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

Feed the Future Innovation Lab for Fish

Semi-Annual Report October 1, 2019 – March 31, 2020

Cooperative Agreement 7200AA18CA0030

USAID
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MISSISSIPPI STATE UNIVERSITY
GLOBAL CENTER FOR AQUATIC FOOD SECURITY

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Prepared for:
Agreement Officer's Representative (AOR)
Feed the Future Innovation Lab for Fish (Fish Innovation Lab)
Bureau for Resilience and Food Security (RFS)
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Research Progress Made by Quick Start Activities During the Reporting Period

Quick Start 1: Analysis of the Aquaculture Post-harvest Chain in Nigeria (Cold Chain Analysis)

US PI: Julius A. Nukpezah, PhD, Mississippi State University (MSU); US Co-PI: Joe Steensma, EdD, MPH, Washington University in St. Louis (WUSTL); HC PI: Tran Van Nhuong, PhD, WorldFish (WF)

The Nigeria Cold-Chain Analysis activity aims 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 team completed all the field work in the previous reporting period and focused on dataset cleaning and analysis of survey and focus-group discussion. The team also wrote a blog for the Chicago Council on Global Affairs, which summarized activity findings. The blog was also published on Agrilinks.

Quick Start 2: Replacing Fishmeal with Single-Cell Proteins in Tilapia *Oreochromis niloticus* Diets in Zambia (Zambia Feeds)

US PI: Delbert Gatlin, PhD, Texas A & M University (TAMU); US Co-PI: Wes Baumgartner, DVM, PhD, University of Illinois (UI); US Co-PI: Don Corace, Meridian Biotech; HC PI: Rodrigue Yossa, PhD, WF; HC Co-PI: Rose Komugisha Basiita, PhD, WF; HC Co-PI: Masautso Sakala, Natural Resources Development College (NRDC); HC Co-PI: Alexander Greiling, Aller Aqua Zambia

The purpose of the Zambia Feeds Quick Start is to investigate the effect of partially or totally replacing fishmeal by single-cell protein (SCP) ingredients in a tilapia (*Oreochromis niloticus*) commercial feed. In 2019, the fish facility at the NRDC in Lusaka was upgraded through the design and building of a flow-through aquaculture system composed of a steel structure with three shelves, 30 aquaria, one 2000-L tank, one 1000-L tank, one air blower, one water pump, and plumbing. In the first half of 2020, the team finalized the research protocol, which included feed formulation. Fishmeal was supplied by Aller Aqua Zambia, and SCP was provided by Meridian Biotech. Seven experimental feeds were produced at TAMU early in 2020 and shipped to Zambia. WorldFish Zambia received the feeds and kept them frozen at NRDC until the start of the experiment. Yalelo supplied experimental fish, which were acclimated at the newly constructed facility at NRDC. This acclimation period also tested the functionality of the new facility. The experiment effectively started on March 18, 2020. Eleven fish with an average body weight of 11g per fish were stocked in each aquarium. Data is collected daily by the HC Co-PI Masautso Sakala and two NRDC interns hired to support the activity while developing their aquaculture and research capacities.

Quick Start 3: Genome Sequencing and Development of Single Nucleotide Polymorphism (SNP) Markers from Rohu in Bangladesh (Genome Sequencing)

US PI: Attila Karsi, PhD, MSU; US Co-PI: Dan Peterson, PhD, MSU; HC PI: Md. Samsul Alam, PhD, Bangladesh Agricultural University (BAU); HC Co-PI: Md. Akhtaruzzaman Khan, PhD, BAU; HC Co-PI: John Benzie, PhD, WF; HC Co-PI: Matthew Hamilton, PhD, WF

The research goal of the Genome Sequencing activity is to improve aquaculture production and the livelihoods of farming communities in Bangladesh and surrounding regions using sustainable approaches. The activity team has collected survey data from 184 rohu farmers. This was the first ever survey work involving rohu, the most important native aquaculture species in Bangladesh. Survey results revealed the importance and contribution of rohu in fish production, nutrition, and youth involvement. Survey results were shared with relevant stakeholders in a workshop organized at BAU on December 26, 2019. Most of the genome sequencing work has been completed. The DNA was sequenced using Illumina and Oxford Nanopore Technologies (ONT) platforms. Contigs were assembled using the ONT reads, and the Illumina data was used to correct errors in the ONT contigs. The assembly suggests that the rohu genome is about 945.5 megabases (Mb) in length, a value less than half the reported size of the rohu genome (1950 Mb). To explore this discrepancy, flow cytometric determinations of rohu genome size were performed, revealing an estimated rohu genome size of 968 Mb (average for five male rohu). The current assembly of the rohu is composed of 4,832 contigs. Hi-C chromatin configuration sequencing is

being conducted to further assemble the contigs into scaffolds, after which the genome will be annotated. Double digest restriction-site associated DNA (ddRAD) sequencing procedure has been optimized for SNP development, and sequencing libraries have been prepared.

Quick Start 4: Improve Nutrition Among Vulnerable Populations in Kenya Through Increased Access to and Consumption of Sustainable Fish Foods (SecureFish)
US PI: Lora Iannotti, PhD, WUSTL; US Co-PI: Austin Humphries, PhD, University of Rhode Island (URI); US Co-PI: Terezie Mosby, PhD, MSU; HC PI: Andrew Wamukota, PhD, Pwani University (PU); HC Co-PI: Elizabeth Kamau-Mbuthia, PhD, Egerton University (EU)

The SecureFish activity 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. All data was collected in 2019, and data analysis and peer-reviewed publication development is currently underway. Publications will address 1) stunting differences in fishing vs. nonfishing households, 2) links between biodiversity and dietary diversity, 3) attitudes and behaviors toward fish as food for young children, and 4) fisheries catch and value chain dynamics. In the last quarter of 2019, the team began dissemination efforts including presentations by PIs, as well as local dissemination in Kwale and Kilifi counties with community members and county level nutrition and fisheries officers. During this period, the SecureFish team completed both quantitative and qualitative data collection in the villages of Tiwi, Shimoni, Vipingo, and Uyombo. Quantitative data was collected from 100 fishing households and 100 nonfishing households. Twenty-one in-depth interviews were conducted; participants included caregivers and community health workers. Data-management and -cleaning efforts for both the nutrition- and fisheries-related data were conducted.

Quick Start 5: Assessing Facilitators and Barriers to Aquaculture and Fish Consumption in Zambia (Fish4Zambia)
US PI: Kathleen Ragsdale, PhD, MSU; US Co-PI: Mary Read-Wahidi, PhD, MSU; US Co-PI: Elin Torell, PhD, URI; HC PI: Lauren Pincus, PhD, WF; HC Co-PI: Pamela Marinda, PhD, University of Zambia (UNZA)

The Fish4Zambia activity aims to identify barriers and facilitators related to 1) expanding aquaculture entrepreneurship and 2) increasing quality/quantity of fish transported to and benefitting household nutrition and food security in rural Zambia. The team completed all field work in the previous reporting period and focused on data cleaning and analysis of survey data (397 Women's Empowerment in Fisheries Index (WEFI) surveys) and three sets of qualitative data (16 focus group discussions (FGD) among 30+ year olds, five FGD among 18-29 year olds, and three key informant interviews with Ministry of Health and Ministry of Fisheries and Livestock personnel). The team has contributed to several Fish Innovation Lab-related blogs that have been published on the Fish Innovation Lab website and Agrilinks. The Fish4Zambia team has had six abstracts accepted for presentation at scientific conferences, of which two have been presented (one conference and one symposium were cancelled due to the COVID-19 pandemic). The team is developing three manuscripts for submission to peer-reviewed journals.

Issues or Concerns Encountered During the Reporting Period

COVID-19 Pandemic-Related Issues
The start dates for all the newly awarded research-for-development activities have been delayed due to COVID-19. Multiple Quick Start activities had plans to organize and attend conferences, workshops, and seminars that were cancelled due to COVID-19. The Zambia Feeds activity experienced several COVID-19 effects: 1) the HC Co-PI was unable to ship gut samples to the US for histology and immunohistobiochemistry, 2) PI Rodrigue Yossa was unable to participate in launching of the experiment in Zambia in March, and 3) if the situation has not improved, PIs Delbert Gatlin and Rodrigue Yossa will not be able to travel to Zambia to participate in final sample collection in mid-June 2020. These challenges were addressed by PI Rodrigue Yossa supporting the HC team virtually during the activity launch, and PIs will continue to support the HC team virtually if necessary.

Non-COVID-19 Pandemic-Related Issues
The Genome Sequencing team encountered concerns while surveying the rohu farms to collect socioeconomic data. The respondents were reluctant to cooperate and spend their time because it required a minimum of three hours to complete each survey. The farmers also asked for some type of benefit from participating in the research. Most farmers asked for improved technologies and improved strains of rohu and other species that would grow better and resist disease, making their farming more profitable. They also asked for access to good quality but affordable feed. The farmers were motivated with the hope that better performing rohu could be developed through marker assisted selection using the SNP markers that would be generated through this activity. The Genome Sequencing team overcame the problem by providing each respondent with a T-shirt. They also contacted the District Fisheries Officers and Upazila Fisheries Officers to help perform the survey work. The designated officers instructed the rohu farmers to cooperate with the data enumerators. Thus, the survey was finished smoothly.

Human and Institutional Capacity Development, Other Cross-Cutting Themes, and Management Entity (ME)-Related Support

Short-Term Training
Quick Start programs did not conduct short-term trainings during the reporting period.

Long-Term Training

Trainee Number	Sex	University	Degree	Major	Program End Date	Degree Granted	Home Country
1	M	Bangladesh Agricultural University	Master's	Agricultural Finance	December 2019	Y	Bangladesh

Other Cross-Cutting Theme Accomplishments
Gender Equity and Youth Engagement: **Kathleen Ragsdale and Mary Read-Wahidi,** Fish Innovation Lab gender specialists, collaborated with Steven Cole of the International Institute of Tropic Agriculture to develop the Gender Responsive Aquaculture/Fisheries Development Assessment (GRADA–FIL) tool. This is an evaluation tool for Fish Innovation Lab-supported research activity PIs and implementing partners. **The SecureFish activity** addressed gender equity through the inclusion of both male and female respondents in the quantitative and qualitative surveys. Community-level dissemination included both male and female attendees, and the presentation facilitators ensured both men and women had equal opportunity to share ideas. In addition, the research-assistant team included the same number of male and female research assistants, who each had equal responsibilities with data collection, management, and analysis**.** In **the Cold-Chain Analysis activity**, results of the key informant interviews and focus group discussions indicated that there are unique gender roles in the aquaculture value chain. Men are more likely to participate in aquaculture production and processing activities, while women are more active in trading, wholesaling, and retailing activities. **The Genome Sequencing activity** investigated youth engagement in fish farmers and found that approximately 47% of the fish farmers are 36-51 years old. These young to mid-life farmers were more productive and efficient than older farmers because they were early adopters of innovative production technology. The older farmers used more conventional production methods. For instance, the younger fish farmers used aerators for supplying oxygen in their ponds, acclimated fish fry before stocking in ponds to improve survival rates, prepared ponds with lime for better water quality, and used feeding trays for efficient use of feed. The **Fish4Zambia activity** completed the gender disaggregated analysis of 397 WEFI surveys. The team members finalized data analysis and submitted results disaggregated by gender to the Fish Innovation Lab in November 2019. The University of Zambia team also completed a draft of the gender-disaggregated focus group

discussion and key informant interview results and submitted to Mississippi State University, WorldFish, University of Zambia, and University of Rhode Island team members.

Human Nutrition: Initial findings from **the SecureFish activity** indicate that fish is not widely consumed by young children in the four study sites. This is particularly true among fishing households. Community-level discussions reveal this pattern may be due to the importance of selling fish as a livelihood strategy for fishing households, cost of purchasing fish in the market, and attitudes and beliefs about fish as an appropriate food for young children. The **Genome Sequencing activity** found that rohu-based aquaculture improves the access of fish-based nutrition for farmers. Analysis shows that fish-farming households consumed approximately 41g of rohu per day on average followed by silver carp, mrigal, and catla. Moreover, rohu supplied from the fish farms contributed more than half of their daily fish consumption and 13.6% to the daily protein requirements. The **Fish4Zambia activity's** research on post-harvest losses in Zambia found that all species were at risk of spoilage but chisense, which is a small fish that is important from a food-security perspective, suffers the most loss during the rainy season because it is processed solely by sun drying. This means that fishers, processors, and traders lose potential income due to either wasted fish or selling spoiled fish at low price. Women reported that insufficiently sun-dried fish was infested by maggots. Other than the economic loss, fish that has decomposed is unfit or unsafe for human consumption.

Resilience of Value Chains/Households: **The SecureFish team** shared their results with the communities where data was collected. During these dissemination exercises, value-chain actors (such as fishermen and mama karanga market vendors) were invited in an open forum where discussions focused on capacity adequacy and interventions necessary to strengthen value-chain governance and therefore manage shocks and stresses. Through **the Cold-Chain Analysis activity**, research findings revealed that post-harvest aquaculture value chains in Nigeria were short and simple, though there were variations in value-chain configuration and coordination among studied states. Value chains in states with higher aquaculture concentration, such as Lagos, Ogun, Delta, and Rivers, have higher levels of complexity than those with small aquaculture production. In all states, value-chain actors have limited cold storage facilities. From farm to fork, aquaculture fish products were marketed and sold in different forms including live fish, fresh fish, and smoked/dried fish. Given the poor infrastructure for transportation and limited electricity supply, value-chain actors keep products for a short duration then sell to the next actors.

Capacity Building: During community-level dissemination activities, **the SecureFish team** shared information about the connections between fisheries management and human nutrition with fishers, caregivers, and county-level fisheries and nutrition officers. **The Zambia Feeds activity** brought together partners from the academic, research, development, public, and private sectors to implement research and development activities that will not only propose a solution to a global aquaculture problem, but also build the capacity of the local vocational institution (NRDC). Specifically, Masautso E. Sakala, who is the aquaculture training officer of NRDC and co-PI on this activity, has been involved in every step of the three activities completed in the activity so far. He has thus gained experience in aquaculture research, which will be used during his future teaching and training duties at NRDC. In addition, key staff gained training in technical and scientific aquaculture research. This training included students and interns who participated in the construction and other hands-on activities related to the experiments and activity. The Bangladesh research team in **the Genome Sequencing activity** has trained three master's-level students of BAU as enumerators for field data collection. Quality of survey data shows that the students were properly trained, and they have achieved competence in survey data collection. The BAU research team acquired field-level practical knowledge on rohu-based carp polyculture through farm visits and focus group discussion. The BAU PI acquired experience with genome data management by visiting the IGBB at Mississippi State University and US fish farming by visiting catfish farms in Mississippi. The **Fish4Zambia team** contributed to Fish Innovation Lab capacity-building through a presentation to Fish Innovation Lab Quick Start PIs and Co-PIs. Additionally, members of the team collaborated with the Fish Innovation Lab to organize and record a public presentation by Steven Cole, a gender specialist from the International Institute

on Tropical Agriculture, which focused on gender dynamics in small-scale fisheries and aquaculture. This lecture was delivered on the Mississippi State University campus and shared publicly on the Fish Innovation Lab website.

Management Entity (ME) and ME Partner Activities

The Fish Innovation Lab ME implements its research portfolio to achieve knowledge and technology adoption, scaling, and impact. Important activities completed in the first half of Year 2 were finalizing the selection of activities in the competitive request for applications process; communicating results, lessons learned, and success stories related to the Quick Start activities; and supporting the Quick Start activities as they conclude their field work and enter the data analysis, synthesis, and dissemination stages.

Future Work

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

Research Activities
Quick Starts ● Finalize sampling (Zambia Feeds) and ddRAD library sequencing (Bangladesh Genome Sequencing) ● Data analysis ● Presentations of results ● Writing of final reports ● Publication of scientific papers
New Research-for-Development Activities ● Design research protocols and tools ● Initiate IRB and IACUC approval processes ● Pre-test questionnaires ● Conduct literature reviews ● Hire and train community collaborators, enumerators, laboratory, and field staff ● Organize inception workshops ● Identify and recruit fishers, farmers, and hatcheries to participate in research-for-development activities ● Initiate sampling
Management Entity Activities
● Support research-for-development activities in the development of methods and technologies as well as implementing cross-cutting themes ● Conduct monthly and quarterly PI and ME partner meetings and platform learning sessions ● Conduct annual PI meeting ● Conduct virtual learning, MEL, communications, and finance/administration trainings for new grantees. ● Facilitate and manage the virtual workspaces for internal communication and teambuilding ● Develop and distribute quarterly newsletter ● Communicate lessons learned from the Quick Start activities via print and/or digital media ● Track and contribute to USAID-led learning and sharing opportunities as requested ● Support human and institutional capacity building activities for subawardees ● Monitor research-project MEL activities, including collecting quarterly research activity results (narrative reporting inputs and indicator results)

Appendix 1. Semi-Annual Progress Summary Table

Objectives, Activities, and Subactivities	Country and Location(s) of Activity	Activity lead	FY 2020 Progress (October 1, 2019 to March 31, 2020)
Activity 1.1: Analysis of the aquaculture post-harvest chain in Nigeria			
1.1.1: Identify technologies and practices that provide income growth and improve diets, including post-harvest loss reduction	Nigeria (ten states in Zones of Influence)	Nukpezah US PI (MSU), Steensma US Co-PI (WUSTL), Nhuong HC PI (WF)	The activity completed data collection in the previous reporting period. In the current reporting period, the team focused on data cleaning and analyzing data, which includes a field survey and focus group discussions.
1.1.2: Identify and map the aquaculture market systems that improve productivity and reduce post-harvest losses of aquaculture fish			The Quick Start activity team met in Malaysia for data analysis in February 2020 followed by several virtual meetings. A stakeholder validation workshop was planned for May 2020 in Nigeria, but it had to be cancelled because of the COVID-19 pandemic.
1.1.3: Identify gaps in the aquaculture post-harvest sector in Nigeria			Initial activity findings have been summarized in a blog for the Chicago Council for Global Affairs, which was also published on Agrilinks in April.
Activity 1.2: Replacing fishmeal with single cell proteins (SCP) in tilapia *Oreochromis niloticus* diets in Zambia			
1.2.1: 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	Zambia (Lusaka Province)	Gatlin US PI (TAMU), Baumgartner US Co-PI (UI), Yossa HC PI (WF), Basiita HC Co-PI (WF), Sakala HC Co-PI (NRDC), Greiling HC Co-PI (Aller Aqua Zambia)	The research protocol and the feed formulations have been completed. The fish facility at the NRDC in Lusaka has been upgraded through the design and building of a flow-through aquaculture system composed of 30 aquaria, a steel structure with three shelves, one 2000-L tank, one 1000-L tank, one air blower, one water pump, and plumbing. The fishmeal was supplied by Aller Aqua Zambia, and SCP was provided by Meridian Biotech. The seven experimental feeds were produced at TAMU early in 2020 and shipped to Zambia.

1.2.2: Estimate the optimum level of substituting fishmeal with single cell proteins in tilapia diets			All the research partners are working actively toward the activity milestones in a timely manner. The experiment is ongoing at NRDC, and data is collected daily by the HC Co-PI, Masautso Sakala, and two NRDC interns hired to support the activity while developing their aquaculture and research capacities.
1.2.3: Determine which of the two SCPs tested is more appropriate for tilapia nutrition			The experiment effectively started on Wednesday, March 18, 2020, in the newly constructed fish facility at NRDC (Lusaka, Zambia). Eleven fish were stocked in each aquarium, with an average body weight of 11 g per fish.
Activity 1.3: Genome sequencing and development of SNP markers from Rohu in Bangladesh			
1.3.1: Establish collaborations and conduct stakeholder surveys	Bangladesh (16 districts of south-central/east)	Karsi US PI (MSU), Peterson US Co-PI (MSU), Alam HC PI (BAU), Khan HC Co-PI (BAU)	Survey data were collected from 184 rohu farmers. This was the first ever survey work involving rohu, the most important native aquaculture species in Bangladesh. Survey results revealed the importance and contribution of rohu in fish production, nutrition, and youth involvement. The survey results were shared with the relevant stakeholders in a workshop organized at BAU on December 26, 2019.
1.3.2: Conduct sequencing of the rohu (*Labeo rohita*) genome			Most of the genome-sequencing work has been completed. The DNA was sequenced using Illumina and Oxford Nanopore Technologies (ONT) platforms. Contigs were assembled using the ONT reads, and the Illumina data was used to correct errors in the ONT contigs. The assembly suggests that the rohu genome is about 945.5 Mb in length, a value less than half the reported size of the rohu genome (1950 Mb). To explore this discrepancy, the team performed flow cytometric determinations of rohu genome size. The flow cytometry estimate of the rohu genome is 968 Mb (average for five male rohu). The current assembly of the rohu is composed of 4,832 contigs. After completion of Hi-C chromatin configuration sequencing, the genome will be annotated.

1.3.3: Identify genome-wide single nucleotide polymorphisms (SNP)			Hi-C chromatin configuration sequencing is being conducted to further assemble the contigs into scaffolds. The ddRAD sequencing procedure has been optimized for SNP development, and sequencing libraries have been prepared.
Activity 3.1: Improved nutrition security in Kenya through increased access to and consumption of coastal marine fish (SecureFish)			
3.1.1: Identify nutritious coastal marine fish for food that maintain ecosystem functioning	Kenya (Kwale, Mombasa, and Kilifi counties)	Iannotti US PI (WUSTL), Humphries US Co-PI (URI), Mosby US Co-PI (MSU), Wamukota HC PI (PU), Kamau-Mbuthia HC Co-PI (EU)	Initial study findings indicate that fish is not widely consumed by young children in the four study sites. This is particularly true among fishing households. Community-level discussions reveal this pattern may be due to the importance of selling fish as a livelihood strategy for fishing households, cost of purchasing fish in the market, and attitudes and beliefs about fish as an appropriate food for young children. During community-level dissemination activities, the team shared information about the connections between fisheries management and human nutrition with fishers, caregivers, and county-level fisheries and nutrition officers.
3.1.2: Assess the acceptability and feasibility of these fish as foods for nourishing vulnerable populations of pregnant women, lactating women, and young children			Qualitative and quantitative data collection has been completed. Quantitative data was collected from 100 fishing households and 100 nonfishing households. Twenty-one in-depth interviews were conducted; participants included caregivers and community health workers.
3.1.3: Determine market conditions for ensuring availability, affordability, and safety of these coastal marine fish as food			Data analysis and peer-reviewed publication development is underway, focusing on fisheries catch and value-chain dynamics.
Activity 3.2: Assessing facilitators and barriers to fish consumption in Zambia (Fish4Zambia)			
3.2.1: Assess the current state of wild-caught small pelagic fish (e.g., kapenta and chisense) capture, processing, and trading activities	Zambia (Eastern & Central Provinces)	Ragsdale US PI (MSU), Read-Wahidi US Co-PI (MSU), Torell US	This objective was addressed via key informant interviews, focus group discussions, and the WEFI. The results are summarized in qualitative research publications (in preparation).

from point of catch to processing to moving to local and distant markets for sale in both rural and urban areas		Co-PI (URI), Cole HC PI (WF), Marinda HC Co-PI (UNZA)	
3.2.2: Identify the social and gender barriers to entry and/or participation in these value chain activities for the different actors (particularly for women and youth)			This objective is addressed through the qualitative research, which has been summarized in a draft manuscript that will be submitted for peer-reviewed publication in 2020.
3.2.3: Assess how small pelagic fish are accessed by different consumer groups and consumed within households, especially in households in rural (also urban) areas distant from their source of production			The WEFI survey and subsequent quantitative data analysis assesses how small pelagic fish are accessed by different groups.
3.2.4: Explore the potential of upgrading the small pelagic fish value chain via improving processing, storage, and trading methods to reduce post-harvest losses and improve food safety			Recommendations for upgrading the small pelagic fish value chain will be addressed in the qualitative research reports, which will be submitted for peer-reviewed publication in 2020.
3.2.5: Explore the use of small dried pelagic 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			Research findings related to this objective are presented in a draft manuscript that will be submitted for peer-reviewed publication in 2020.
Activity 4.1: Launch the competitively selected Fish Innovation Lab research-for-development activities and support the completion of the five Quick Start activities			
4.1.1: Finalize and launch competitively selected research activities (finalize subawards, develop Year 1 work plans, and develop data management plans	MSU, URI, WUSTL, Texas State University (TSU), Research	ME and ME partners	Activity completed. Competitive award process is completed, and 13 activities were selected for final award.

and monitoring and evaluation plans)	Triangle Institute (RTI)		
4.1.2: Support the five Quick Start activities by identifying methods, results, and technologies that can be disseminated and scaled; support the development of success stories and other materials, including the final report	MSU, URI, RTI, TSU	ME and ME partners	The team developed procedures for final Quick Start reporting and disseminated information to PIs. Success stories from Quick Start activities are being collected.
4.1.3: Develop action plan for how to work through regional coordinators to finalize Quick Start activities and manage and support the competitively awarded research-for-development activities	MSU, URI	ME and ME partners	Scopes of work were developed for in-country coordinators, and support for Quick Start and competitively awarded activities is ongoing.
4.1.4: Conduct field visits to research-for-development activities	MSU, URI, RTI	ME and ME partners	A Kenya field visit was completed in November 2019. A visit to Zambia Quick Start activities was conducted in the previous reporting period. A planned visit to Nigeria in May 2020 was canceled due to COVID-19. During the COVID-19 pandemic, Quick Start activities have been supported remotely.
4.1.5: Support research-for-development activities in implementing cross-cutting themes	MSU, URI, RTI	ME and ME partners	The cross-cutting theme leads reviewed the 13 competitively selected activities to ensure that they sufficiently address gender, nutrition, resilience, and capacity building. The gender theme lead developed a Gender Responsive Agricultural Development Assessment for the Fish Innovation Lab (GRADA-FIL).
4.1.6: Conduct monthly PI and ME partner meetings	MSU, URI, RTI	ME and ME partners	Meetings are being conducted as planned.
Activity 4.2: Implement cross-activity learning and communicate the results of Fish Innovation Lab research-for-development programs			
4.2.1: Conduct quarterly virtual Platform Meeting-learning sessions	Virtual	ME and ME partners	A virtual platform meeting was organized in the last quarter of 2019. In the first quarter of 2020, the virtual platform meeting was replaced with orientations for the PIs of new activities.

4.2.2: Conduct annual PI meeting to harvest and share lessons learned	MSU, URI, WUSTL, TSU	ME and ME partners	The annual meeting was postponed to August 2020. Due to COVID-19 restrictions, the meeting will have to be conducted virtually or postponed.
4.2.3: Conduct in-country platform meeting in one target country	MSU, URI, RTI, country coordinators	ME and ME partners	The platform meeting was replaced by start-up meetings in Bangladesh and Nigeria. However, both start-up meetings are canceled due to COVID-19-related travel restrictions. Virtual learning modules for communications, MEL, and financial administration are being developed to replace meetings in Bangladesh and Nigeria.
4.2.4: Identify successful methodologies, technologies, and extension strategies implemented by current Fish Innovation Lab grantees and pinpoint bottlenecks that limit scale-up of aquaculture and fisheries	MSU, URI, WUSTL, TSU	ME and ME partners	Information on successful methods and technologies are being collected from Quick Start reporting.
Activity 4.3: Identification of collaborative teams of experts to conduct needed research to fill critical knowledge gaps through commissioned research activities			
4.3.1: Establish research priorities for commissioned research by taking into account gaps identified after selection of the competitively awarded grants	MSU, URI, WUSTL, TSU, RTI	ME and ME partners	This work is ongoing.
4.3.2: Assembly of direct commissioned activity teams and formation of research objectives	MSU, URI, WUSTL, TSU	ME and ME partners	Direct commissioned activities will be organized in 2020.
Activity 4.4: Implement knowledge management plan			
4.4.1: Orient new stakeholders and subawardees to the communications strategy and expectations, branding requirements, and ethical standards for photography and videography	MSU, RTI	Dechert (MSU), Lawrence (MSU)	The ME team organized a 2.5-hour introductory session to newly awarded activity PIs in April 2020. The session provided a communications overview. A more in-depth virtual orientation will follow in 2020.

4.4.2: Facilitate and manage virtual workspaces for internal communication and teambuilding	MSU	Dechert (MSU), Springer (RTI), Lawrence (MSU)	The team is utilizing several platforms, including Google Drive and Piestar, for internal communications and teambuilding.
4.4.3: Develop and implement measurable goals for digital communications to drive awareness of the Fish Innovation Lab brand and resources and drive organization of content on platforms	MSU, RTI	Allen (MSU), Dechert (MSU), Lawrence (MSU)	The ME technical specialist, Peter Allen, is working with the MSU Research and Curriculum Unit to adapt aquaculture materials into digital learning modules.
4.4.4: Develop and implement communications strategy for platform meetings	MSU, RTI, URI	ME and ME partners	Communications strategy will be developed in concert with planning for platform meetings, which will be implemented in year 3 of the Fish Innovation Lab.
4.4.5: Develop and launch videos for all Quick Start activities	MSU, RTI, URI	Dechert (MSU), Lawrence (MSU), Quick Start PIs	Videos for four Quick Starts have been produced and launched. The video for the fifth activity is on hold due to COVID-19 restrictions and will be resumed when in-person meetings and interviews can be conducted.
4.4.6: Develop and launch a video for the Fish Innovation Lab overall	MSU	ME and ME partners	This video is on hold due to COVID-19 restrictions and will be resumed when in-person meetings and interviews can be conducted.
4.4.7: Develop and distribute quarterly newsletter	MSU, RTI, URI	Dechert (MSU), Lawrence (MSU)	Quarterly newsletter is being produced and disseminated.
4.4.8: Communicate lessons learned from the Quick Start activities via print and/or digital media	MSU, RTI, URI, WUSTL, TSU	Dechert (MSU), Lawrence (MSU), Quick Start PIs	Quick Starts have been highlighted in blog posts, Agrilinks articles, videos, and on social media.
4.4.9: Develop and launch materials such as fact sheets, technical briefs, and success stories showcasing methods, technologies, and progress made by activities and/or clusters of activities implemented in the same regions	MSU, RTI, URI, WUSTL, TSU	Dechert (MSU), Allen (MSU), Lawrence (MSU), Quick Start PIs	Success stories have been produced. Technical briefs and other materials are in development.

4.4.10: Amplify key milestones via press releases, events, social media, website, and other channels	MSU, RTI, URI	Dechert (MSU), Lawrence (MSU)	Key milestones have been shared across Fish Innovation Lab platforms, including the website, social media, and others, and through press releases and other external communications.
4.4.11: Attend and showcase the Fish Innovation Lab at a minimum of two major conferences	MSU, RTI, URI	Dechert (MSU), Hill (MSU), Allen (MSU), Lawrence (MSU)	The Fish Innovation Lab attended and was showcased at the World Food Prize Bourlaug Dialogue in October 2019. Due to COVID-19 travel restrictions, the lab will be unable to attend or showcase at a second conference this year.
4.4.12: Track and contribute to USAID-led learning and sharing opportunities as requested	MSU, RTI, URI	Springer (RTI), Dechert (MSU), Hill (MSU)	A dataverse for the Fish Innovation Lab was established on Harvard Dataverse for sharing subaward data sets.
4.4.13: Support human and institutional development activities to subawardees (including Nigeria HICD case study)	MSU, URI, RTI	Torell (URI), Springer (RTI), Dechert (MSU)	The MEL specialist wrote and published a blog post for the Fish Innovation Lab's about the HICD toolkit and validation workshop in Ibadan in September 2019.
Activity 4.5: Monitoring, evaluating, and learning from research findings, determining factors that limit adoption of new knowledge/technologies, and scaling			
4.5.1: New subawardee MEL training	URI, RTI	Torell (URI), Springer (RTI)	An initial MEL orientation was part of the virtual new-grantee meeting in April 2020. A more in-depth virtual training is being organized for presentation to awardees in 2020.
4.5.2: Learning Agenda workshop	MSU, URI, RTI	Lawrence (MSU), Torell (URI), Springer (RTI),	The learning agenda workshop will take place in conjunction with the annual PI meeting.
4.5.3: Targeted M&E baseline assessments	MSU, URI, RTI, WUSTL	Lawrence (MSU), Torell (URI), Springer (RTI),	Baselines will be completed when the new activities have started.

4.5.4: Monitor FIL research project MEL activities (ongoing - some in-country work)	MSU, URI, WUSTL, TSU, RTI	Lawrence (MSU), Torell (URI), Springer (RTI),	The MEL specialist has worked with PIs on indicator reporting and data-quality assurance. The ME requested and received approval for a new core indicator to replace one that is no longer relevant to subaward activities.
4.5.5: Collect quarterly research activity results (narrative reporting inputs and indicator results)	MSU, URI, WUSTL, TSU, RTI	ME and ME partners	The ME team has developed a Piestar template for final activity reporting and a second template for transferring data sets in compliance with USAID's Open Data Policy. These templates will be used by the Quick Starts as they conclude their activities.
4.5.6: Submit MEL inputs for reporting	MSU, RTI, URI	Springer (RTI), Lawrence (MSU), Torell (URI)	Inputs were submitted as needed, including the Feed the Future Monitoring System.
4.5.7: Prepare semi-annual and annual reports and Year 3 work plan	MSU, URI, RTI	Lawrence (MSU), Torell (URI), Hill (MSU), Dechert (MSU), Springer (RTI), Activity PIs	Year 1 annual report was submitted on time and approved by the USAID AOR. Year 2 semi-annual report is on track for on time submission. Year 3 work plan deadlines for data collection have been established and communicated with ME partners and activity PIs.

Appendix 2. FY20 Q1&2 Quick Start Indicator Results Table

In Quarters 1 and 2 of FY20, Quick Start activities resulted in an increase in results for two indicators.

- **EG.3-2: Number of individuals participating in USG food security programs.** The SecureFish team conducted dissemination workshops to share research findings with caregivers, fishermen, and community health workers in four communities in Kenya. The team also held two workshops with government nutrition and fisheries officers. The Genome Sequencing team conducted a multi-stakeholder workshop with 70 representatives from academic and research institutions, development organizations, and government officials to discuss activity findings.
- **EG.3.2-24: Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance.** Quick Start teams engaged 33 new researchers and research assistants, scientists, and industry technicians in the development and application of improved management practices and technologies.

INDICATOR	FY19 ACTUAL	FY20 Q1&2 ACTUAL	QUICK START TOTAL
EG.3-2: Number of individuals participating in USG food security programs	250 individuals	165 individuals	**415 individuals**
	222 females	62 females	**284 females**
	132 youth	33 youth	**165 youth**
EG.3.2-7: Number of technologies, practices, and approaches under various phases of research, development, and uptake as a result of USG assistance	3 technologies/ practices/approaches	3 technologies/ practices/approaches	**3 technologies/ practices/approaches**
EG.3.2-24: Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance	23 individuals	10 individuals	**33 individuals**
	10 females	7 females	**17 females**
	11 youth	6 youth	**17 youth**