



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Innovation Lab for Fish

Semi-Annual Report October 2018 - March 2019

Cooperative Agreement 7200AA18CA0030



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GLOBAL CENTER FOR
AQUATIC FOOD SECURITY

Feed the Future Innovation Lab for Fish

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Cooperative Agreement 7200AA18CA0030

May 31, 2019

Prepared for:

Agreement Officer's Representative (AOR)

Feed the Future Innovation Lab for Fish (Fish Innovation Lab)

Bureau for Food Security (BFS)

United States Agency for International Development (USAID)

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Acronyms

AOR	Agreement Officer's Representative
BMGF	Bill and Melinda Gates Foundation
BMU	Beach Management Unit
CLA	Collaborating, Learning, and Adapting
EMMP	Environmental Management and Mitigation Plan
FTFMS	Feed the Future Monitoring System
HICD	Human and Institutional Capacity Development
IACUC	Institutional Animal Care and Use Committee
IFPRI	International Food Policy Research Institute
IGBB	Institute for Genomics, Biocomputing, and Biotechnology
IRB	Institutional Review Board
ME	Management Entity
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation and Learning
MSU	Mississippi State University
NGO	Non-Government Organization
NRDC	Natural Resources Development College
PI	Principal Investigator
PIRS	Performance Indicator Reference Sheet
RFA	Request for Application
RTI	Research Triangle Institute International
SCP	Single Cell Protein
SNP	Single Nucleotide Polymorphisms
URI	University of Rhode Island
USAID	United States Agency for International Development
WUSTL	Washington University in St. Louis

1. Executive Summary

The Feed the Future Innovation Lab for Fish began in September 2018 and has completed its first six months. This initial phase was spent mostly in establishing the Management Entity (ME) at Mississippi State University and the ME Partners at the University of Rhode Island, Research Triangle Institute International, Washington University in St. Louis, and Texas State University. Five one-year research and capacity building activities (Quick Start projects) were established in the first year. These five projects are being conducted in Nigeria, Kenya, Bangladesh, and Kenya, and they are responsible for all the research and capacity building activities for the Fish Innovation Lab in Year 1. Their activities range from experiments to replace fish meal with single cell proteins, analysis of post-harvest chain for fish, analysis of indigenous species for nutrition in vulnerable populations, and genome analysis of rohu carp. Year 1 of the Innovation Lab for Fish was also important for establishing and building collaborative relationships. For example, one of the Quick Start projects works collaboratively with a WorldFish project funded by Bill and Melinda Gates Foundation in Nigeria. Another Quick Start project features collaboration with a U.S. company (Meridian Biotech, which is providing the single cell protein (SCP) ingredient) and two companies in Zambia (Aller Aqua Zambia, which is a fish feed production company, and Yalelo, an aquaculture production company). Each company is contributing to the project and is interested in results for potential adoption of findings. The Fish Innovation Lab is excited about the potential for these projects to impact nutrition and livelihoods in vulnerable populations that depend on fish. Other important accomplishments for the Fish Innovation Lab include development of its website and building networks for disseminating knowledge and information. Importantly, the Fish Innovation Lab has established its Request for Applications (RFA) process, which will be vital for the program's success. This process will be the major activity for the Fish Innovation Lab in the next six months to complete Year 1.

2. Fish Innovation Lab

Summary

Funded by the U.S. Agency for International Development (USAID), the Feed the Future Innovation Lab for Fish (Fish Innovation Lab) aims to reduce poverty and improve nutrition, food security, and livelihoods in developing countries by supporting the sustainable development of aquaculture and fisheries. To achieve these goals, the Fish Innovation Lab supports research and capacity-building activities targeting three program areas:

1. **Advancing productivity:** The Fish Innovation Lab works to identify and develop scalable technologies and practices that enhance opportunities for prosperity, nutrition, and resilience in aquaculture and fisheries, with the overarching objective to enhance food and nutrition security. This includes developing innovations to increase achieved yield of fish in aquaculture, improving availability and nutritional quality of feed (especially removal of fish meal and fish oil), improving genetics and reliability of fish seed, and enhancing sustainable fisheries management to improve harvest yields and increase reliability.
2. **Reducing and mitigating risks:** These Fish Innovation Lab activities identify and develop scalable technologies and practices that promote resilience and mitigate food security risks, especially through improved fish and environmental health. This includes increasing the tolerance of fish to biotic and abiotic stresses (including ecological resilience), improving diagnostic capabilities, maintaining healthy and bio-secure production environments, and reducing pre- and post-harvest losses (including ensuring food safety).

3. **Improving human outcomes:** This Fish Innovation Lab program area generates evidence on how to sustainably and equitably improve economic opportunity, nutrition, and resilience in aquaculture and fisheries value chains, households, and communities. This includes identifying how aquaculture and fisheries can help improve nutrition and market opportunities (especially for vulnerable populations), equitable access to production assets (especially for women and youth), and establishing an enabling environment for fish production.

Rationale for Aquaculture and Fisheries

Fish are a nutrient-rich and highly traded food commodity; as such, they are a unique global resource that offers opportunity for the Feed the Future Initiative to accomplish the goals of the Global Food Security Strategy for sustainable and equitable agriculture-led economic growth, strengthened resilience in people and systems, and improved nutrition—particularly for women and children. In the developing world, more than 2.6 billion people depend on fish and aquaculture products for more than 20% of their total animal protein — and in the Feed the Future countries of Bangladesh, Cambodia, Ghana, Sierra Leone, and Indonesia, fish constitute over 50% of animal protein intake (FAO. 2018. The State of World Fisheries and Aquaculture 2018 - Meeting the sustainable development goals. Rome. License: CC BY-NC-SA 3.0 IGO). To meet the growing demand for food and quality protein (especially animal source protein), reduce potential conflicts over natural resources, and ensure equitable access to fish in developing countries, innovations are needed in both aquaculture and fisheries to foster sustainable, resilient, inclusive, and profitable production and marketing systems.

The aquaculture and fisheries sectors are important to global food security because:

1. **Fish provide high-quality animal protein and micronutrients**, including vitamins A, B12, zinc, iron, and selenium. In many of the Feed the Future countries (examples listed above), fish are the primary source of animal protein; thus, increased consumption of fish and/or fish products has potential to reduce childhood stunting and improve brain development and function.
2. **Fish are one of the most widely traded agricultural commodities worldwide**; increased trade (local and regional) has potential to improve livelihoods and increase incomes.
3. **Aquaculture and fisheries provide formal and informal employment opportunities for women and youth.**
4. **Aquaculture enables diversification of farming systems** through opportunities such as integrated aquaculture, providing increased economic resilience for producers.

Fish Innovation Lab Pillars

The Fish Innovation Lab funds **research for development**, which generates knowledge, innovations, and technologies and transfers information and innovations to stakeholders for achievement of impacts. Research for development requires scientific rigor, awareness of local context, and building of relationships to enable adoption and scaling. It is not an abstract quest for fundamental knowledge and the improvement of scientific theories, nor is it the straightforward delivery of goods and services associated with development work.

Fish Innovation Lab strategies are based on these pillars:

1. **Technology Innovations:** Innovative technologies to advance aquaculture and fisheries production result from productive collaborations among universities, private industry, government research agencies, and producers.

2. **Behavior Change:** Effective implementation of sustainable aquaculture and fisheries often requires voluntary behavioral changes among producers and fishers to comply with best practices. Socioeconomic research, therefore, is often required to determine the best methods to change behaviors.
3. **Value Chain Linkages:** Small-, medium-, and large-scale farms require linkages and support from private investors and industries up and down the value chain. Infrastructure development for industries to support producers (e.g., feed mills, seed stock production, harvesting and hauling equipment and services, and processing plants) is necessary for sustainable aquaculture development.
4. **Local Capacity Development:** Ensuring local institutional capacity that endures beyond Fish Innovation Lab-sponsored activities is achieved most effectively by building capacity in partner organizations. One of Fish Innovation Lab's goals is to build cooperative learning programs that foster two-way learning and the exchange of ideas and expertise between U.S. universities and international partners.

Theory of Change and Results Framework

The Fish Innovation Lab Theory of Change posits that: ***If*** innovative technologies from universities and Non-Governmental Organizations (NGOs) are more effectively developed and transferred to aquaculture producers and commercial support industries (particularly in feed and seed production), aquatic animal health and biosecurity capacity is effectively engaged to support aquaculture, behavior changes in producers and fishers are adopted to use sustainable practices, and equitable access to fish markets is enabled for fish producers and consumers, ***then*** goals of improved profitability and sustainability in fish production, increased resilience to cope with disease outbreaks and other threats, and more nutritious diets for vulnerable individuals (especially children and women) can be realized.

All Fish Innovation Lab activities connect to this Theory of Change and include three approaches, as specified in the Fish Innovation Lab Results Framework:

1. **Research for development.** Increased end-user aquaculture and fisheries research results promote sustainable, resilient intensification of production systems, enhance food safety and nutrition, increase trade and domestic market opportunities, and contribute to responsible aquatic resource management.
2. **Capacity building.** Projects result in increased capacity of local partners to independently generate and transfer fish-related knowledge, technologies, and practices to beneficiaries.
3. **Adoption of innovation and scaling.** Projects yield increased adoption of new technologies and practices, as well as other innovations.

Management Entity

The Fish Innovation Lab is managed by Mississippi State University (MSU) and is housed in the MSU Global Center for Aquatic Food Security, which is affiliated with the College of Veterinary Medicine.

Members of the Management Entity

Mississippi State University:

- Mark L. Lawrence, Director (88%)
- Peter Allen, Aquaculture Specialist (8%)
- Kathleen Ragsdale, Gender/Youth Specialist (17%)

- Shauncey Hill, Program/Finance Manager (77%)
- Kristen Dechert, Communications Manager (100%)

Mississippi State University works with the ME Partners to coordinate and manage Fish Innovation Lab activities. Fish Innovation Lab ME Partners are the University of Rhode Island, Research Triangle Institute International (RTI), Washington University in St. Louis, and Texas State University.

Members of the Management Entity Partners

University of Rhode Island:

- Elin Torell, Deputy Director (50%)
- Catherine McNally, Capacity Development Specialist (50%)
- Brian Crawford, West Africa Coordinator (17%)
- Austin Humphries, East Africa Coordinator (25%)

Research Triangle Institute International:

- Joanna Springer, MEL Advisor (100%)

Washington University in St. Louis:

- Lora Iannotti, Nutrition Specialist (8%)

Texas State University:

- Madan Dey, Asia Coordinator (25%)

The Fish Innovation Lab has In-Country Coordinators in our priority regions to facilitate and coordinate Fish Innovation Lab activities in the region.

In-country Coordinators:

- Andrew Wamukota (50%), Kenya Coordinator contracted for six months from September 2018 to March 2019
- Md. Gulam Hussain (50%), Bangladesh Coordinator contracted for six months from September 2018 to March 2019

Fish Innovation Lab External Advisory Board

The Fish Innovation Lab ME is advised by the Fish Innovation Lab External Advisory Board, who provides strategic direction for Fish Innovation Lab goals and objectives, gives scientific oversight for Fish Innovation Lab activities, and monitors progress toward Fish Innovation Lab objectives.

Members of the Fish Innovation Lab External Advisory Board:

- Rohana Subasinghe, FutureFish Managing Director
- Michael Phillips, Director of the CGIAR Research Program on Fish Agri-Food Systems & WorldFish Director of Aquaculture and Fisheries
- Melba B. Reantaso, Aquaculture Officer at the Food & Agriculture Organization

- Bryan McCoy, CEO, Yalelo and Director of FirstWave Group
- Karen Veverica, Former Director, Auburn University E.W. Shell Fisheries Research Center

Location of 2018-2019 Project Activities

The Fish Innovation Lab currently implements Quick Start projects in Bangladesh, Kenya, Nigeria, and Zambia (Figure 1).



Figure 1: Location of Fish Innovation Lab Quick Start Projects

3. Accomplishments

Goals and Objectives

The overarching goal of the Fish Innovation Lab is to alleviate poverty and improve nutrition through reliable provision of fish, a nutrient-rich animal source food. Like all Feed the Future Innovation Labs funded by the United States Agency for International Development (USAID), the Fish Innovation Lab will reach its goal by supporting a research for development program that will be composed of competitive subawards, commissioned research, and collaborations with international partners (universities, non-governmental organizations, private sector, and governmental research agencies). Buy-ins and Associate Awards will be used to extend Fish Innovation Lab activities and expand countries that are reached. The Fish Innovation Lab ME will implement activities that fit under the following three objectives:

1. Advance aquaculture and fisheries productivity
2. Reduce and mitigate risks to aquaculture and fisheries
3. Improve human outcomes from the aquaculture and fisheries sector

These three objectives align with Fish Innovation Lab's three Areas of Inquiry, which are the focus of the Fish Innovation Lab research for development and capacity building programs. In Year 1, the activities undertaken within these objectives are being implemented as Quick Start projects.

Actual Accomplishments

In the first half of Year 1, the Fish Innovation Lab was focused on establishing its management structure and filling positions; developing its first year workplan, Monitoring, Evaluation and Learning (MEL) plan, and Environmental Management and Mitigation Plan (EMMP); establishing five direct commissioned Quick Start projects; and initiating the process for identifying the major projects that will be funded by the Fish Innovation Lab through its RFA process. A summary of ME activities is provided in the next section.

Research and capacity building progress in Year 1 is based on the Quick Start projects, which are still in their setup or initial stages. Some of the Quick Start projects have initial results reported in this Fish Innovation Lab semi-annual report, but others have not started. In future reports, we anticipate reporting results related to increased incomes in aquaculture and fisheries, improved household nutrition (particularly in vulnerable groups), improved resource management, improved innovations in aquaculture and fisheries, and adoption of improved technologies or practices. It is also too early to report on results related to short- and long-term trainees.

Management Entity Activities

The Fish Innovation Lab ME implements its research portfolio to achieve knowledge and technology adoption, scaling, and impact. Important activities completed in Year 1 were formation of the Fish Innovation Lab External Advisory Board, hiring of ME positions, and defining roles of ME personnel.

Assessment of local and regional critical gaps that limit scaling of aquaculture and fisheries.

During the first quarter of 2019, the Fish Innovation Lab ME engaged with local stakeholders to assess the status of the aquaculture sector in Nigeria and Bangladesh. Stakeholder feedback was collected from producers, universities, and government stakeholders by the Fish Innovation Lab country coordinator for Asia via email and phone. The Bangladesh assessment identified the following priority research areas for the Fish Innovation Lab to consider (listed in order of importance):

Area of Inquiry 1: Advancing Productivity of Aquaculture and Fisheries: Technologies and Practices That Provide Income Growth and Improve Diets in Bangladesh

1. Development of growth-enhanced and disease-resistant rohu and catla carp through marker assisted selection;
2. Cryogenic sperm-banking of Indian major carps (*Catla catla*, *Labeo rohita*, and *Cirrhinus cirrhosus*) for use in commercial seed production and brood banking;
3. Develop farming of indigenous species, including nutrient-rich small indigenous species;
4. Improve farming of commercially established species such as tilapia, pangasius, shrimp, and Indian and Chinese major carps;
5. Develop alternative feed ingredients and better feed dispensation systems;
6. Improvement of pond aquaculture practices for better handling, preservation, and marketing of cultured fishes;
7. Improve productivity of coastal aquaculture for tiger shrimp;

8. Development of semi-intensive shrimp farming using specific pathogen free seeds in southwest coastal region;
9. Improve integrated rice-fish culture practices in wetlands and floodplains;
10. Conduct studies on seasonal floodplain aquaculture of indigenous fish species in beels (lake-like wetlands with static water) and haors (shallow wetland ecosystems in northeastern Bangladesh that are typically bowl shaped);
11. Improve community-based fish farming for maintaining sanctuaries and restocking indigenous fish species;
12. Development of pen and cage culture involving rural farmers in suitable open water lagoons stocking desirable aquaculture species and using artificial feeds;
13. Develop hatchery-based seed production and aquaculture of marine finfish species including grey mullet, greenback mullet, and shellfish such as mud crab;
14. Assess potential underutilized marine fisheries resources of the Bangladesh coast including blue crab, lobster, and cuttlefish;
15. Improve seaweed culture and utilization in coastal waters of Cox's Bazar involving the local community;
16. Develop integrated floating cage aquaponics system in southwest coastal areas of Bangladesh;
17. Develop integrated multi-trophic aquaculture in the southwest coastal areas of Bangladesh.

Area of Inquiry 2: Reducing and Mitigating Risk to Fish Production Systems in Bangladesh

1. Develop broodstock and improve disease management in tilapia and shrimp farming;
2. Improvement of hygiene and sanitation at marine landing centers for better fish handling and preservation;
3. Conduct environmental impact assessments of Sundarbans coast with special emphasis on pollution and heavy metal contamination in fish and shellfish.

Area of Inquiry 3: Improving Human Outcomes: Generating Evidence on Sustainability and Equity Improving Economic Opportunity, Nutrition and Resilience in Bangladesh

1. Analyze post-harvest value chains/marketing/economic performances of native indigenous species in aquaculture and fisheries value chains;
2. Assess marine fisheries stocks in the southwest waters of the Exclusive Economic Zone of Bay of Bengal;
3. Conduct research on fish consumption and human nutrition to improve dietary diversity, particularly among vulnerable populations;
4. Conduct socio-economic studies of seasonal floodplain aquaculture in Daudkandi and Comilla regions.

Surveys are being designed by the Bangladesh Quick Start team to conduct further aquaculture stakeholder assessments for this country.

A face-to-face stakeholder meeting was conducted by the Nigeria Quick Start project activity in Abuja in January 2019. Three stakeholder meetings were organized by the USAID Nigeria Mission and conducted by conference calls in March 2019 (one for academia, one for non-governmental organizations, and one for industry).

The Fish Innovation Lab planned to conduct a Platform meeting in one target country (Bangladesh) in mid-2019. The goal of the Fish Innovation Lab Platform meeting was to enable direct stakeholder feedback as well as introduce the Fish Innovation Lab and projects in the region. On the advice of the Fish Innovation Lab Agreement Officer's Representative (AOR), the Platform meeting was postponed for two primary reasons: 1) personnel at the USAID Bangladesh Mission are in transition, and the new personnel will not be in place in summer 2019; and 2) the AOR and Bangladesh Mission suggested planning the Fish Innovation Lab Platform Meeting after Fish Innovation Lab research results are ready for dissemination.

Identification of collaborative teams of experts to conduct needed research to fill critical knowledge gaps through a competitive request for applications process. The Fish Innovation Lab ME is working to develop a research portfolio to address critical knowledge gaps that prevent scale-up of aquaculture and fisheries and limit poverty alleviation and food security through a rigorously competitive RFA process. The Fish Innovation Lab approach was to combine a request for applications from all three Areas of Inquiry into a single RFA, which was released in April 2019. The RFA was designed under the Theory of Change with input from experts in relevant technical areas and cross-cutting themes. The RFA encourages integrated, creative approaches from globally eminent researchers. To ensure a competitive process, the RFA was distributed widely through the Fish Innovation Lab website, the Fish Innovation Lab mailing list, and listservs to reach U.S. universities as well as qualified universities and non-government organizations (NGOs) in target countries.

The RFA competition will take place in two stages: 1) Concept papers that will be screened for alignment with scope of work, and 2) Full applications. A formal process was conducted whereby interested applicants submitted written questions about the RFA, and written responses from the Fish Innovation Lab ME were posted publicly. The Fish Innovation Lab ME developed a web-based submission and review system for the RFA process in collaboration with Piestar, and the ME is responsible for maintaining security and confidentiality of documents throughout the routing and review processes.

Implement knowledge management plan. The Fish Innovation Lab will use the Piestar platform for collecting and organizing monitoring data from research activities, as well as sub-awardee activities and achievements. RTI worked closely with MSU and the Piestar team to tailor its platform for Fish Innovation Lab's reporting and MEL needs. This process involved setting up and assigning reporting responsibilities, emailing campaign calendars, and preparing the data entry forms for indicators and semi-annual reporting. RTI supported the Piestar training for Principal Investigators (PIs) and worked one-on-one with researchers to resolve issues and clarify how to navigate the system.

Monitoring, evaluating, and learning from research findings, determining factors that limit adoption of new knowledge/technologies, and scaling. The Fish Innovation Lab ME partners participated in a facilitated session led by RTI to develop impact pathways for each of the three Fish Innovation Lab areas of inquiry. The impact pathways provide the basis for cross-project learning and review of the Fish Innovation Lab's Theory of Change. They will be further developed over the life of the project.

A MEL plan for the Fish Innovation Lab was drafted by RTI and finalized by the Fish Innovation Lab ME for submission to USAID. The MEL plan follows guidance specific to the Bureau for Food Security and incorporates the standard elements of a MEL plan, including a section about Collaborating, Learning, and Adapting (CLA). USAID approved the MEL plan in the second quarter of FY19.

The Fish Innovation Lab selected four core indicators from Feed the Future standard indicators that will apply to Quick Starts and all future sub-awards. The MEL coordinator developed Performance Indicator Reference Sheets (PIRS) by tailoring the standard Feed the Future PIRS and discussed the indicators in-depth with each Quick Start team. RTI held multiple phone/Skype consultations with PIs and co-PIs from each Quick Start team, followed up by email exchanges, to set targets and document the rationale or justification for each target. The targets were entered in the Feed the Future Monitoring System (FTFMS) in a timely manner, although the targets continued to be updated in discussions with the Quick Start teams as planning progressed. A final set of targets were incorporated into the finalized MEL Plan in February. The targets were then further reviewed and discussed with Quick Start teams as their agreements were finalized. The MEL coordinator has maintained a tracking sheet with updates to target estimates and target rationales for future reporting.

RTI provided two two-hour orientation sessions for Quick Start teams involving a presentation of MEL for USAID and facilitating cross-team discussion of MEL-related approaches and experiences. RTI met as needed with Quick Start teams to discuss plans for tracking participants and advising on data needs for FTFMS reporting.

The Fish Innovation Lab ME Partners conducted weekly virtual meetings from September-December 2018 during the kickoff phase. Starting in January 2019, the ME Partners conduct monthly virtual meetings, and monthly Fish Innovation Lab team meetings are held with Quick Start PIs. In March 2019, the Fish Innovation Lab conducted its first half-day virtual MEL review/Pause and Reflect meeting for CLA, as described in the approved Fish Innovation Lab MEL Plan.

Lessons Learned

Adaptability: One challenge has been shifts in country focus within the Fish Innovation Lab. In our original plan, we proposed to work in Ghana, Kenya, Uganda, and Bangladesh. However, the USAID Mission in Ghana did not provide Mission Concurrence to the Fish Innovation Lab. The Fish Innovation Lab therefore moved two Quick Start activities from Ghana to countries where it has Mission Concurrence. In addition, one Quick Start activity was moved from Uganda to Zambia to facilitate a private industry partnership. As a result, three Quick Start projects moved to different countries than what had originally been proposed:

- *Novel Microbial Protein Replacement of Fish Meal in Nile Tilapia and African Catfish Feeds* moved from Uganda to Zambia. The new project name is *Replacing Fishmeal with Single Cell Proteins in Tilapia Oreochromis niloticus Diets in Zambia*.
- *Assessing Facilitators and Barriers to Aquaculture and Fish Consumption for Ghana's Northern Region (Fish4Ghana)* moved from Ghana to Zambia. The new Quick Start name is *Assessing Facilitators and Barriers to Aquaculture and Fish Consumption in Zambia (Fish4Zambia)*.
- *Bottlenecks to Aquaculture and Fisheries Entrepreneurship Development and Adoption of New Technologies in Ghana* moved from Ghana to Nigeria. The new Quick Start title is: *Analysis of the Aquaculture Post-harvest Chain in Nigeria*.

Due to stakeholder feedback in Bangladesh, the research focus of the Quick Start project in Bangladesh changed to genetics of Rohu carp. These changes caused delays as local partners had to be identified and Quick Start proposals had to be revised.

MEL: Fish Innovation Lab ME has identified that coordination amongst members of research teams is critical to successful MEL – including target-setting and indicator tracking and reporting. For this reason, RTI began to incorporate an element of coordination into target-setting and target review meetings to ensure that all members of the team have the same information as it relates to MEL. When necessary, these meetings became an opportunity for PIs and co-PIs to align separate understandings of indicators, targets, and technical planning. Thinking ahead, the Fish Innovation Lab is planning to convene full team meetings for all indicator and target-setting discussions for future sub-awards. In addition, Fish Innovation Lab Management has identified that dissemination of the Fish Innovation Lab Theory of Change, impact pathways, and application of cross-cutting themes requires additional focus and effort. For this reason, the Fish Innovation Lab will make these central to virtual platform meetings and the annual PI meeting. RTI will orient learning activities and the learning agenda around these core components of the Fish Innovation Lab’s technical design.

Financial administration: The Fish Innovation Lab ME experienced a slow process in awarding subawards for the Quick Start projects. Some of the challenges that caused projects to take up to six months to develop and award include the amount of time required to: 1) obtain appropriate documents from new subawardees, 2) obtain appropriate documents from institutions with limited experience managing U.S. government funding, and 4) some inefficiencies in award mechanisms at MSU due to limited experience managing large international projects. The Fish Innovation Lab ME continues to evaluate and critique past processes while thinking creatively for new systems and processes to reduce the amount of time to award projects efficiently.

4. Progress on Research Activities (Quick Starts)

Analysis of the Aquaculture Post-harvest Chain in Nigeria

US PI: Julius A. Nukpezah, Ph.D., Mississippi State University

US Co-PI: Joe Steensma, Ed.D., MPH, Washington University in St. Louis

HC PI: Tran Van Nhung, Ph.D., WorldFish

Description: This project aims to improve the contribution of aquaculture fish to the diet and household incomes of the Nigerian people, including poor and vulnerable women and children. This activity will build on available data from public and private sector partners. It will map the aquaculture value chain in Nigeria, covering accessible important geographies. Geographic Information System tools will be combined with field assessments using mobile data collection tools to better understand current aquaculture post-harvest chain structure, efficiency, and key market constraints. This aquaculture post-harvest assessment will complement current work conducted by the Bill and Melinda Gates Foundation (BMGF) and WorldFish, and it will identify opportunities for designing investments for improving the overall contribution of aquaculture to the wellbeing of the people of Nigeria including poor and vulnerable women.

Objectives: The goal of the project is to conduct a comprehensive analysis of the aquaculture post-harvest chain of Nigeria to better understand the fate of harvested fish from production to consumption. The specific objectives are to:

1. Identify technologies and practices that provide income growth and improve diets, including post-harvest loss reduction.

2. Identify and map the aquaculture market systems that improve productivity and reduce post-harvest losses of aquaculture fish.
3. Identify gaps in the aquaculture post-harvest sector in Nigeria.

Achievements: The cold chain analysis team organized and facilitated two workshops in Nigeria in January 2019, with 22 participants total from universities, research institutions, the public and private sectors, including WorldFish, BMGF, Commonwealth Scientific and Industrial Research Organization (CSIRO), MSU, University of Ibadan, Triton Group, and Skretting Nigeria. The first workshop was held at the International Institute of Tropical Aquaculture (IITA) headquarters in Ibadan from January 8-11, with 15 participants; the second workshop was held at the Hilton Transcorp in Abuja from January 15-16 with 31 participants. The majority of the participants attended both workshops.

The workshops were organized by WorldFish and aimed at developing the research methodology and the project workplan, as well as building consensus among project stakeholders. The workshops facilitated decisions on project implementation geographies and initiated an integrated design of research methodologies for different components of the project. Since the workshops, preparation of the survey instruments has gotten underway.

Lessons learned: Judging from the two workshops organized in Nigeria, the research team has learned that partnering with local partners (universities and research institution) in addressing the post-harvest losses in Nigeria will provide the necessary expertise to identify and resolve challenges in aquaculture production in Nigeria. Also, collaborating with existing institutions will contribute to increased adoption of aquaculture technologies introduced to farmers along the chain.

Furthermore, partnering with international nonprofit organizations such as BMGF via a project implemented by WorldFish provided the synergies to accomplish more than the project would have if it were acting alone in Nigeria. Collaborating with other agencies with different missions and goals provides lessons in managing boundaries to achieve bigger goals.

Presentations and publications: None

Assessing Facilitators and Barriers to Aquaculture and Fish Consumption in Zambia (Fish4Zambia)

US PI: Kathleen Ragsdale, Ph.D., Mississippi State University
US Co-PI: Mary Read-Wahidi, Ph.D., Mississippi State University
US Co-PI: Elin Torell, Ph.D., University of Rhode Island
HC PI: Steven Cole, Ph.D., WorldFish
HC Co-PI: Pamela Marinda, Ph.D., University of Zambia

Description: Fish provide essential micronutrients and contribute to a diversified diet for millions of people in Zambia, yet undernutrition is a serious problem in the country, where 40% of children under the age of five are stunted. Fish are a unique animal-source food that is rich in protein and essential fatty acids. Small fish have particularly high levels of micronutrients, especially in the bones, head, and gut. Because small fish are often eaten whole, they provide high nutritional benefits, especially for pregnant and lactating women and children in the first 1,000 days. Research to assess how small fish reach vulnerable household members (e.g., infants/children, pregnant/lactating women) in Zambia is lacking. Fish4Zambia outputs include 1) an assessment of existing fisheries enterprises disaggregated by key actors' gender and age to assess existing barriers and bridges to women- and youth-led fisheries development to pinpoint leverage points for growing this sector, and 2) a fish flow study of actors' engagement across the fish value chain (i.e., as producers, processors, marketers, and consumers). Results will inform the Fish Innovation Lab supported post-harvest value chain

activities, USAID/Zambia, and the Government of Zambia investments in fisheries. Fish4Zambia contributes to Feed the Future objectives to understand why many Zambians (particularly women and children) continue to lack dietary diversity and remain vulnerable to food insecurity and malnutrition.

Objectives: Fish4Zambia aims to increase the quality/quantity of fish benefitting nutrition and food security in Zambia, especially for women and children in the first critical 1,000 days of life. Objectives include the following:

1. Assess the current state of small fish (e.g., kapenta and chisense) capturing, processing, and trading activities from point of catch through processing to local and distant markets for sale in both rural and urban areas.
2. Identify the social and gender barriers to entry and/or participation in these value chain activities for the different actors, particularly women and youth.
3. Assess how small captured fish are accessed by different consumer groups and consumed within households, especially in households in rural and urban areas distant from their source of production.
4. Explore the potential of upgrading the small fish value chain via improving processing, storage, and trading methods to reduce post-harvest losses and improve food safety.
5. Explore the use of small dried fish for further processing into fish powder and incorporating into locally appropriate foods for enhanced nutrition of women and children in the first 1,000 days of life.

Achievements: Fish4Zambia PIs and co-PIs held a kick-off meeting on March 22, 2019. The team discussed protocol development, potential survey and other instruments/tools, University of Zambia student involvement, and field work scheduling. The next meeting is scheduled for April 12, 2019.

Lessons Learned. Nothing to report

Presentations and Publications. None

Genome Sequencing and Development of SNP markers from Rohu in Bangladesh

US PI: Attila Karsi, Ph.D., Mississippi State University

US Co-PI: Dan Peterson, Ph.D., Mississippi State University

HC PI: Md. Samsul Alam. Ph.D., Bangladesh Agricultural University

HC Co-PI: John Benzie, Ph.D., WorldFish

HC Co-PI: Matthew Hamilton, Ph.D., WorldFish

HC Co-PI: Md. Akhtaruzzaman Khan, Ph.D., Bangladesh Agricultural University

Description: Bangladesh is an excellent example of the contribution of aquaculture to food security and livelihoods due to the importance of fish as a dietary source of protein and micronutrients. As the second most important aquaculture species in Bangladesh, Rohu accounted for about 13% of the total production of fish from ponds in 2016-2017. Polyculture practices have incorporated carps such as Rohu for many years and recently have included combinations with small indigenous fishes. Improvements in broodstock selection are needed to increase the productivity of Rohu. Broodstock selection has been initiated, and family lines have been developed at WorldFish, but the evaluation of beneficial traits is needed to optimize and accelerate targeted family development. This project will identify challenges, possibilities, and needs of aquaculture in Bangladesh. Direct outputs will include the evaluation of broodstock development, a high-quality genome sequence of Rohu, and the identification of genome-wide Single Nucleotide Polymorphisms (SNP) markers for broodstock

selection programs. The research will be beneficial for informing selective breeding for additional carp species such as silver carp and catla, and it will enable assessment of species impacts on pond productivity, which will reduce poverty and improve food security in Bangladesh.

Objectives: The research goal is to improve aquaculture production and the livelihoods of farming communities in Bangladesh and surrounding regions using sustainable approaches. The objectives of this Quick Start project, which will allow attainment of our long-term goal, are to:

1. Establish collaborations and conduct stakeholder surveys.
2. Conduct sequencing of the Rohu (*Labeo rohita*) genome.
3. Identify genome-wide Single Nucleotide Polymorphisms.

Achievements: *Objective 1: Establish collaborations and conduct stakeholder surveys.* The Quick Start project PI, Co-PI, and collaborators participated in virtual Fish Innovation Lab kick-off meetings for all Quick Starts, and both PIs have participated in monthly virtual PI coordination meetings. The team is currently working on developing a stakeholder survey questionnaire and focus group discussion guide. The team is also working on obtaining Institutional Review Board (IRB) approval for the survey.

Objective 2: Conduct sequencing of the Rohu genome. After obtaining Institutional Animal Care and Use Committee (IACUC) approval from Bangladesh Agricultural University, the team met with WorldFish to discuss logistics of rohu sampling. The team collected blood samples from five rohu males and shipped them to the US PI at MSU, who hand-delivered them to the Institute for Genomics, Biocomputing, and Biotechnology (IGBB) at MSU for DNA extraction and genome sequencing. The team visited the Carp Genetic Improvement Project of WorldFish in Jashore to oversee the collection of fin clip samples, which were then preserved at WorldFish Center Head Quarters, Penang, Malaysia. WorldFish shipped 120 fin clip samples to the US PI at MSU who hand-delivered them to IGBB for SNP discovery.

Objective 3: Identify genome-wide SNP. No activities to date

Lessons Learned: Nothing to report

Presentations and Publications: None

Improve Nutrition Among Vulnerable Populations in Kenya Through Increased Access to and Consumption of Sustainable Fish Foods (SecureFish)

US PI: Lora Iannotti, Ph.D., Washington University in St. Louis (WUSTL)

US Co-PI: Austin Humphries, Ph.D., University of Rhode Island (URI);

US Co-PI: Terezie Mosby, Ph.D., Mississippi State University (MSU)

HC PI: Andrew Wamukota, Ph.D., Pwani University

HC Co-PI: Elizabeth Kamau-Mbuthia, Ph.D., Egerton University

Description: Kenya has food insecurity; 47 percent of the population lives below the poverty line and 26 percent of children less than 5 years are stunted. Coastal marine fisheries are chronically overexploited, and this can be seen in the four-fold decrease in catch for coastal fisheries since the 1980s. Nationally representative data indicate low dietary diversity in vulnerable groups, and only a small fraction of young children (21%) were reported to consume any fish, meat, or poultry. Some of the most vulnerable people to malnutrition and micronutrient deficiencies are those along Kenyan lakes and coastlines, including infants and young children, pregnant and lactating women, and school-aged children living in poor households. Here, small-scale fishing has large-scale implications

because it is essential to well-being via nutrient-rich food. This project will advise subsequent research initiatives to improve human welfare and nutrition using improved approaches to increase access to and consumption of coastal marine fish as food. Outcomes include a comprehensive inventory of coastal marine fish for food that maintain ecosystem functioning and address micronutrient deficiencies in vulnerable groups. It will yield insights into current household fish consumption and social dynamics in low-income households. The market analysis outputs will guide research on coastal marine fish species with potential as micronutrient sources, which will improve access and safety of household consumed coastal marine fish.

Objectives: This project aims to build a foundation for the Fish Innovation Lab goal to improve nutrition among vulnerable populations in Kenya through increased access to and consumption of sustainable fish as food from coastal marine fisheries. This Quick Start research aims to:

1. Identify nutritious coastal marine fish for food that maintain ecosystem functioning
2. Assess the acceptability and feasibility of these fish as foods for nourishing vulnerable populations of pregnant and lactating women, and young children
3. Determine market conditions for ensuring availability, affordability, and safety of these coastal marine fish as food

Achievements: The SecureFish U.S. and host country PIs and co-PIs met in Nairobi and traveled to Mombasa for a study initiation visit from January 17-February 2, 2019. There were two objectives during this visit: 1) make contact with Kenyan government and non-government officials involved in the fisheries and aquaculture sector to solicit input on the research objectives; and 2) begin the quick start project activities along the coast. The team met with local leaders in Kwale, Mombasa, and Kilifi counties. The team submitted and received IRB approval from Pwani University; PIs and co-PIs from WUSTL, URI, Egerton University, and MSU are currently in the IRB approval processes with their respective institutions. The team applied for a research permit from the Kenyan governmental agency, National Commission for Science, Technology, and Innovation, and expect to receive the permit in mid-April.

Objective 1. Identify nutritious coastal fish for food that maintain ecosystem functioning. Meetings with key contacts from government and non-governmental agencies revealed there is high priority placed upon developing offshore fisheries. Challenges exist across the entire value chain, but stakeholders emphasized there is no capacity for fish processing in Kenya.

Objective 2. Assess the acceptability and feasibility of these fish as foods for nourishing vulnerable populations. The team organized their experimental design around the Beach Management Units (BMU); they met with leaders of each BMU who took them to talk with fishers, fish traders, and households with small children. The team adapted their planned survey questionnaire to incorporate information collected through dozens of such interviews. The team also visited a local health clinic to discuss nutrition communication in the villages and better understand health treatment norms.

Objective 3. Determine market conditions for ensuring availability, affordability and safety of these coastal marine fish as food. No activities to date.

Lessons learned: Nothing to report

Presentations and publications. None

Replacing Fishmeal with Single Cell Proteins in Tilapia *Oreochromis niloticus* Diets in Zambia

US PI: Delbert Gatlin, Ph.D., Texas A & M University

HC PI: Rodrigue Yossa, Ph.D., WorldFish

HC Co-PI: Steven Cole, Ph.D., WorldFish

Description: Several ingredients have been investigated as alternatives to fishmeal in commercial aquatic animal feeds to support the sustainable growth of aquaculture globally. These alternative ingredients include, but are not limited to, insect meals and single cell protein (SCP). SCP can be composed of yeast, bacteria, algae, or a combination. Zambia is unique in sub-Saharan Africa because it has high-quality, locally produced commercial tilapia feed from two commercial fish feed mills, Skretting Zambia and Aller Aqua Zambia, which are both located in Siavonga next to Lake Kariba. The commercial tilapia feed in Zambia uses soy and fishmeal as protein sources; replacement of fishmeal has the potential to increase profitability and sustainability of tilapia aquaculture in Zambia. This activity will evaluate the potential of replacing fishmeal in tilapia diets with SCP products developed by Meridian Biotech, a U.S. company. Two products will be evaluated: MRD-Pro, which is a bacterial product, and DY-Pro, which is a yeast product. The project will provide data to determine which product provides improved nutrition for tilapia and optimal levels of fishmeal replacement by evaluating growth, survival, nutrient utilization, and condition factor in tilapia. It will further determine potential health benefits of the SCP products by evaluating effects on gut health. This project will also provide institutional capacity development for Natural Resources Development College (NRDC) in Lusaka by improving facilities and building faculty expertise, and it will provide individual capacity development for NRDC faculty and students participating.

Objectives: The objective of this study is to investigate the effect of partially or totally replacing fishmeal by SCP ingredients in a tilapia (*Oreochromis niloticus*) commercial feed.

The specific objectives are:

1. To study the effect of partial or total replacement of fishmeal by single cell proteins on the growth, survival, nutrient utilization, condition factor, and gut health in tilapia;
2. To estimate the optimum level of substituting fishmeal with SCPs in tilapia diets;
3. To determine which of the two SCP products tested is more appropriate for tilapia nutrition.

Achievements. This project is still in its approval stages.

Lessons Learned. Nothing to report

Presentations and Publications. None

5. Human and Institutional Capacity Building

Human and Institution Capacity Development (HICD) Toolkit Case Study

The Fish Innovation Lab participated in discussions with USAID and the International Food Policy Research Institute (IFPRI) regarding use of one of the Fish Innovation Lab Quick Starts as a case study for a USAID capacity development toolkit. The result of the discussions was to select the Nigeria Cold Chain Analysis Quick Start as the case study. The Fish Innovation Lab participated in initial planning meetings and, moving forward, will continue to be involved by reviewing the toolkit itself.

Short-term trainings

Fish Innovation Lab Quick Start projects are in startup phases, and there are no capacity building results to report.

Long-term trainings

Fish Innovation Lab Quick Start projects have a one-year time limit and fixed budgets, so no long-term training has been conducted to date.

Institutional Development

Fish Innovation Lab Quick Start projects are in startup phases, and there are no capacity building results to report.

6. Innovation Transfer & Scaling Partnership

Innovation Transfer

Nothing to report

Scaling Partnerships

Replacing Fishmeal with Single Cell Proteins in Tilapia *Oreochromis niloticus* Diets in Zambia:

This Quick Start project features a public-private partnership to promote adoption and scaling of the research findings. The private industry partners (Meridian Biotech, Aller Aqua Zambia, and Yalelo) each contribute to the project, and they each have interest in potential adoption based on research results. An overview of the project workflow is shown in Figure 2. Meridian Biotech is providing the SCP ingredient, Aller Aqua Zambia is providing the fish feed base mash, and Yalelo is providing the tilapia. The research is conducted by Texas A&M University, Natural Resources Development College, and WorldFish.

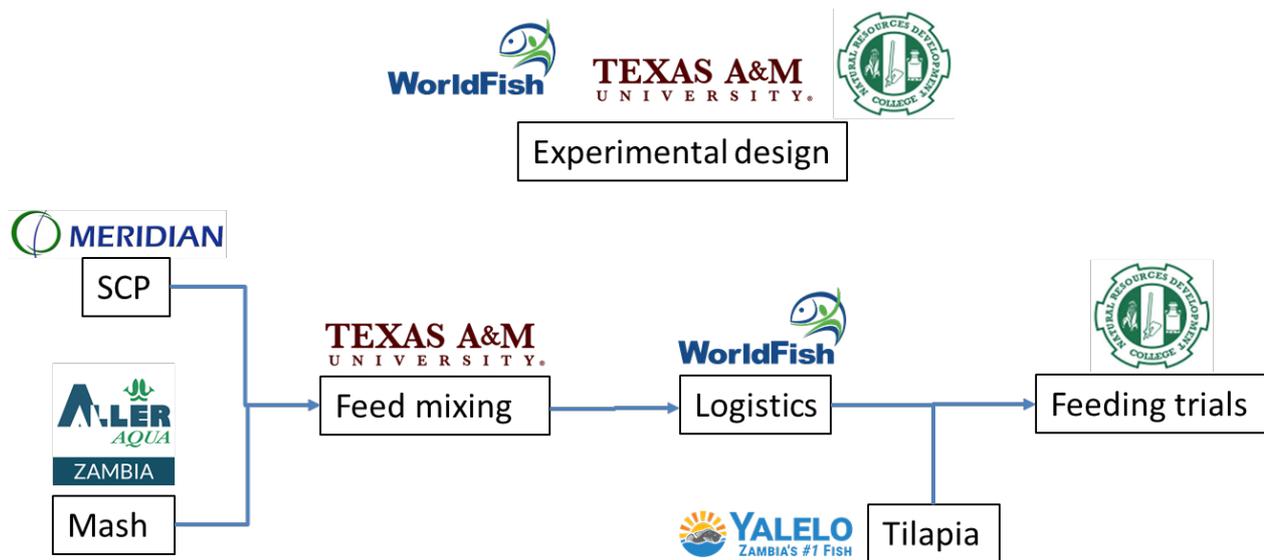


Figure 2: Zambia fish meal Quick Start scaling partnership schematic

7. Environmental Management & Mitigation Plan

The Fish Innovation Lab EMMP has been submitted to the Fish Innovation Lab AOR. Upon AOR concurrence, it will be submitted to the Bureau Environmental Officer. Information specific to each of the research projects funded by Fish Innovation Lab will be added to the EMMP, and it will be resubmitted to the AOR for final feedback and approval.

8. Open Data Management Plan

The Fish Innovation Lab ME will work with the Quick Start teams to explain and prepare the Data Management Plan once they have launched their activities. This has already been done for the SecureFish Quick Start project in Kenya. For the Quick Start projects with later start dates, this will be done in July-August 2019.

9. Management Entity Partner Activities

Management Entity – MSU

As Director, Dr. Lawrence provided direction and oversight for all Fish Innovation Lab activities. Dr. Lawrence supervised the Fish Innovation Lab ME and ME Partners. Dr. Lawrence facilitated collaboration with current and potential research partners. Dr. Lawrence served as the primary contact for the Fish Innovation Lab AOR and represented the Fish Innovation Lab at the following meetings and activities:

- 1) Innovation Lab Directors meeting (Washington DC, September 11-12, 2018).
- 2) Fish Innovation Lab kickoff meeting (Washington DC, October 9-11, 2018) attended by the Management Entity, Management Entity partners, the Office of Acquisition and Assistance (OAA), and the Fish Innovation Lab AOR
- 3) Startup Inception and Planning Workshops for the WorldFish, BMGF, and MSU partnership projects in Nigeria (Abuja, Nigeria, January 14-17, 2019)

Dr. Ragsdale was involved in providing feedback and edits for Fish Innovation Lab guiding documents such as the "Feed the Future Innovation Lab for Fish: Communications Strategy: January 2019-September 2022" and "Fish Innovation Lab: Web Content: How We Work."

Dr. Allen advocated and increased awareness for Feed the Future Fish Innovation Lab at the World Aquaculture Society Meeting in New Orleans, LA. He assisted in disseminating information on the Fish Innovation Lab and making contacts with aquaculture scientists for future RFA notification. Dr. Allen assisted in facilitation of the Bangladesh Quick Start project by bringing parties together, making contacts, writing the proposal, and providing technical insight.

Ms. Hill assisted the Director and ME partners in planning, organizing, and managing Fish Innovation Lab activities, as well as developing the initial documents required by USAID such as the work plan, branding and marketing plan, quick start activities, etc.

As Communications Manager, Ms. Dechert has focused on building the infrastructure for communications for the Fish Innovation Lab, including the website, newsletter, templates, photography guidelines, and internal communications platform lab staff and partners will use. Additionally, she handled dissemination of the RFAs and assisted with the responses to questions.

She has shared several news releases and stories and developed materials to be shared at the Innovation Lab Directors meeting held in Ethiopia in May 2019.

ME Partner – URI

During the first six months of the Fish Innovation Lab (Q1 and Q2 of FY19) University of Rhode Island contributed to the ME in the preparation of the following:

1. Support the finalization of Quick Start proposals: The URI team reviewed and provided feedback on revised Quick Start proposals—and in particular the Feed4Zambia and Kenya proposals.
2. Development of a MEL Plan: The URI team reviewed and provided input on the draft MEL plan, which was developed by RTI. This included brainstorming and finalizing indicator targets as well as the learning plan. Following the finalization of the MEL plan, the URI team worked with RTI on rolling out the MEL plan to project partners.
3. The Environmental Monitoring and Mitigation Plan (EMMP): The URI team took the lead in drafting an EMMP for the Fish Innovation Lab.
4. Development of a request for applications (RFA): The URI team supported MSU in finalizing the RFA. This included providing technical input as well as conducting a final edit and providing input/examples for the RFA annexes.
5. Organization of the first virtual platform meeting: The URI team worked with RTI to develop and implement the first virtual platform meeting, which was held on March 19th.
6. Human and Institution Capacity Toolkit Case Study: Participated in discussions with USAID and IFPRI regarding the opportunity of showcasing one of the Fish Innovation Lab Quick Start projects as a case study in a USAID capacity development toolkit. Moving forward, this work will also include reviewing the toolkit itself.
7. Participated in the first Fish Innovation Lab advisory group meeting.
8. Provided feedback and participated in meetings related to the development of the Fish Innovation Lab Piestar system

ME Partner – RTI

RTI International conducted the following activities:

1. Developing Area of Inquiry Impact Pathways: RTI facilitated the ME in preparing impact pathways for each of the three Fish Innovation Lab areas of inquiry: productivity, risk mitigation and socioeconomic outcomes.
2. Development of a MEL Plan: RTI wrote a MEL plan, solicited and incorporated feedback from MSU, RTI and USAID, and finalized the plan for submission to Fish Innovation Lab Director and AOR.
3. Development of indicators: RTI worked with MSU and URI to select four core indicators from Feed the Future standard indicators, tailored the standard Feed the Future PIRS and discussed indicators in-depth with each Quick Start team.
4. Indicator target-setting: RTI held multiple consultations with PIs and co-PIs to set targets and rationales. A final set of targets were incorporated into the finalized MEL Plan in February. RTI has maintained a tracking sheet with ongoing updates to estimates and rationales for future reporting.

5. Guidance on indicator tracking: RTI met as needed with Quick Start teams to discuss plans for tracking participants and advising on data needs for FTFMS reporting.
6. Tailoring and launching the Fish Innovation Lab Piestar platform: RTI worked closely with MSU and the Piestar team to tailor the generic Piestar platform for Fish Innovation Lab's reporting and Monitoring and Evaluation (M&E) needs.
7. MEL Orientation for Quick Start teams: RTI provided two MEL orientation sessions for Quick Start teams involving a presentation of M&E and Learning for USAID and facilitating cross-team discussion of MEL-related approaches and experiences.
8. Development of RFA: RTI supported MSU in finalizing the RFA. This included providing technical input on MEL and resilience sections.
9. Organization of the first virtual platform meeting: RTI worked with URI to develop and facilitate the first virtual platform meeting, which was held on March 19th.
10. RTI delivered a three-day Grants Management Training and provided communications advising and review of deliverables.

ME Partner – Texas State University

Dr. Dey coordinated various activities for the Fish Innovation Lab in Bangladesh and supervised the country coordinator, Dr. Hussain. During this reporting period, Dr. Dey:

1. Established informal communications with various high-ranking government officials in Bangladesh (including Minister for Agriculture, Minister for Fisheries and Livestock, Senior Member of the Planning Commission (Dr. M. Shamsul Alam), and Director General of the Bangladesh Fisheries Research Institute).
2. Informed various government officials, researchers from various universities (including Bangladesh Agricultural University, Patuakhali Science and Technology University, and Sylhet Agricultural University) and NGOs about the Fish Innovation Lab goals, objectives, and plans.
3. Consulted stakeholders in Bangladesh (policy makers, researchers and NGO officials) to update national priorities for aquaculture and fisheries research in the country.
4. Helped with initiating and implementing the Quick Start project on Genome Sequencing and Development of Single Nucleotide Polymorphism Markers from Rohu in Bangladesh.
5. Reviewed existing literature on aquaculture and fisheries research in Bangladesh.

ME Partner – Washington University in St. Louis

Dr. Iannotti provided technical inputs regarding nutrition and food security during a visit to the USAID office from October 10-12, 2018. During this meeting, she assisted the Fish Innovation Lab Director in outlining the Fish Innovation Lab strategy, priority countries, calendar and processes. During regular Fish Innovation Lab management calls, she offered guidance regarding internal and external communications, nutrition networks, and planning efforts for the larger call for proposals. Other contributions included inputs for the Fish Innovation Lab Impact Pathways and Theory of Change.

10. Communications

Website, Newsletter, and Social Media

For knowledge dissemination, the Fish Innovation Lab website was developed and released in March 2019. The MSU Information Technology Department has been working to fix minor concerns that

were identified by USAID during its security scan to receive final approval from USAID's Web Governance Board. The Fish Innovation Lab ME collected input from its research implementers for its first newsletter in May 2019, and it is anticipated to be released in June 2019. A three-minute informational video about the role of the Fish Innovation Lab Quick Start project in Nigeria to address resilience will be produced in May 2019.

Social Media

Ms. Dechert will be creating and sharing content on social media starting in the summer of 2019. This timing is intended to coincide with the timeline of the newsletter to maximize opportunity to gain initial followers. The Fish Innovation Lab intends to have an active presence on Twitter and Facebook and to use YouTube for hosting videos that are shared on these platforms and on the Lab's website. Additional social media will be considered for the future on an as needed basis.

Top Stories and Content Highlights

Below are the major stories the Fish Innovation Lab has shared or earned during this reporting cycle:

- [MSU to Lead New USAID Feed the Future Innovation Lab on Fish.](#) This initial news release announced the Fish Innovation Lab to the MSU community and was shared widely across MSU networks. (September 12, 2018)
- [With MSU CVM at the Table, Fish to Help Alleviate World Hunger.](#) This feature story focused on the lab and Dr. Lawrence and was published in *Pegasus Press*, the magazine of the MSU College of Veterinary Medicine. (December 2018)
- Fish Innovation Lab Awards \$500,000 in 'Quick Start' Grants. This news release announced and summarized the five quick start projects supported by the lab. At the time of this report, it has been picked up by four media outlets. (March 22, 2019)
- Global stakeholders convene to discuss progress on early research by MSU-based Fish Innovation Lab. This story discussed the lab's first virtual convening of staff and partners. At the time of this report, it has been picked up by one media outlet. (April 25, 2019)
- [Student Scholar to Assist with Research in Zambia.](#) This short feature is about an MSU undergraduate student who has received university funding to join the Fish4Zambia quick start project for the summer of 2019. (May 15, 2019)

Distribution of the Request for Applications (RFA)

The Fish Innovation Lab RFA was shared on the Fish Innovation Lab website, Agrilinks, MSU newsroom web page, and Piestar, and it was disseminated to 26 listservs and contact groups. Additionally, the RFA was disseminated via Mail Chimp to the Fish Innovation Lab's database of contacts (316 at the time of disseminating the RFA). At the time of this report, there have been 9,100 opens of the Mail Chimp RFA dissemination, and the Fish Innovation Lab has gained 169 new subscribers, indicating it has been shared widely by initial recipients (April 22, 2019).

11. Issues

Regional Coordinators

Given the changes in countries where the Fish Innovation Lab is implementing Quick Starts compared to originally proposed countries in its Notice of Funding Opportunity, the Fish Innovation Lab ME has learned to be adaptable to changes in needs for in-country regional coordinators. In particular, the Fish Innovation Lab has not filled a position for in-country management of West Africa activities. Originally, the Fish Innovation Lab had planned on hiring a regional coordinator located in Ghana, but because the initial Quick Start activity is located in Nigeria, the team does not yet have an active in-country coordinator for West Africa.

Learning Activities

During Year One work planning, the Fish Innovation Lab recognized that due to budget considerations, it is not practical to bring all PIs to a foreign country every year to share results and lessons learned. The Management Entity also recognized that the primary purpose of the in-country meetings is to engage regional stakeholders and promote adoption and scaling of Fish Innovation Lab findings. Therefore, the best opportunity and venue for Fish Innovation Lab-level learning is at the annual management meeting for US PIs.

The Fish Innovation Lab will also use the quarterly virtual platform meetings as opportunities for Fish Innovation Lab-level learning with participation of all PIs. The team will use one of these virtual meetings to prepare for the learning agenda activities that RTI will facilitate at the US PI meeting. To execute the Fish Innovation Lab-level learning agenda, the Fish Innovation Lab will need to gather input from regional in-country meetings, US PI meetings, and virtual meetings. This will be possible if at least one full day at in-person meetings is set aside to conduct activities and prepare deliverables planned in the learning agenda.

Issues Related to Quick Start Projects

1. The Nigeria project integrates into a bigger project being supported by the Bill and Melinda Gates Foundation and implemented by World Fish. Thus, the timeline for the Quick Start project required coordination with the Bill and Melinda Gates Foundation project.
2. Several Quick Starts experienced a delay in issuing the sub-contracts to partner institutions. As a result, most of the Quick Starts will get underway in Q3 of FY19. Delays were caused by DUNS number problems with some institutions and regulatory compliance approval delays.

12. Future Work

The next steps for the Quick Start projects in implementing their work plans are as follows:

Research Activities
<u>Cold Chain Analysis</u> in Nigeria (project period ends December 20, 2019) <ul style="list-style-type: none">• Complete survey instruments• Seek IRB approval of the survey instrument• Recruit fieldwork supervisors• Recruit data collectors

<ul style="list-style-type: none"> • Train field staff • Procure equipment for the data collection • Collect and analyze data
<p><u>Fish4Zambia</u> (project period ends March 15, 2020)</p> <ul style="list-style-type: none"> • Finalize instruments, study sites, and field work schedule • Seek IRB approval for field work protocol • Mobilize for data collection • Initiate data collection once protocol has been IRB-approved
<p><u>Rohu Carp Genome Sequencing</u> in Bangladesh (project period ends February 28, 2020)</p> <ul style="list-style-type: none"> • Finalize stakeholder survey schedule and focus group discussion guide • Obtain IRB approval for human subjects to be used in the surveys • Conduct focus groups and implement survey • Synthesize existing data and studies
<p><u>Secure Fish</u> in Kenya (project period ends December 31, 2019)</p> <ul style="list-style-type: none"> • Initiate data collection in May 2019 • Site visits in October 2019 • Maintain communication with team through WhatsApp and monthly Zoom calls
<p><u>Zambia Feeds</u> (project period ends March 31, 2020)</p> <ul style="list-style-type: none"> • Finalize protocol and feed formulations • Upgrade the fish facility • Process the feed • Conduct the fish experiment • Conduct intermittent sampling and final sampling • Prepare and ship samples to MSU • Perform lab analysis

The next step for the ME and ME Partners in implementing the annual work plan are as follows:

<p>Management Activities</p>
<p><u>Management Entity – MSU</u></p> <ol style="list-style-type: none"> 1. Project selection through RFA process. Concept Notes will be screened by a 3- to 4-person Fish Innovation Lab ME team consisting of the Fish Innovation Lab Director, Deputy Director, and 1-2 others with no conflict of interest in the specific Fish Innovation Lab RFA competition. The Fish Innovation Lab AOR will review all of the Concept Notes.

2. Review of Full Applications. Applications will be 1) screened internally for compliance with submission requirements by an internal panel and 2) scored by a technical evaluation panel (3-5 individuals) of Fish Innovation Lab ME, ME Partners, USAID AOR, and a small number of other qualified experts with no conflict of interest from each discipline/theme/country area.
3. Based on scoring, proposals will be ranked and submitted to the Fish Innovation Lab External Advisory Board for input. Anyone submitting an application may not be a reviewer in that theme area for that competition round. The Fish Innovation Lab will select subawards based on technical review and program fit using the following criteria: scientific quality, potential for adopting and scaling, relevance and value addition, and feasibility/overall effectiveness.
4. The Fish Innovation Lab anticipates obligating \$5-7 million of the Fish Innovation Lab research budget in Round 1 of funded projects. Anticipated project sizes will range from \$200,000 to \$500,000 over 2-4 years with approximately 10-15 projects awarded. Projects providing justification may be allowed to request and be awarded a budget of up to \$800,000.
5. Fish Innovation Lab ME will ensure financial accountability of research subawards. Following selection, Fish Innovation Lab ME will establish subcontracts.
6. Project support. To support Year 1 Fish Innovation Lab activities, members of the ME will travel to countries to attend Fish Innovation Lab related stakeholder and implementation meetings, meet with PIs, in-country coordinators, and visit research sites.
7. The ME will conduct an annual meeting at a location to be decided. The first annual meeting will focus on administrative procedures, network/teambuilding building amongst all PIs, and collaborative learning.

ME Partner – URI

1. Support the roll out of the RFA, including reviewing abstracts for scope and fit, assisting in coordinating a feedback session, assist in identifying reviewers for the full proposals, and supporting the final selection.
2. Support the finalization of the EMMP.
3. Support the development of two virtual platform meetings, the Bangladesh in-country meeting, and the annual partners meeting.
4. Support the development of a Nigeria HICD case study; review and provide feedback on the USAID HICD toolkit.
5. Supervise monitoring, evaluation, and learning activities, including Quick Start learning and quarterly indicator reporting and the development of MEL plans for the new projects awarded in fall 2019.
6. Participate in the Fish Innovation Lab advisory group meetings.
7. Support any other meetings and activities as requested.
8. Manage East Africa research activities (Humphries) and West Africa research activities (Crawford). This will include supervising in-country coordinators and support them in grant coordination, research, and learning.
9. Support Quick Starts and in-country program staff in activities related to resilience and HICD

ME Partner – RTI

1. Support the roll out of the RFA, including reviewing concepts for scope and fit, contributing to a webinar for competitors, reviewing MEL and resilience sections of full proposals, and supporting the final selection.
2. Deliver training on indicator reporting to PIs and MEL point persons; support quarterly indicator reporting.
3. Develop and facilitate two virtual platform meetings, support the preparation and facilitation of the Bangladesh in-country meeting, and prepare for facilitating the preparation of a Learning Agenda at the annual partners meeting.
4. Conduct monitoring, evaluation, and learning activities, including quick start learning and quarterly indicator reporting and the development of MEL plans for the round one grants.
5. Support any other meetings and activities as requested.

ME Partner – Texas State University

1. Build capacity with various in-country researchers to support submitting letters of intent and proposals in response to the Fish Innovation Lab RFA.
2. Organize platform meeting in Bangladesh (subject to authorization from the USAID Mission in Dhaka).

ME Partner – Washington University in St. Louis

1. Participate in weekly Fish Innovation Lab management entity meetings and attend the in-country platform meeting.
2. Peer-reviewed publication drafted with co-author Dr. Humphries from URI (based on results from the Kenya Quick Start Project).

13. Appendices

List of awards – Nothing to report

Publications – Nothing to report

Data Management – Nothing to report