



## NOURISHING NATIONS: IMPROVING THE QUALITY AND SAFETY OF PROCESSED FISH PRODUCTS IN NIGERIA

As an affordable and accessible animal source food in Africa, fish is important for many poor and marginalized women, men, and youth. However, fish processing methods in Nigeria remain limited to traditional salting, sun drying, and smoking methods. These methods expose fish to pests, insects, microorganisms, sand, and dirt. Smoked fish faces an additional health hazard of accumulation of polycyclic aromatic hydrocarbons due to high wood burning temperatures. Although processing fish is an important method of reducing postharvest loss, traditional methods can lead to a multitude of food safety issues that put consumers at risk. Additionally, heat, sunlight exposure, and fermentation processes alter the nutrient content of fish. Understanding how traditional processing methods impact the nutritional content of fish can help policymakers in prioritizing investments and interventions to ensure the safety of these important food products.



Nigeria market. Photo by Brianna Bradley, WorldFish

The Nourishing Nations activity took place in Delta State, Nigeria, from October 2019 to December 2022. WorldFish, Mississippi State University, and the University of Calabar worked together to achieve three objectives: 1) Develop cost-per-nutrient guides by analyzing the nutrient and contaminant profile of select processed fish products and their respective prices in comparison to other animal source food, 2) Build capacity among women and youth fish processors to produce high quality, safe and nutritious processed fish products for local consumption, and 3) Educate women and youth fish processors about the benefit of fish in human diet and develop a low-literacy tool to help them better market their product. By accomplishing these objectives, the team worked to improve food and nutrition security in Delta State, Nigeria.

### CAPACITY BUILDING AMONG FISH PROCESSORS

The activity strengthened capacity among fish processors in Delta State through a training program administered across two workshops. During the first workshop, fish processors were trained on the benefits of fish for human health and how to educate others about these benefits using simple low-literacy tools, which included wristbands, aprons, and fans with messages about fish for health and nutrition. Sessions were also held on hygienic food handling. The second training workshop focused on providing fish processors with information and hands-on practical experience to improve the quality and safety of fish products as well as strengthening their business and entrepreneurial skills to expand their businesses and financial access. Sessions during this workshop included topics on entrepreneurship, financial access, business plan development, formation and operation of cooperative societies, fish handling and packaging techniques, traditional and modern fish smoking and drying techniques, and value addition. An evaluation of the second workshop revealed that almost all participants (97%) rated the training highly and were willing to utilize the knowledge and skills gained. Overall, the training program enabled fish processors to grow their businesses, increase their market share, and diversify their product lines.



## ACTIVITY TEAM

### Lead PI

Monica Pasqualino, PhD  
WorldFish

### Nigeria Co-PI

Henrietta Ene-Obong, PhD  
University of Calabar, Cross River State

### U.S. PI

Terezie Tolar-Peterson, EdD, MS, RDN,  
LDN, FAND  
California State University, San Bernardino

## ENGAGING WOMEN AND YOUTH IN THE FISH PROCESSING SECTOR

Women represented the majority of training participants (~70%), creating opportunities for female empowerment through collective action and business strengthening. By participating in the training program, women and youth gained knowledge on the nutritional value of fish and how to develop products that could satisfy the nutritional needs of pregnant and lactating women, infants, and young children. This knowledge also gave them the means to develop fish products of higher quality and value, thereby strengthening market demand for their products. The training sessions on improved fish handling and processing and entrepreneurship further strengthened their skills as empowered actors in the fish processing sector. Additionally, platforms were developed to link fish processing cooperatives to strengthen collaboration and foster the exchange of knowledge, information, and skills.

## FISH FOR HUMAN NUTRITION

In addition to improving knowledge about the nutritional value of fish and strengthening processors' skills to create high quality fish products, the activity conducted research to inform national nutrition policies and guidelines. Data were collected on the nutrient and contaminant profiles of select processed fish products as well as their respective prices to create cost-per-nutrient guides, which enable comparison between fish products and other animal source food. The team completed fish sample collection and analysis as well as four market surveys to capture seasonal fluctuations in price. The guides allow for an informed examination of the food environment in Nigeria and can support government stakeholders as they design nutrition-sensitive programs and policies. The information can also be used to update the Nigerian Food Composition Table and national Food Based Dietary Guidelines, which are often used in the design of nutrition education content and messaging. Data on the contaminants present in the fish products can also be used by policymakers to identify and mitigate food safety issues in this sector.

## RECOMMENDATIONS

The activity improved food and nutrition security by increasing knowledge and awareness of the importance of fish in the diet and food safety issues in the fish sector, strengthening women's social and economic empowerment through business training and improved product development, increasing production of nutritious and safe fish products, and improving consumer access to high quality and safe processed fish products. To expand upon the accomplishments of the activity, the following recommendations are suggested:

- Engage with stakeholders to capitalize on use of the training and educational materials developed through the activity to continue creating opportunities for fish processors to strengthen their knowledge and skills. Information dissemination on improved fish processing, value addition, and new fish products development should continue through workshops, lectures, seminars, and sensitization programs on television, radio, and social media.
- Although the fish processing business provides employment opportunities and income to many in Delta State, particularly women, the absence of improved infrastructure, facilities, and equipment for processing may hamper efforts toward improving the nutrition and safety of processed fish products. Adequate funding of the sector is critical to promote the adoption of safe and quality improved practices along the fish processing value chain is needed.
- Conduct additional longitudinal studies to evaluate the food security determinants of dietary diversity among women of reproductive age and children, with emphasis placed on raising awareness on the importance of dietary diversification.
- Utilize the research gathered on the nutrient and contaminant profiles of fish to inform national guidelines, programs, and policies focused on nutrition, food security, and food safety.

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## ABOUT THE FISH INNOVATION LAB

The Fish Innovation Lab supports the United States Agency for International Development's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. Mississippi State University is the program's management entity. The University of Rhode Island, Texas State University, Washington University in St. Louis, and RTI International serve as management partners.

[www.fishinnovationlab.msstate.edu](http://www.fishinnovationlab.msstate.edu)

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