



## FISHFIRST! ZAMBIA: RESEARCH FOR DEVELOPMENT AND SCALING STAPLE-FISH PRODUCTS FOR ENHANCED NUTRITION IN THE FIRST 1,000 DAYS OF LIFE

Despite great progress in the last two decades, undernutrition among infants and young children (IYC) in Zambia is categorized as serious, as 34.6% of children under 5 years of age are stunted and daily intakes of energy, calcium, iron, and vitamins are below recommended levels. During the complementary feeding stage, malnutrition risks increase as vulnerable IYC begin consuming diets that rely heavily on cereal-based staples (e.g., maize) that lack essential protein, fats, and micronutrients. Although multiple micronutrient powders—standardized prepackaged vitamin/mineral sachets distributed by international donors—have helped reduce global rates of stunting among vulnerable IYC, they have had less impact on protein malnutrition.

Supported by the USAID-funded Feed the Future Innovation Lab for Fish, FishFirst! Zambia's goal is to determine feasibility of harnessing the power of nutrient-dense pelagic small fish—locally available animal-source foods that provide protein, fat, essential micronutrients, and vitamins A, C, B12, E, and D—to help fill protein and micronutrient gaps among food-insecure IYC and families. The research team developed a novel fish-based protein/micronutrient blend, *Complementary Food for Africa+Dried Fish Powder* (ComFA+Fish). The activity's work was concentrated at Lake Kariba, Zambia's primary source of pelagic small fish known as Kapenta (*Limnothrissa miodon* and *Stolothrissa tanganicae*), and this fish was used as the principal ingredient of the ComFA+Fish protein/micronutrient blend evaluated during FishFirst! Zambia.



Sensory Panel II participants at Lake Kariba. Photo by K. Ragsdale, Mississippi State University.

### FISHFIRST! ZAMBIA PHASE I: WOMEN'S EMPOWERMENT IN FISHERIES INDEX

In 2021, the research team administered six survey instruments to a random sample of 485 Lake Kariba fishers, processors, and traders. These included questions to assess women's economic and decision-making empowerment, individual- and household-level hunger, postharvest fish loss across the value chain, dietary diversity among women of reproductive age, and dietary diversity and anthropometric data among 6–23-month-olds.

### FISHFIRST! ZAMBIA PHASE II: ASSESSING SENSORY ACCEPTABILITY OF COMFA+FISH

In 2022, the team conducted fish-focused nutrition trainings, cooking demonstrations, and sensory panels. For Sensory Panel I, caregivers evaluated seven attributes—aroma, appearance, texture, taste, sweetness, convenience, and overall acceptability—of four ComFA+Fish dishes. These dishes included: 1) ComFA+Fish Complementary Maize Porridge; 2) ComFA+Fish Chibwabwa Fisashi (a pumpkin leaf-based savory dish); 3) ComFA+Fish Kapenta Chutney (a savory dish of whole pelagic small fish); and 4) ComFA+Fish Bean-Vegetable Soup. For Sensory Panel II, caregivers evaluated acceptability of ComFA+Fish Complementary Maize Porridge among their IYC.



## ACTIVITY TEAM

### Lead PI and U.S. PI

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For both panels, a majority of caregivers evaluated the dishes as highly acceptable. Most importantly, ComFA+Fish Complementary Maize Porridge was evaluated as highly suitable as a food not only for IYC but for the entire household, which suggests ComFA+Fish can help fill protein and micronutrient gaps among food-insecure IYC and families. The nutrient analysis of Kapenta dried fish powder and the ComFA+Fish Sensory Panel I-II results are available at <https://tinyurl.com/n77x8kwj>.

## FISHFIRST! ZAMBIA PHASE III: ASSESSING SCALABILITY OF COMFA+FISH

In 2023, the team collaborated with Sylva Food Solutions—a multi-sectoral Zambian enterprise that mass produces, brands, markets, and exports prepackaged foods for African and European markets—to produce two ComFA+Fish instant porridges for evaluation during the Phase III Learning

Event and Workshop. Attendees included mothers, community health workers, entrepreneurs/business owners, and government officials (i.e., Ministry of Health, Department of Fisheries, and other governmental personnel). They evaluated acceptability of plain and vanilla ComFA+Fish instant porridges during Sensory Panel III and participated in focus group discussions on nutrition priorities and an exercise to assess scalability of ComFA+Fish instant porridges. The results of ComFA+Fish Sensory Panel III and the scaling readiness exercise, which were both overwhelmingly positive, are available at <https://tinyurl.com/2sejjudx> and <http://tinyurl.com/bdd86wp7>. The workshop's guest of honor, Siavonga District Commissioner Geoffrey Jakopo, launched FishFirst! Zambia's ComFA+Fish Recipe Booklet, which included a version for English-speakers and a version for Tonga-speakers.

## COMFA+FISH AND POTENTIAL FOR ADOPTION AT-SCALE

The results of this research strongly support the conclusion that improving the diets of at-risk IYC and other vulnerable household members is achievable by incorporating pelagic small fish into their daily meals via a protein/micronutrient blend such as ComFA+Fish that has demonstrated high nutritional content, is locally accessible, and is congruent with meal preparation among caregivers in the target populations. The primary ingredient of ComFA+Fish is pelagic small fish, a locally available animal-source food that provides protein, fatty acids, and essential micronutrients and vitamins. The overwhelmingly positive evaluations across all three sensory panels and the scaling readiness exercise provide evidence that ComFA+Fish is strategically well-placed to address protein and micronutrient gaps among vulnerable 6–23-month-olds and families across Zambia and sub-Saharan Africa. This is particularly important for low-resource households that lack dietary diversity and rely on high-phytate, maize-based diets, which increases vulnerability to nutrient deficiencies. Having determined the feasibility of harnessing the power of pelagic small fish to benefit nutrition and help fill protein and micronutrient gaps among vulnerable IYC and families, the team recommends the following next steps: 1) complete a shelf-life study of Kapenta dried fish powder; 2) adjust the ComFA+Fish recipes as needed to ensure recommended serving sizes meet recommended Dietary Reference Intake values without compromising flavor, etc.; and 3) continue to forge collaborations with tiered in-country partners to scale ComFA+Fish instant porridges at national (e.g., school feeding programs), regional (entrepreneurs), and village levels across Zambia and sub-Saharan Africa.

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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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