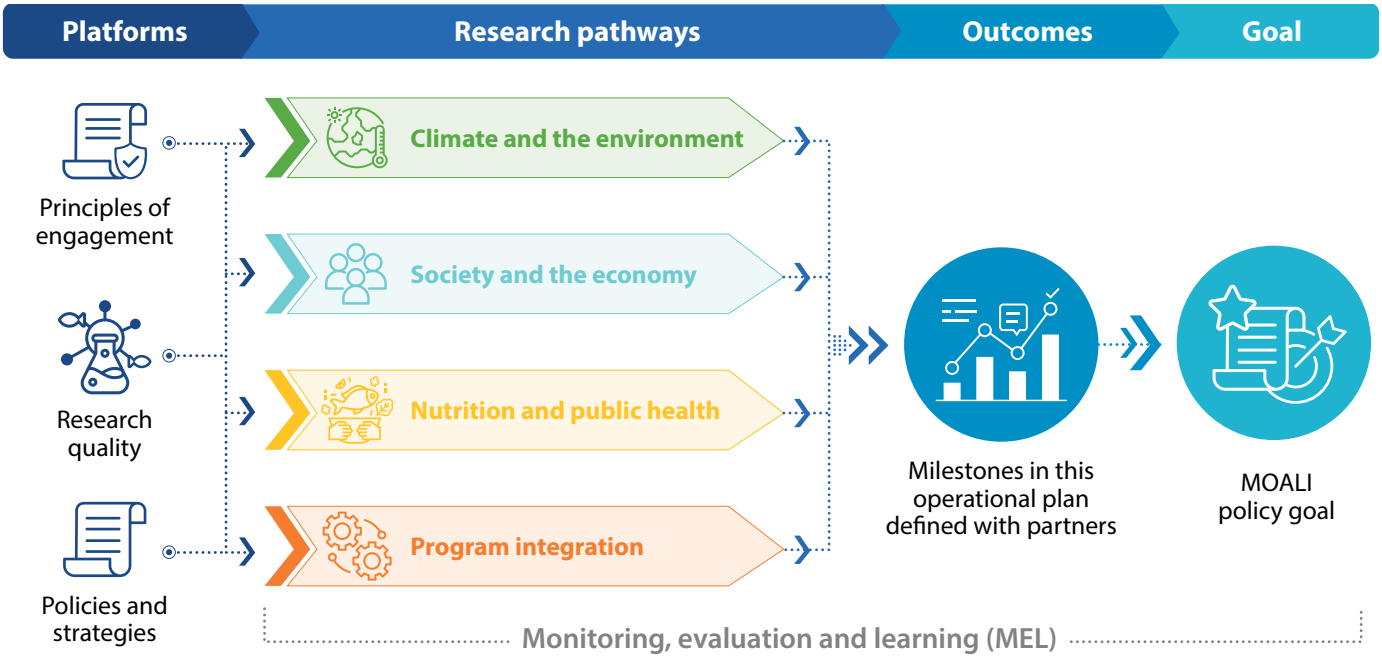


Figure 1. The four main research pathways for outcomes and impact at scale.

Climate and the environment

WorldFish foresight model projections indicate that the fish supply-demand gap in Nigeria will widen over the coming decades. Since fish supplies from marine capture fisheries will remain stable, future growth in fish supplies will have to come from aquaculture, artisanal fisheries and imports. Fish supply in the country is declining for two reasons: (1) the increasing impact of climate change on rainfall patterns is causing frequent floods that hamper aquaculture production in many states, and (2) coastal and freshwater small-scale fisheries are being mismanaged and overfished. In deploying climate resilient production systems and practices and optimizing the management of small-scale fisheries, both will increase the growth rate of aquaculture. In doing so, not only will this increase supply and thus fish consumption among Nigerians, but it will also save a significant amount of foreign currency used for fish imports and divert it to improving the sustainability of smallholder-based aquaculture and small-scale fisheries.

Society and the economy

Aquaculture requires more knowledge and skills than basic agriculture and livestock production. This means any investment to enhance fish value chains in Nigeria will provide important opportunities to empower women and youths and generate additional financial benefits. Currently, smallholder catfish farming still dominates Nigerian aquaculture, even though it is still technologically immature. Farm production of catfish alone is unlikely to bridge the demand-supply gap for fish or satisfy consumer demand for aquatic food over the coming decade. So it is vital to explore opportunities to diversify species in Nigerian aquaculture with indigenous and/or introduced species. As the first step toward this, WorldFish has partnered with the private sector to introduce Genetically Improved Farmed Tilapia (GIFT) and promote the GIFT value chain. The Development and Scaling of Sustainable Feeds for Resilient Aquatic Food Systems in Sub-Saharan Africa project is searching for affordable quality feeds to address the increasing feed cost, while the Climate-Resilient Aquaculture Systems for Africa project will also focus on genetics, among other aspects, by investigating better catfish strains to increase aquaculture productivity.

Nutrition and public health

As one of the most dynamic economies in Africa, Nigeria is going through a demographic revolution that will make it the third-most populous country in the world. These demographic and economic changes place tremendous pressure on natural resources and the food systems, which has implications on food and nutrition security. On top of this, malnutrition remains a major public health and development concern. The International Food Policy Research Institute (IFPRI) ran diagnostics on Nigeria's agrifood systems and found that the fish value chain is second only to livestock at reducing poverty and second only to oilseeds, livestock, vegetables and fruits in diet quality. All of WorldFish's program activities in Nigeria could play a key role in diversifying the fish supply as nutritious food.

Program integration

The donor community in Nigeria is forming partnerships. This entails building the capacity of smallholder farmers, farming cooperatives, corporate sector value chain actors and local nongovernmental organizations to enable them to deliver improved practices to increase food production. For this, WorldFish has formed several partnerships with local corporate sector actors, farming cooperatives, farm clusters and farmer associations (most notably those involved in seed and feed production and supply) as well as other CGIAR centers. WorldFish is collaborating with the University of Ibadan to improve smallholder farm biosecurity and connect them to veterinarians on an e-health platform, and with the University of Calabar to develop a cost-per-nutrient guide for fish so that consumers can select the most affordable fish products with the highest nutrition benefits.

Tilapia breeding hapas installed in a pond.

Platforms

To be a locally impactful and globally relevant organization, WorldFish stands on platforms that combine national and international structures, emphasize multidimensional research quality, and take a deliberate approach to "how" we work. These platforms support our purpose and core values.

Policies and strategies

There is no dedicated policy for fisheries and aquaculture or the aquatic food sector in Nigeria. At the request of the FMARD, WorldFish is currently partnering with the IFPRI to draft a fisheries and aquaculture policy and to update the aquaculture development strategy for the FMARD. As such, WorldFish Nigeria is mostly guided by the Nigeria new Agricultural Technology and Innovation Policy 2022–2027, where innovative approaches are included to boost the national fish supply in order to reduce the country's dependency on imports.

In addition, we take guidance from the FMARD's Federal Department of Fisheries and Aquaculture's policy elements included in other sectors that influence the fisheries and aquaculture sector. These include land use, water use, environment, science, technology and innovations, and public-private partnership policies.

Internally, the WorldFish 2030 Research and Innovation Strategy provides the basis for how we engage, our ambitions and how we measure progress. At a higher level, our program in Nigeria is also guided by the CGIAR Strategic Results Framework, which emphasizes development outcomes from research and is aligned to the global targets on sustainable development.

WorldFish Nigeria is participating in Transforming Agrifood Systems in West and Central Africa, a CGIAR regional research initiative in Resilient Agrifood Systems. Innovations of the initiative deal with crop varieties, such as nutritious vegetables, as well as GIFT, seed systems and climate adapted GAPs, including post-harvest technologies, digital advisory services, agri-businesses, food processing and safety.

These strategic documents provide both a platform for our work—"what we do"—and the outcomes we seek—"why we do it."

Research quality

WorldFish places the highest emphasis on quality research by following the CGIAR Frame of Reference of Quality of Research for Development:

Relevance	Learning is aligned with national and regional priorities and incorporates stakeholder engagement in planning.
Scientific credibility	Dependable and sound knowledge is logically interpreted and gained from a rigorous method and evaluated in peer review.
Legitimacy	Representation is ethical and fair for all involved and is sensitive to the perspectives of contributors and intended users.
Effectiveness	Knowledge, products and services have high potential to address a problem and contribute to innovations and solutions.

Principles of engagement

WorldFish follows a set of guiding principles of engagement for quality research in Nigeria:

1. Be transparent: WorldFish will be transparent with our partners about intentions and impacts, including communities where we work.
2. Be accountable: WorldFish will be predictable and accountable in planning with our partners and communities.
3. Be inclusive: WorldFish will actively seek input and participation by all without bias in hierarchy, gender, religion or ethnicity.
4. Be committed: WorldFish will form mutually beneficial partnerships with national agencies and communities built on non-extractive research and a long-term commitment to people and places.

Adhering to these guiding principles is critical for WorldFish to continue to enjoy the trust of our partners and maintain a wholesome reputation and image in Nigeria.

Research pathways

Climate and the environment

As per the United States Agency for International Development's (USAID) country profile of Nigeria, climate change puts a wide range of livelihoods, agricultural practices and commodities at risk. Rising sea levels increase vulnerability to flooding and waterborne disease. Drought and rising temperatures hinder agricultural production and fishing, which reduce food security and negatively impact health and nutrition. And flooding is a frequent incident that causes damage to aquaculture farm clusters.

2023 Milestone	Application
Test the aquaculture co-management guidelines in cluster farms.	Apply co-management guidelines in aquaculture cluster fish farms to design and build fishponds so that surface runoff can flow freely to prevent floods.
Scale up solar tent dryers to dry fish for value addition.	Build the capacity of fish processors, especially women and youths.
Test rice-fish systems in Liberia under the EU initiative on climate-relevant innovation through research in agriculture (and in food systems) in developing countries via the Development of Smart Innovation through Research in Agriculture project.	Strengthen the innovative capacity and the introduction of more efficient cultivation methods, including integrating fish with rice-based farming systems.
Adopt a cluster management approach to improve aquatic health management, enabling producers to prevent biosecurity shocks.	Create a better health management system, including practical field-level diagnostics for the smallholder-based aquaculture sector.
Develop low-cost, highly nutritious fish feeds based on novel ingredients that are tested and adopted, leading to increased income, improved food security, and reduced waste and pollution.	Most climate change predictions indicate that the lower adaptive capacity and preparedness of small-scale producers will make them the most vulnerable to climate change. Therefore, environmentally friendly and cost-effective technologies and production practices, such as sustainable fish feeds, are critical to mitigating the effects of climate change within the aquaculture sector.

Society and the economy

As per the National Bureau of Statistics, 40 percent of Nigeria's population, or almost 83 million people, live below the country's poverty line of NGN 137,430 (USD 381.75) per year. To improve nutrition for the most vulnerable, WorldFish and partners are attempting to increase the diversity of fish products and develop a cost-per-nutrient guide for consumers to select the most affordable fish products with the most nutrition benefits.

2023 Milestone	Application
Publish a training manual on lean management technology in aquaculture.	Use experts in lean management to train fellow farmers and adopt lean management technology to increase fish farm efficiency.
Publish a training curriculum and manual on GIFT better management practices for broodstock maintenance, fry rearing and grow-out farming.	Promote small- and medium-sized GIFT hatcheries to decentralize the seed supply and increase grow-out farming to diversify aquaculture production.
Identify catfish genetic improvement needs.	Improve the quality of catfish seed and lay the foundation for a longer-term catfish genetic improvement program.
Develop an e-health platform and make it functional.	Link smallholder aquaculture farmers to real-time diagnostic information, and connect them to veterinarians to report disease incidents and seek timely support on fish health.
Make a farm-level basic biosecurity audit checklist available to farmers.	This will allow farmers to make self-assessments of biosecurity risks and gaps for any given facility. The findings can form the basis for decision-making on cost-effective biosecurity plans and investments.
Make farm-level biosecurity e-learning modules and standard operating procedures (SOPs) available.	Support educational and teaching materials in universities and the extension units of the Department of Fisheries.
Prepare a draft of the Fisheries and Aquaculture Policy in partnership with the IFPRI and submit it to the FMARD.	The FMARD adopts the policy to support implementation of a program to narrow the supply and demand gap of the country's fish supply.

2023 Milestone	Application
Develop a digital market information system and make it functional.	Develop a functional platform to disseminate market information and to reach buyers and sellers of farmed fish and fish products.
Pilot small-scale cage culture with private partners.	Promote small-scale cage culture of tilapia among smallholder farmers to diversify the farming systems.

Nutrition and public health

Malnutrition remains a major public health and development concern: 49 percent of children under 5 years of age are either stunted, wasted or overweight. Even though it is known as a nutritious food, Nigeria's per capita consumption of fish is only half of the world's average of 20.1 kg. There is a clear North-South divide on household income, which is reflected in fish consumption patterns. Continued efforts to increase access to fish is important to improve dietary diversity, particularly among rural and marginal communities.

2023 Milestone	Application
Publish a cost-per-nutrient guide for processed fish products.	Help consumers select cost-effective processed fish products to maximize nutrition benefits.
Submit a concept note to USAID to add a nutrition component to the existing West Africa Trade Investment Hub (WATIH/USAID) sponsored Creating a GIFT seed supply chain and piloting GIFT-seed-based aquaculture business/industry in Nigeria project.	Improve fish consumption and dietary diversity in Nigeria with an initial focus on WATIH/USAID project beneficiaries and other smallholder farming households in the states of Ogun and Delta.
Train men and women fish processors in Delta State on how to safely improve processed fish products.	Educate fish processors to improve the safety and quality of fish products in Delta State.
In partnership with Africa Rice and the International Institute of Tropical Agriculture (IITA), submit a new concept note on how to build resilient seed systems for rice, cassava, cowpea, cocoa and fish value chains to strengthen food and economic diversification in Liberia in an effort to obtain EU funding for four years at the request of an EU mission in Liberia.	Enhance food and nutrition security in Liberia through demand-driven, well-structured and regulated seed systems for target crops, such as rice, cassava, cowpea and cocoa, as well as for fish.

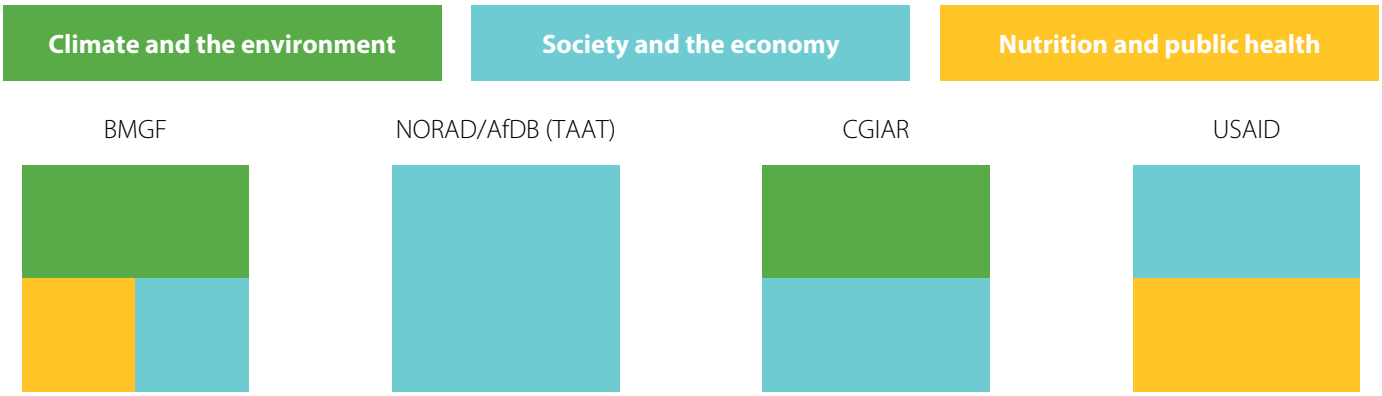
Program integration

WorldFish will work along the principles of engagement seeking to be the fisheries and aquaculture research partner of choice in Nigeria and act as a research-practice-policy interface contributing to national learning events and making dissemination products accessible for uptake.

2023 Milestones	Application
Link CGIAR regional initiatives with ongoing bilateral projects.	Add value to ensure that these address both public and private sector needs.
Engage partners in meetings, workshops and other events on implementing WorldFish's program, with opportunities for cooperation and adoption of new tools and techniques.	Update partners on WorldFish's program implementation, with opportunities for cooperation and adoption of new tools and techniques.
Make farm-level biosecurity e-learning modules and SOPs available.	Support educational and teaching materials at the University of Ibadan and the extension units of the Department of Fisheries and Aquaculture.
Develop new lean management technology training activities to train specialists on lean management and pilot them with farm clusters and farm cooperatives.	Incorporate upskilling activities on improving farm efficiency into partners' services with farm clusters and farm cooperatives.

Delivering 2023

The WorldFish program in Nigeria is financially supported by USAID (Fish Innovation Lab and West Africa Trade Investment Hub), the Bill & Melinda Gates Foundation, African Development Bank (Technologies for African Agricultural Transformation (TAAT)), Norwegian Agency for Development Cooperation (NORAD), International Fund for Agricultural Development (IFAD), and the CGIAR Resilient Agri Food Systems Regional Initiative (West and Central Africa). These investments map onto the three impact areas of CGIAR, which we define as three of our four research pathways:



Monitoring, evaluation and learning 2023

For the operational plan to be effective, it must be monitored and tracked against milestones to learn and adjust critical issues in a timely manner. WorldFish uses a CGIAR-developed web-based knowledge-sharing and monitoring, evaluation and learning (MEL) platform. The platform is used as a tool to ensure responsible and adaptive program operations, and it tracks indicators to assess overall progress toward objectives and targets in the program. In monitoring outcomes, methods are employed to capture distributional effects of activities on different groups, including separating them by age and gender.

The WorldFish Nigeria team

The WorldFish program in Nigeria is led by the country officer-in-charge and is supported by a technical lead and a TAAT aquaculture compact leader—all of whom are responsible for delivering this operational plan. The team is made up of eight staff members working at the country office in Nigeria located on the IITA campus in Ibadan. In addition to the officer-in-charge and the TAAT compact leader, our team is made up of one national research staff member trained and skilled in aquaculture technology transfer, a finance manager, two finance assistants, an administrative assistant and an MEL assistant on short-term contracts. We have two PhD-level staff and one MSc-level staff in the program. The research team is supported by program administration support staff in Nigeria and the Project Management Unit at WorldFish Headquarters in Penang, Malaysia.

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For more information, please visit www.worldfishcenter.org