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# WorldFish Nigeria Strategy

2018–2022

# Foreword

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The WorldFish mission is to strengthen livelihoods and enhance food and nutrition security by improving fisheries and aquaculture. WorldFish pursues this mission through research and development partnerships focused on helping those who stand to benefit the most: poor producers and consumers, women and children.

The UN High Level Panel of Experts on Food Security and Nutrition (HLPE) recently concluded that fish is “crucial to any debate and action to reduce poverty and improve food security and nutrition.” In a world where climate change, water and land scarcity, ecosystem decline and shifting consumption patterns pose critical risks to sustainable agricultural production, recognition of the role and power of fisheries and aquaculture is growing fast.

WorldFish conducts research to harness this power for human development and deliver impacts through strong partnerships. Research addresses three interlinked challenges within the fish agri-food system: sustainable aquaculture, resilient small-scale fisheries and enhancing the contributions of fish to the nutrition of the poor. Our focus is on countries where demand for fish is high and where research can make the most difference.

Recognizing the actual and potential importance of fish to the people of Nigeria, WorldFish partnered with a wide range of stakeholders—state agencies, civil society, communities and the private sector—to conduct a scoping study and value chain analysis to better understand the fish agri-food system in Nigeria, and how fisheries and aquaculture could be used to improve food and nutrition security, youth employment and the livelihoods and income of the poor. The two studies were presented during a stakeholder consultation held in Abuja on 20–21 March 2018.

The studies, consultation and agreed next steps influenced the preparation of this WorldFish Nigeria Strategy 2018–2022 report. It highlights key findings from the process, a vision and strategic direction for a future partnership with Nigeria, with the aim of pursuing a research and development agenda to enhance the potential and increase the development impact of fish, fisheries and aquaculture in Nigeria. The Nigeria strategy aligns with the WorldFish Strategy 2017–2022 and has as its overall goal improved food security, nutrition, employment, income and empowerment of women and youths in Nigeria.

# Nigeria and fish

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## Socioeconomic background

Nigeria is the most populous country in Africa. Although it has made significant socioeconomic progress over the past 15 years, the country continues to face massive development challenges, which include reducing its dependency on oil and diversifying the economy, addressing insufficient infrastructure, and building strong and effective institutions, as well as improving governance, public financial management systems and human development indicators. Inequality in terms of income and opportunities has been growing rapidly, adversely affecting poverty reduction and leading to poor living conditions for most of the population. The north-south divide has widened in recent years because of the Boko Haram insurgency and a lack of economic development in the north. Large pockets of the population live in poverty, without adequate access to basic services, and could benefit from more inclusive development policies. The lack of job opportunities is at the core of the high poverty levels, regional inequality, and social and political unrest.

The private sector is the main driver of the Nigerian economy. However, its potential has not been fully exploited as it faces its own set of challenges. Increasing the availability and accessibility of nutritious food, reducing food insecurity and improving health is a significant challenge that has become a state priority in recent years.

## Agriculture, livestock, fisheries and food systems

Despite Nigeria's oil resources, agriculture remains the base of the country's economy, providing the main source of livelihood for most Nigerians. Among rural, farming households, 80 percent of the working population engage in crop and animal production as their primary income activity. Most rural households fall below the USD 1.90/day poverty line, with over 70 percent defined as "very poor," based on a measure of daily per capita expenditures. Livestock is an important component of Nigerian agriculture, giving it social and economic development potential.

Fisheries is a major economic sector, estimated to employ over 8.6 million people directly and a further 19.6 million indirectly, 70 percent of whom are women. Currently, Nigeria produces just over 1 million metric tons of fish, leaving a deficit of over 800,000 metric tons, which is imported annually. Recognizing the importance of fish within the agriculture sector for its potential contribution to alleviating poverty, improving food and nutrition security, reducing youth unemployment and building profitable business ventures, both capture fisheries and aquaculture are gaining increased attention, in both the public and private sectors.

## Future fish supply, demand and consumption

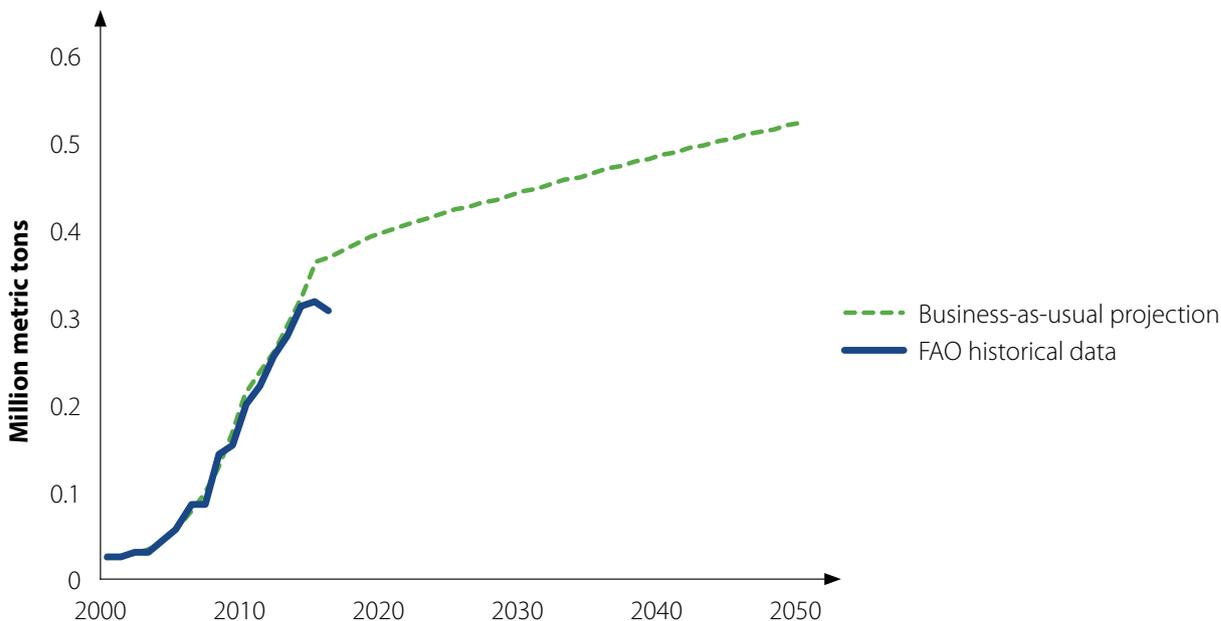
Over the past 35 years, aquaculture production in Nigeria has grown 12 percent a year (compared to the world average of 8 percent), from a little over 6,000 metric tons in 1980 to nearly 307,000 metric tons in 2016. The country is the largest aquaculture fish producer in sub-Saharan Africa, accounting for 52 percent of the total

farmed fish production in the region. Nigeria's aquaculture focuses mainly on freshwater fish, with catfish species accounting for 64 percent of aquaculture production in 2015.

The increase in fish production in Nigeria accounted for 55 percent of the increase of its apparent total fish consumption between 1980 and 2013; the remaining 45 percent was covered by the increase in its net import (i.e. import minus export) of fish. The fish trade deficit increased from 350,000 metric tons to nearly 2 million metric tons between 2000 and 2011, before declining to 940,000 metric tons in 2013, thanks to a rapid increase in domestic fish production.

WorldFish updated the IMPACT fish model to 2050. The result suggests that if other factors affecting fish demand (e.g. fish price and consumer preference) remain unchanged, demand in the early 2020s will be 600,000 metric tons higher than in the mid-2010s, because of income and population growth. If the current trend is maintained, aquaculture production in the early 2020s will be 150,000 metric tons higher than in the mid-2010s. This will only cover a quarter of the 600,000 metric tons of increased demand, resulting in a 450,000-metric ton demand-supply gap.

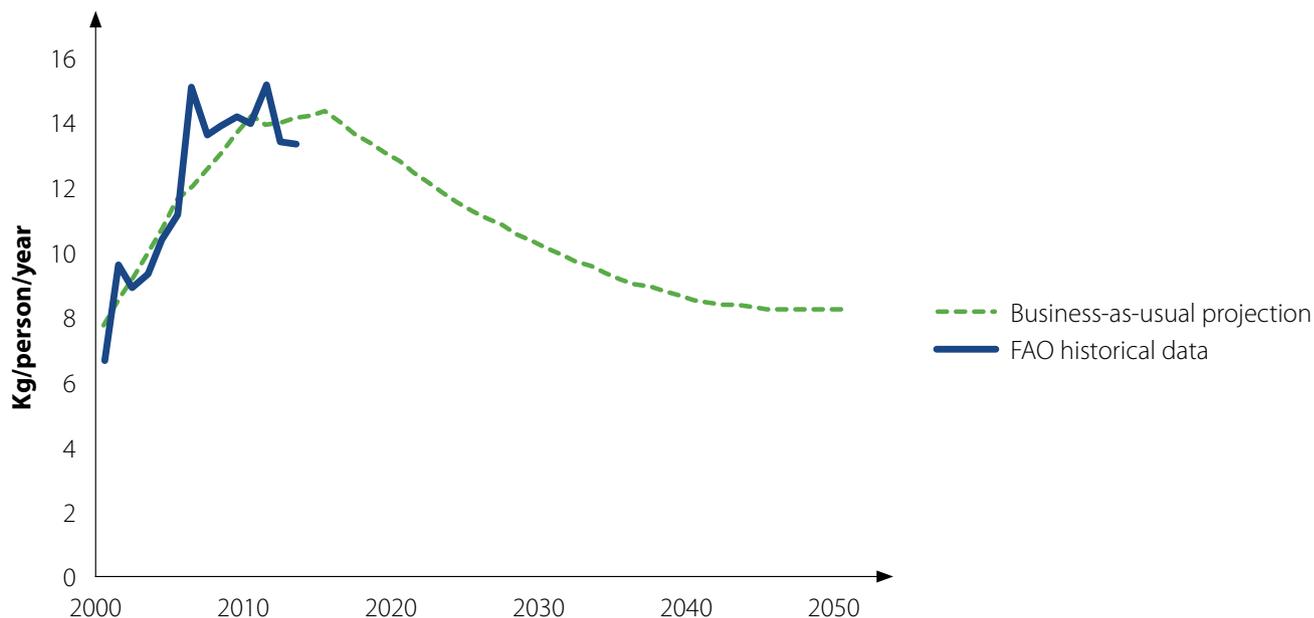
The gap can only be bridged by sustainably increasing the growth rate of the sector by 22 percent a year. This will not only increase production and consumption but also lead to higher youth employment, increased household income, improved nutrition and reduced child mortality (Figure 1).



Source: WorldFish (IMPACT fish model)

Figure 1. Projection of aquaculture production in Nigeria.

Although Nigeria accounts for per capita fish consumption of 13 kg/year, accurate data on gender- and wealth-disaggregated consumption, intrahousehold consumption, consumption during the first 1000 days of life and other critical data are totally lacking. The social, economic and environmental value of small-scale fisheries is poorly understood. Considering the current market prices of fish (NGN 800–900 for a kg of tilapia and NGN 600–700 for a kg of catfish), and meager rural incomes in an era of economic recession, it is unlikely that fish consumption among the rural poor reflects the national average. If business as usual continues, over the coming decades, per capita fish consumption in Nigeria will be significantly reduced, with major implications for the country's nutritional status (Figure 2).



Source: WorldFish (IMPACT fish model)

Figure 2. Projection of per capita fish consumption in Nigeria.

## Policy environment and challenges

The Nigerian government has underlined poverty reduction and improved food and nutrition security as priorities, and it regards aquaculture as a means to increase fish production and youth empowerment. The policy of backward integration, which encourages all fish importers to invest in aquaculture, has realized an estimated annual increase of 20,000 metric tons. Yet although strong political will exists to support aquaculture development, resulting in sector growth of nearly 12 percent per annum, many aquafarmers have failed to become profitable. This may be the result of high input costs, economic recession, a lack of adequate support services, a lack of investments, a lack of incentives to initiate an aquaculture business and a lack of conducive national policies. Better alignment between producers, service providers and the state is necessary to make the sector profitable, especially for small-scale producers and farming households.

WorldFish, a member of CGIAR, is the world's leading scientific research organization dedicated to improving the contribution of fisheries and aquaculture to livelihood, nutrition and environmental improvement, with a strong focus on the poor and vulnerable. WorldFish has a 40-year track record of delivering research innovation in fisheries and aquaculture to advance knowledge, promote sustainable, evidence-based solutions and strengthen policy design and implementation. This has been achieved in partnership with an extensive network of national and international research institutions, universities, the private sector, NGOs and development agencies that share a common vision to help the millions of people in the developing world who depend on fish for food, nutrition and income.

The WorldFish Strategy 2017–2022 outlines ambitious impact targets, which are closely aligned with the UN Sustainable Development Goals, and charts a course to achieve them. The strategy focuses research on the three interlinked challenges of sustainable aquaculture, resilient small-scale fisheries and enhancing the contributions of fish to nutrition of the poor, in places where research and development can have the greatest impact on the livelihoods of the poor and vulnerable. WorldFish partners with relevant communities, research innovators, entrepreneurs and investors to meet these challenges. This multidisciplinary and partnership-based approach supports the development and implementation of innovations that optimize the individual and joint contributions of fisheries and aquaculture for reducing poverty, improving food and nutrition security, and sustaining the underlying natural resources and ecosystems on which both depend.

However, to meet future demand for fish, particularly in developing countries like Nigeria, aquatic production must be doubled by 2030 and postharvest losses minimized. Meeting this challenge requires research innovations across the entire spectrum of fish-food systems, from production through processing, retailing and consumption. Referring to the crucial role of fish in global strategies to reduce poverty and improve food security and nutrition, and noting the need for investment in research and development, WorldFish is leading the 6-year CGIAR Research Program on Fish Agri-Food Systems (FISH). FISH focuses on the interlinked challenges of sustainable production from aquaculture and small-scale fisheries, with the crosscutting themes of gender, youth and capacity development, in priority geographies in Africa, Asia and the Pacific.

FISH also interacts with several other CGIAR research programs (CRPs), including Agriculture for Nutrition and Health (A4NH), offering another promising opportunity to enhance the contribution of fish to nutrition security and health.

In both small-scale fisheries and aquaculture value chains and nutrition, WorldFish emphasizes livelihood opportunities for women and youths in fish production, processing and trade, in the supply of inputs, such as locally produced feed and seed for aquaculture, and in the marketing and distribution of nutritious fish-based products for maternal and child health. For young women and men, barriers to participating in fisheries and aquaculture value chains range from limited access to fishing grounds, capital and training to perceptions of risk in the sectors. Youths are often neglected as a specific target group in policies and as agents of change within small-scale fisheries and aquaculture. WorldFish employs a youth-responsive research agenda to increase opportunities for safe and rewarding employment and entrepreneurship, engaging youths to determine the factors that enable or hinder their participation in decision-making as well as access to training, technology and financing.

# WorldFish Nigeria Strategy 2018–2022

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## Stakeholder consultation

On 20–21 March 2018, a stakeholder consultation was held in Abuja to design the WorldFish Nigeria Strategy 2018–2022 and identify the research needed to implement the strategy. Stakeholders agreed on the overall objective of the strategy: *to improve the contribution of fish to the income, livelihoods and nutrition of the rural poor in Nigeria*. The consultation was attended by representatives from the public and private sectors, civil society, academia and the farming community.

The consultation addressed both small-scale fisheries and aquaculture but emphasized that aquaculture should be a priority vehicle for lifting poor rural communities and youths out of poverty and tackling undernutrition and hunger. The pathways and interventions to achieve nutrition-related outcomes will, however, require further research. The strategy should also keep in mind that aquaculture in Nigeria is truly a private sector activity.

The scoping research and consultation inform the strategy but recognize that further research is required on local fish agri-food systems, including the role of small-scale producers, current fish consumption patterns and related nutritional aspects, and small-scale fisheries during the early stages of strategy implementation. Proven and emerging aquaculture technologies and production solutions, including genetic improvement techniques, culture systems, better feed, seed and health management systems, will be developed and/or adopted from other projects. The first objective will be to transform the aquaculture sector to achieve improved productivity, value chain efficiency and the inclusiveness of farmed fish, directly benefitting smallholders and improving the nutrition of women and children.

Research will aim to provide a foundation for the sustainable growth of aquaculture production, delivering livelihood and nutritional benefits, and catalyzing the private sector and partners to invest in and scale high-potential fish production and value chain models. Considering Nigeria's strong and growing demand for fish, and significant opportunities for aquaculture growth to positively impact smallholder incomes, youth employment, women's empowerment and nutrition, the role of fish in addressing undernutrition will be further assessed.

Several crosscutting issues exist in Nigeria that could potentially limit the livelihood and nutrition benefits of fish. Climate change is impacting fisheries and aquaculture directly, by influencing production quantities and efficiency. At the same time, gender equity and women's empowerment in the sector could boost productivity, reduce poverty and hunger, and enhance nutrition security. Achieving such impacts at scale can only happen by leveraging the dynamism of private enterprise, with appropriate enabling policies. In the aquaculture sector, this must cover the spectrum from family, homestead pond production to medium- and large-scale commercial input, production and processing operations, where these offer efficient vehicles to sustainably increase the availability of and access to affordable, nutritious fish for poor consumers.

The scoping study, preliminary assessment and consultation indicate strong potential for delivering impact for the poor through investments in aquaculture and, possibly, small-scale fisheries. Nigeria certainly needs more fish that are nutritious and affordable to the poor. While further baseline assessments and analyses are required to identify high-impact interventions and pathways for change, a preliminary set of national outcome targets has been developed through 2022, aligned to the six impact categories in the WorldFish Strategy 2017–2022 (Figure 3).

	<ul style="list-style-type: none"> <li>• 0.35M producer households adopt improved breeds, aquafeeds, fish health, and aquaculture and fisheries management practices</li> </ul>
	<ul style="list-style-type: none"> <li>• 0.19M people, of which at least 50% are women, are assisted to exit poverty through livelihood improvements related to fisheries and aquaculture value chains</li> </ul>
	<ul style="list-style-type: none"> <li>• 0.12M people, of which 50% are women, are without deficiencies of one or more of the following essential micronutrients: iron, zinc, iodine, vitamin A, folate and B12</li> </ul>
	<ul style="list-style-type: none"> <li>• 20% reduction in greenhouse gas emissions and 10% increase in water and nutrient use efficiency in 0.20M metric tons of fish per annum</li> </ul>
	<ul style="list-style-type: none"> <li>• 0.13M more women of reproductive age consuming an adequate number of food groups</li> </ul>
	<ul style="list-style-type: none"> <li>• 0.11M hectares of ecosystems restored through more productive and equitable management of small-scale fisheries resources and restoration of degraded aquaculture ponds</li> </ul>

Figure 3. Anticipated impacts in Nigeria by 2022.

## Geographies

Most of the current research activities in Nigeria are focused on (a) better understanding the socioeconomic status of the rural poor, (b) evaluating and estimating the status of natural resource availability for fish production, (c) value chain analysis and (d) negotiations with the public and private sectors on modalities of engagement. Aquaculture production is not evenly distributed across the states. Oyo, in western Nigeria, is one of the main aquaculture-producing states. With a land area of more than 28,000 km<sup>2</sup>, Oyo could continue to contribute the lion's share of aquaculture over the coming decades. Nevertheless, many other states could also contribute to the national efforts to increase fish production. The government estimates that about 1.7 million ha of land are suitable for pond aquaculture, of which only 600,000 ha are under aquaculture production. The WorldFish research team is currently engaged in demarcating the states and areas where aquaculture and small-scale fisheries interventions could be piloted or implemented. This exercise is expected to be completed by the end of 2018.

# Partnerships for impact

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This strategy has been prepared with Nigerian partners and will be implemented by further strengthening and diversifying these partnerships. Strong multistakeholder partnerships are an essential part of research and necessary for delivering impacts at scale.

Our initial assessments and the stakeholder consultation identified the partners listed below. During the early stages of implementation, we will continue to build partnerships with stakeholders who share a common vision for how innovation and science underpin the development of fisheries and aquaculture systems in Nigeria.

- Federal Ministry of Agriculture and Rural Development
- International Institute of Tropical Agriculture (IITA)
- University of Ibadan
- Skretting Africa
- Private sector fish farms
- Catfish Farmers Association of Nigeria (CAFAN)
- Tilapia Aquaculture Developers Association of Nigeria (TADAN)
- Foundation for Partnership Initiatives in the Niger Delta (PIND)
- Economic Community of West African States (ECOWAS)
- African Union Inter-African Bureau for Animal Resources (AU-IBAR)
- United States Agency for International Development (USAID)
- Bill and Melinda Gates Foundation (BMGF)
- African Development Bank
- World Bank

Delivering the strategy through partnerships will take the form of engagement and coordination across different initiatives and programs, such as Technologies for African Agriculture Transformation (TAAT) and the West African Agriculture Transformation Project (WAATP).

# Priority research activities

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Two days of deliberation during the stakeholder consultation brought broader consensus on the following research priorities under the strategy. The consultation also recognized that there is a need to better understand the small-scale fisheries sector and its contribution to food and nutrition security in order to design future research interventions. The agreed research areas are divided into six main themes aligned with WorldFish's key program areas (1) fish seed quality, breeding and genetic improvement, (2) fish feeds and feeding, (3) small-scale fisheries, (4) fish health, (5) market access, value chains and value-added products, and (6) gender and nutrition.

## Sustainable aquaculture

### Fish seed quality, breeding and genetic improvement

- Genetically characterize the existing strains of tilapia and catfish in Nigerian aquaculture, with a view to establishing genetic improvement program/s to enhance seed quality. These programs should include scientific research into broodstock management, improving the quality of hatchery-produced seed, seed management during early rearing, improving tolerance and resistance to several common diseases, and improving overall culture performance.

### Fish feeds and nutrition

- Reduce cost of feed by replacing imported ingredients with locally available and economically feasible ingredients with optimal quality.
- Improve feeding efficiency to reduce cost of feed and improve productivity, under different culture conditions and feeding regimes, and develop best management practices (BMPs) for farmers and feed producers.
- Conduct comparative analysis of nutritional quality and composition of commercial fish feeds in Nigeria, with a view to developing national feed formulation and management standards and guidelines for quality, nutritious fish.

### Small-scale fisheries

- Recognizing that the scoping study did not assess the value and potential of small-scale fisheries in Nigeria, an early assessment is necessary to evaluate this as well as the potential for interventions to reduce food insecurity, improve nutrition and increase household income.

## Fish health

- Conduct a basic disease and health survey of the Nigerian aquaculture sector to gain a better understanding of fish health status.
- Establish a sustainable regional/national aquatic animal disease surveillance program, develop a national list of pathogens and diseases, develop and/or adapt appropriate diagnostic tools, improve aquatic animal health management capacity, prepare science-based hatchery and farm biosecurity protocols, guidelines and BMPs, and eventually develop a national aquatic animal health strategy.

## Market access, value chains and products for nutrition

- Transfer technologies and value chain models that can be deployed at scale by adopting, adapting and applying skills, experience and knowledge gained and lessons learned from other WorldFish focal and scaling countries.
- Conduct more quantitative value chain analysis of the localities in which WorldFish aquaculture research will be conducted to better understand the complexities of the interactions between value chain actors, and find solutions for improving value chain efficiency and equity.
- Develop a reliable cold chain, using renewable energy such as solar, making use of renewable and/or nonrenewable energy and making value-added products of small portion size affordable to the poor, as a means to improve access to fish by the rural poor, including women and young children.

## Gender and nutrition

- Conduct science-based community surveys, particularly in the current projects and program locations, to better understand the current role of fish in rural nutrition, health and gender empowerment, as well as identifying opportunities and bottlenecks to inform future investments.
- Implement research activities to better understand fish consumption patterns and consumer behavior among rural communities, with a particular focus on catalyzing the private sector to invest in increasing the year-round availability and affordability of fish and fish products and these communities' access to them.

# Implementation

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Strategy implementation will be pursued through a mix of working mechanisms and new investments, including the following:

- a. long-term research and development initiatives involving a mix of CRP and bilateral grant investments from national and international development agencies and foundations. WorldFish will mainly use the programmatic vehicle of FISH to expand its research and development portfolio in Nigeria, working in close cooperation with other CRPs (including A4NH, RTB and LIVESTOCK)
- b. policy dialogue and influence, capacity building and advisory services, which may be shorter term and responsive to windows of opportunity
- c. private sector agreements, with joint investment to enable research innovation and scaling in support of our mission. This proven modality will be applied in Nigeria for scaling up the strategy outcomes to reach the national targets.

Resource mobilization in Nigeria will seek to provide a strong evidence base that shows the benefits of investment in fish and unlocks diversified funding streams, including the Nigerian government, foundations and private sector partnerships, complementing traditional multilateral and bilateral development agencies. We expect the strategy to involve the private sector as a major partner for research and delivery of impact, particularly for successful scaling and extensive use of the technologies developed by the CRP. The strategy will also be implemented using results-based management focused on research and development outcomes, through regular consultations, careful tracking of outcomes and impacts, and efficient capture of learning and adaptive program management.

The ultimate outcomes and impacts of the strategy are expected to extend well beyond the end of the program, influencing the scale of investment by the government, development agencies and the private sector in a way that truly unlocks the value and potential of a vibrant and sustainable fisheries and aquaculture sector for the Nigerian people.



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