



# FEED THE FUTURE

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



## **Feed the Future Bangladesh Aquaculture and Nutrition Activity**

*Annual Progress Report: October 1, 2022 to September 30, 2023*

## Contents

1. Executive Summary .....	1
2. Introduction.....	8
3. Activity goal and objectives.....	8
4. Activity targets.....	8
5. Approach.....	8
6. Geographical focus .....	9
7. Year 6 (October 2022–September 2023): progress against the approved workplan.....	10
IR-1: Increased aquaculture productivity.....	10
Sub-IR 1.1: Increased availability of improved fish seed .....	10
Sub-IR 1.2: Increased availability of affordable quality feed .....	14
Sub-IR 1.3: Increased adoption of improved pond management practices.....	16
IR 2: Strengthened aquaculture value chains .....	20
Sub-IR 2.1: Increased market linkages .....	20
Sub-IR 2.2: Increased engagement of private sector in aquaculture markets .....	21
Sub-IR 2.3: Improved enabling environment for inclusive growth in aquaculture.....	23
IR 3: Improved nutrition related behavior in rural households .....	24
Sub-IR 3.1: Improved nutrition awareness and practices .....	24
Sub-IR 3.2: Improved access to diverse and nutritious food .....	26
8. Project management and cross-cutting.....	27
8.1. Activity management .....	27
8.2. Finance & grants .....	28
8.3. Monitoring, evaluation and learning (MEL).....	33
8.4. Capacity building .....	38
8.5. Gender and youth.....	39
8.6. Environment and Climate Change .....	41
8.7. Knowledge management and communications.....	43
9. ANNEX.....	45

## Acronyms

A2F	Access to finance
AIN	Aquaculture for Income and Nutrition Animal Source Foods
AMP	aqua-medicinal products
ASF	Animal Source Food
AOR	Agreement Officer's Representative
BFRI	Bangladesh Fish Research Institute
BNNC	Bangladesh National Nutrition Council
BSFF	Bangladesh Shrimp and Fish Foundation
CFC	community feed center
CLA	Collaborating, Learning, and Adapting
CoP	Chief of Party
CRM	climate risk management
DCoP	Deputy Chief of Party
DoF	Department of Fisheries
DU	Dhaka University
EMMP	Environmental Mitigation and Monitoring Plan
FtF	Feed the Future
GAP	good agriculture practices
GAqP	good aquaculture practices
GIP	Genetic improvement program
GIS	Geographical Information System
GoB	Government of Bangladesh
ICT	Information and Communications Technology
iDE	International Development Enterprises
IEC	Information, Education and Communication
IEE	Initial Environmental Examination
IPHN	Institute of Public Health Nutrition
INFS	Institute of Nutrition and Food Science
IP	implementing partner
IPRS	in-pond raceway system
INGO	International Non-Governmental Organization
KPI	key performance indicator
LEAF	local extension agents for fisheries
LSP	local service provider
MoHFW	Ministry of Health and Family Welfare
MEL	Monitoring, Evaluation and Learning
MIS	Management Information System
MMC	Market Management Committee
NGF	Nowabenki Gonomukhi Foundation
NGO	non-governmental organization
PI	performance indicator
RTC/RTE	ready to cook/ready to eat
SBCC	Social and Behavior Change Communication
SIS	Small indigenous species
SoP	Standard Operating Procedure
ToR	Terms of Reference
USAID	United States Agency for International Development
ZOI	Zone of Influence
ZOR	Zone of Resilience

## List of Tables

Table 1. Feed the Future Bangladesh Aquaculture and Nutrition Activity indicators: results. ....	6
Table 2. Aquaculture Activity working districts.....	9
Table 3. Aquaculture Activity budget throughout its duration (Years 1–6). ....	29
Table 4. Quarterly forecasts: Year 6 and NCE period. ....	29
Table 5. Partnerships signed in Year 6. ....	31
Table 6. Summary of trainings held in Year 6. ....	32
Table 7. MEL training sessions for data enumerators conducted during the reporting period. ....	37

## List of Figures

Figure 1: Progress of the Aquaculture Activity key performance indicators.....	6
Figure 2. Aquaculture Activity working area. ....	9
Figure 3: Award and expense balance as of Year 6.....	30
Figure 4: Activity MEL MIS .....	34

## List of Annexes

Annex 1: List of Aquaculture Activity IPs (attached) .....	45
Annex 2: Feasibility study to establish sea bass (attached) .....	45
Annex 3: Value chain assessment of mud crab in Bangladesh (attached) .....	45
Annex 4: Report on crablet nursing demonstration (attached) .....	45
Annex 5: Report on mud crab growth and survivability comparison trial (attached).....	45
Annex 6: OneFish App: digital applications to strengthen linkages among aquaculture market actors (attached).....	45
Annex 7: Forum to accelerate financial inclusion for aquaculture market actors (attached).....	45
Annex 8: Post-award orientation program for sub-grantees (attached) .....	45
Annex 9: Bangladesh aquaculture activity indicators (attached).....	45
Annex 10: Aquaculture activity participants GIS information (attached) .....	45
Annex 11: Aquaculture Activity celebrates IWD 2023 (attached) .....	45
Annex 12: Report of refresher training on gender inclusion for partner staff (attached).....	45
Annex 13: Capacity building on environmental compliance and CRM (attached) .....	45
Annex 14: Bangladesh’s aquaculture renaissance (attached) .....	45
Annex 15: Social media coverage of the Aquaculture Activity (attached).....	45
Annex 16: Media coverage (attached) .....	45
Annex 17: Photos (attached).....	45

## 1. Executive Summary

The Feed the Future Bangladesh Aquaculture and Nutrition Activity, also known as the Aquaculture Activity, initially received a funding allocation of USD 24.5 million for a duration of five years, commencing on February 6, 2018. However, in accordance with the proposal submitted by WorldFish on October 27, 2022, the Activity was extended on January 10, 2023, without additional funding, until the end of November 2023. The Aquaculture Activity aims to improve the livelihoods of at least 412,907 beneficiaries, including smallholder fish farmers and other actors in the aquaculture value chain. The interventions emphasized cross-fertilizing knowledge, and sharing expertise to develop the skills of the actors in the sectors, facilitating sustainable growth in the market. The Activity is being implemented by engaging partners from both private and public sectors located in 21 south-western districts and two south-eastern districts of Bangladesh, known as the USAID Feed the Future Zone of Influence (ZOI) and Zone of Resilience (ZOR), respectively.

The key outputs during the reporting period, delivered in partnership with 17 partners and collaborative public sector organizations, include:

- The Activity reached 414,852 people including 14.16% women and 12.70% youth, up to the end of Year 6.
- The Activity created access to 5,358 t of fish feed through newly established service points.
- 9,876 kg carp hatchlings and 186 million tilapia fries were produced, worth USD 2.02 million and sold to farmers.
- Farmers applied improved management practices in a total area of 123,804 ha, and produced 3,322 kg/ha carp and 6,935 kg/ha tilapia.
- Aquaculture farmers and processors received around USD 1.95 million in loans from banks and NGOs. These have promoted agency and micro retailer agent banking through tailoring small and delayed repayment schedules which match the seasonality of farmer/processor income.
- In partnership with ARITS, WorldFish developed and launched the “OneFish” app to improve access to aquaculture technology, feed calculator and aqua business linkage. These have strengthened the aquaculture market value chain and advanced aquaculture technology. A total of 19,267 farmers (12,650 men, 6,617 women) participated in training, equipping them to effectively utilize the Application.
- The Activity has supported the development of recipes for ready-to-eat (RTE) and ready-to-cook (RTC) cultured fish products and their market promotion. White fish in form of RTE and RTC items worth USD 291,160 was processed and sold.
- The Activity partner has had significant success in promoting the production and marketing of natural pituitary gland (PG)<sup>1</sup>, resulting in sales of 967 gm of dry PG worth USD 40,968.
- The Activity’s farmers earned USD 607 million from their fish sales.

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<sup>1</sup> Pituitary glands are used to induce the fish for spawn. The hormone secreted by the pituitary gland stimulates growth, development, maturity and ovulation of eggs.

## Summary of Year 6 highlights

Key activities performed	Remarks
Established and continued partnership with 17 partners	A total of USD 1,375,861 has been invested, with Aquaculture Activity contributing 34% of the total in the form of cost-sharing grants.
Key market system activities	<p>The Aquaculture Activity Team made field visits to ongoing interventions as regular practice, met partners to review progress, and extended support to bring systemic change in the market, covering diverse areas of intervention. The interventions are grouped into five thematic areas: improving access to (1) finance, (2) quality inputs, in particular feed, (3) information through digital platforms, (4) increasing access to forward markets, with special emphasis on the international market, and (5) establishing a one-stop service center.</p>
Access to finance for women producers	Bank Asia and micro-credit partners Shushilan, KMSS, Prottyashi disbursed a total of USD 1,346,128 to 3,951 women fish farmers.
COVID-19	There was limited impact of COVID-19 during the reporting quarter; however, the Activity team has adopted appropriate mitigation measures to address the anticipated potential risks with new virus BF-7.
Meeting with health professionals	<p>Government health professionals have a crucial role in educating the community in essential nutrition actions and essential hygiene actions. However, the dissemination of information regarding the benefits to health of fish consumption is often inadequate and, in some cases, missing. In the reporting period, the Activity organized 15 coordination meetings with more than 450 healthcare professionals in seven ZOI districts. Additionally, the Activity implementing partners sensitized more than 100 community clinic staff on nutrition and the health benefits of fish for children, and pregnant and lactating women; they also installed 100 signboards with essential nutrition messages for these clinics.</p>
Progress review, exit strategy and synergistic workshop	<p>The progress of the Aquaculture Activity made so far was discussed in regular meetings in both the Feed the Future ZOI and ZOR. Valuable insights were gathered, learnings were documented, and substantial evidence of systemic changes was generated, and served as a basis for formulating future plans for the Activity. One significant event during this period was a dedicated workshop held from June 5 to June 6, 2023. In this workshop, the progress made by the Activity, its exit strategy, and potential synergistic partnerships were thoroughly examined and analyzed.</p> <p>During the 10-month extension phase, the Aquaculture Activity has been focusing on scaling-up proven business models and technologies. Additionally, it has been providing support to its private sector partners based on the valuable lessons learned and BMP acquired throughout its implementation. The main goal during this extended phase is to achieve the Activity's objectives by implementing effective strategies. The aim is to transform the aquaculture market systems into an inclusive environment where benefits are equally distributed among smallholder aquaculture farmers and other associated market actors. By doing so, it is expected that the interventions in the sixth year will have a profound impact on the entire aquaculture industry, fostering sustainable growth and broadening its positive effects on all stakeholders involved.</p>
National workshop to launch G3	Funded by USAID under the Feed the Future Bangladesh Aquaculture and Nutrition Activity and coordinated by WorldFish, a workshop, “WorldFish Carp Genetic Improvement Program”, was organized at Bangabandhu

Key activities performed	Remarks
	<p>International Conference Center, Dhaka on May 9, 2023. It brought together over 200 international and national participants from WorldFish, Department of Fisheries (DoF), the Bangladesh Fisheries Research Institute (BFRI), the United States Agency for International Development (USAID), the Feed the Future Innovation Lab for Fish, non-governmental organizations (NGOs), carp hatchery associations, universities, fish hatchery owners and farmers. In the workshop, the Director General of Bangladesh Fisheries, K.H. Mahbubul Haque and Dr. Essam Mohammed, Director General, WorldFish were present as chief guest and special guest, respectively. K. H. Mahbubul Haque officially received the rapidly growing WorldFish Generation Three (G3) Rohu on behalf of the Department of Fisheries (DoF). Mr. Haque thanked the team of researchers responsible for developing the genetically improved generation of fish and making it available for dissemination to both the public and private sectors.</p>
Fisheries policy review	<p>WorldFish has been supporting DoF in the National Fisheries Policy 1998 revision process. As part of this, four policy dialogues were conducted, with support from WorldFish Activities, including BAA, Artemia4BD, SUCHONA and ECOFISH. Next, the Activity will share a policy brief with DoF, and findings of the dialogues in a half-day discussion meeting, to finalize the policy propositions. The meeting will be attended by Chief of Party (BAA), Regional Director (WorldFish) and policy revision lead from WorldFish, and a small WorldFish working group. After finalization, the Activity will approach DoF with its contributions.</p>
Establishment of One Stop Service Centres	<p>A total of 94 one-stop service centers (OSCCs) were established through partnerships with Aftab Feed Ltd., Petrochem Ltd. and Padma Feed, with the aim of extending support to fish farmers, hatchery and nursery operators. These OSCCs have created access to essential information and services and aqua inputs, improved farmers' knowledge on quality inputs and their judicious usage, and strengthened market linkages, thereby contributing to fish farmers increasing their productivity and income.</p>
Interventions around crab, shrimp and prawn	<p>There has been a notable surge in interest in sea bass (<i>Lates calcarifer</i>) aquaculture, particularly for induced breeding and polyculture with tilapia in ponds, as well as cage culture in the coastal waters of Cox's Bazar. To support this growth, the Aquaculture Activity is actively involved in various aspects of sea bass farming.</p> <p>Artemia, being a valuable live feed for early-life stages of shrimp, plays a critical role in hatchery nutrition. To promote Artemia and facilitate market linkages, the Activity arranged linkage workshops, capacity-building initiatives and business promotion events with interested buyers (hatcheries) in the Feed the Future ZOI.</p> <p>Regarding mud crab (<i>Scylla serrata</i>) aquaculture, there is a heavy reliance on crab seeds collected from the wild stock, especially from the Sundarbans and coastal mangroves. This excessive dependence is causing concern due to the declining natural stock size. To address this issue and conserve biodiversity, the Activity has partnered with NGF, an NGO, to increase crablet production. Through this collaboration, 0.172 million crablets have been produced and disseminated to 38 crab farmers in Sathkhira District.</p> <p>Furthermore, the Activity, in collaboration with private sector partners, has initiated efforts to enhance the productivity and business performance of shrimp farmers. It is also facilitating the certification process, which requires farmers adopting good agricultural practices (GAqP) and Hazard Analysis Critical Control Point (HACCP) principles, to improve their ability to meet</p>



Key activities performed	Remarks
	the demands of the export market. These measures aim to enhance the overall sustainability and competitiveness of the shrimp farming sector.

As most of Aquaculture Activity's work involves supporting more effective commercial interaction between the private sector and aquaculture farmers, it is likely that this might have been (and will be) impacted by the continued challenges related to ongoing war in Ukraine, including higher commodity prices. The Activity will therefore continue to engage closely with its partners to understand any need to refocus activities in response to such pressures. For example, it may be pertinent to review training materials for farmers to support the use of less expensive locally produced feed rather than continuing to drive adoption of commercial products, which appear to be becoming unaffordable in a market where consumer demand for fish will also be impacted by the same factors of price inflation. The Aquaculture Activity is continuing to leverage its knowledge of the aquaculture value chain in order to respond where necessary to the effects of this conflict on Activity participants' livelihoods.

### Partnerships

In Year 6, Aquaculture Activity continued partnerships with 17 partners, with a total value of USD 1,375,861, where the Activity contributed USD 904,469 (66%) and partners' contribution was USD 471,392 (34%) (Annex 1). A brief description of the partnerships are as follows:

### Key interventions and highlights

- **Aftab Feed** promoted local service provider (LSP)-driven feed business, and a call center service built around an App-based advisory services for smallholder farmers.
- **Padma Feed** facilitated access to improved fish feed from reliable sources and availability of low-cost feed in the community, to increase knowledge of BMP and availability of water and soil quality testing facilities.
- **Petrochem Bangladesh Limited** created a market-driven, women-inclusive distribution model to create access for rural farmers with aqua products.
- **FishTech Hatchery Limited** established two natural PG processing plants to collect, process, and market quality PG locally.
- **Afil Aqua** introduced in-pond raceway system (IPRS) technology, as a first mover in southern Bangladesh.
- **Ms. Shah Amanath Traders** promoted processing, preservation and marketing safe fresh and dry fish products, capacitating dry fish processors and workers in safe dry fish production technology and storage systems, and produced various safe dry fish products which increased sales volume by 96%.
- **GRAUS** promoted small-scale aquaculture including high valued small indigenous species (SIS) of fish in Bandarban, developing aquaculture market actors and establishing linkages among them.
- **Tahzingdong** strengthened nutrition-sensitive aquaculture in Naikhongchari, Lama and Alikadam *upazilas* in Bandarban district, building the capacity of the pond and creek owners, and developing fish nursery operators to supply quality fingerlings for these owners on time and at reasonable prices.
- **Rehabilitation Employment and Development for the Youth (READY)** is improving access to Generation 3 (G-3) rohu seed, adopting a comprehensive marketing and communication strategy through a supply chain development project. This initiative facilitates the promotion of G-3 rohu through the identification of market actors, organization of business networking events, and the development of a strong supply chain with fish actors in six districts (Jashore, Narail, Khulna, Satkhira, Bagerhat, Gopalganj), thereby boosting farmers' cultivation of G-3 rohu.
- **Bank Asia** improved access to formal financial products and services for aquaculture stakeholders.



- **Shushilan** improved access to finance, combined with nutrition-sensitive messaging for rural families.
- **Khulna Mukti Seba Sangstha (KMSS)** established local aquaculture business centers as one-stop service centers (OSSCs) for aquaculture, to provide necessary information on aquaculture technology, products and services, especially on the sources of finance.
- **Protyashi** promoted the small-scale aquaculture of fish and shrimp farming by improving access to seed and feed, creating support of LSPs, and capacitating farmers and other market actors in improved small-scale aquaculture in Cox’s Bazar.
- **Bangladesh Shrimp and Fish Foundation (BSFF)**. BSFF organized farmer clusters for shrimp farming, developed the capacity of shrimp farmers on BMP, improved post-harvest management, support farmers’ access to better quality inputs including post-larvae, feed and aqua medicinal products (AMPs) through promotion and marketing, introduce and pilot digital traceability in the shrimp value chain, facilitate market linkages with buyers and exporters. The company is also piloting modern feed-based seabass culture technology to capture the production and economic performance of seabass farming, feasibility study to establish a seabass hatchery in Bangladesh, which will open a window for supplementary feed-based seabass farming.
- **COAST Foundation** is promoting high valued SIS in the Barishal region. It will provide extension support to farmers on small indigenous fish culture, and vegetable cultivation on pond dikes and homestead for ensuring family nutrition as well as additional income generation.
- **Nowabenki Gonomukhi Foundation (NGF)** is working to increase production of crablet through improving their hatchery management techniques under the contract signed with the Aquaculture Activity. with the help of. This initiative will also help conserving wild crab stock by increasing dependency on hatchery produced crablet.
- **Brothers Seafood** is a trading organization which has been exporting whole fish to more than 12 countries. Considering issues of sustainability and market development, Brother Seafood will (1) introduce BMP into aquaculture systems on farms, to be sourced for traceable fish marketing, (2) develop contact fish farming to supply fish to the company, (3) develop a healthy cool chain system in fish transportation, and (4) develop and organize “Fish Market Promotion Hubs” in aquaculture and fish-producing potential areas.
- **ARITS:** In partnership with ARITS, WorldFish developed and launched the “OneFish” app to improve access to aquaculture technology, feed calculator and aqua business linkage to strengthen aquaculture market value chain and advance aquaculture technology.

### **Monitoring, Evaluation and Learning**

During the reporting period, the Activity’s Monitoring, Learning and Evaluation (MEL) team rolled out annual performance monitoring surveys as an ongoing process, and systematically tracked and monitored the progress of implementing partners (IPs) against the Activity’s targets. These enabled decision-makers and implementers to determine whether an activity was progressing towards its intended goal within the stipulated timeframe or whether the program needed to intervene. The MEL applied system for updating data values as part of the performance data table. The web-based info hub was upgraded for improved data access, GIS navigation and visualization. The team also conducted an Internal Data Quality Assessment (iDQA) and those measures that emerged needing improvement were implemented as a routine activity. *Error! Reference source not found.* The IPs’ MEL deliverables were checked and tracked regularly using the KPI matrix. The MEL team also maintained an MIS-based solution to keep a record of IPs’ monthly progress reports.

### **Key results**

During the reporting period, Activity reached 414,852 people, including 14.16 percent women and 12.70 percent youth. The Activity partnered four financial institutions, as a result of which 3,951 farmers (3,372 women, 1,406 youth) secured a total of USD 1,346,128 in the form of loans, which they used to buy aquaculture inputs. The Activity leveraged USD 1,434,406, of which the USG committed

amount is USD 721,508 and which in turn leveraged the private sector to invest USD 712,898. This created access to 5,358 t of fish feed through service points. In addition, 9,876 kg hatchlings and 186 million tilapia fries were produced worth USD 2.02 million, and sold to 323,038 carp and 7,090 tilapia farmers. As a whole, in FY2023 the leveraged investment generated total sales of USD 4,397. As a result of Activity interventions, farmers applied improved management practices in an area totaling 123,804 ha and produced 3,322 kg/ha carp and 6,935 kg/ha tilapia. The farmers earned a total of USD 607 million from the sale of fish in FY2023 (Figure 1, Table 1).

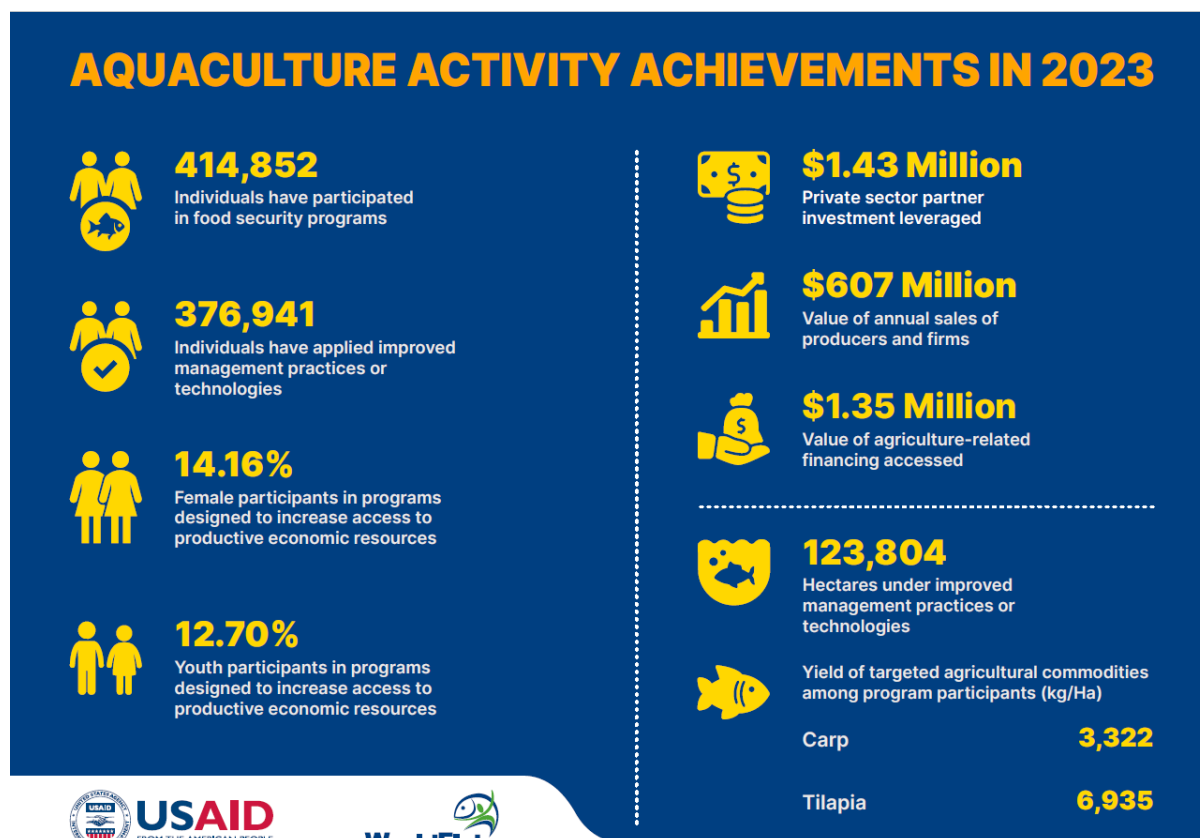


Figure 1: Progress of the Aquaculture Activity key performance indicators

Table 1. Feed the Future Bangladesh Aquaculture and Nutrition Activity indicators: results.

Indicator Ref No. # & Name	Level	Unit	2023 targets	2023 results	% ACHV
EG.3.1-14-Value of new USG commitments and private sector investment leveraged by the USG to support food security and nutrition [IM-level]	Private sector partner leveraged amount	USD	617,006	712,898	116%
	USG commitment amount	USD	572,142	721,508	126%
	<i>Sub-total</i>	USD	<i>1,189,148</i>	<i>1,434,406</i>	<i>121%</i>
EG.3-2-Number of individuals participating in USG food security programs [IM-level]		number	412,907	414,852	100.5%
EG.3.2-24-Number of individuals in the agriculture system who have applied improved management		number	384,448	376,941	98%

Indicator Ref No. # & Name	Level	Unit	2023 targets	2023 results	% ACHV
practices or technologies with USG assistance [IM-level]					
EG.3.2-25-Number of hectares under improved management practices or technologies with USG assistance [IM-level]	Commodity: carp	hectare	103,835	117,487	113%
	Commodity: tilapia	hectare	6,284	6,317	100.5%
	<b>Sub-total</b>		<b>110,119</b>	<b>123,804</b>	<b>112%</b>
EG.3-10-11-12-Yield of targeted agricultural commodities among program participants with USG assistance [IM-level]	Yield: carp	kg/ha	3,810	3,322	87%
	Yield: tilapia	kg/ha	6,656	6,935	104%
EG.3.2-26-Value of annual sales of producers and firms receiving USG assistance [IM-level]	Commodity: fish	USD	531,314,640	607,106,828	114%
	Firm – enterprises	USD	6,382,713	4,397,542	69%
	<b>Sub-total</b>	USD	<b>537,697,353</b>	<b>611,504,371</b>	<b>114%</b>
EG.3.2-27 Value of agriculture-related financing accessed as a result of USG assistance	Number of recipients	number	4,070	3,951	97%
	Size of recipient	USD	1,385,027	1,346,128	97%
GNDR-2 Percentage of female participants in USG-assisted programs designed to increase access to productive economic resources [IM-level]	No. of female program participants (GNDR-2 numerator)	number	3,246	3501	108%
	No. of male and female program participants (GNDR-2 denominator)	number	4,070	4789	118%
	Percentage of female participants	percentage	<b>80</b>	<b>73</b>	<b>92%</b>
YOUTH-3 Percentage of participants in USG-assisted programs designed to increase access to productive economic resources who are youth (15–29) [IM-level]	Number of youth program participants	number	1,225	1585	129%
	Number of total participants in the program	number	4,070	4789	118%
	Percentage of youth participants	percentage	<b>30</b>	<b>33</b>	<b>110%</b>

## **2. Introduction**

The Feed the Future Bangladesh Aquaculture and Nutrition Activity aims to improve the sustainable livelihoods of fish farmers and other aquaculture market actors through adopting a combination of market systems and direct delivery approaches. However, the Activity has been implementing its interventions with an emphasis more on facilitation than on direct implementation. The Activity will focus more on addressing the critical underlying issues constraining the sector and encourage co-investment by private sector companies and NGOs as they did in the past five years. A total of 10 existing private sector partners were on board further during the reporting period to continue their business with the support from the Activity. A key strategy of the Activity is to encourage capacity building in existing value chains rather than supporting unsustainable capacity building initiatives that fade away at the end of the project support. The Activity focusses on improved nutrition through more productive aquaculture and has strong cross-cutting elements of the environment, youth, and gender which are inculcated into sub-grantees.

The Activity is now in its sixth and last year of implementation and is at a mature stage, with significant learning from its interaction with all the actors in the aquaculture value chain. The program is currently concluding a process of critical assessment of the impact and sustainability of its past and current interventions. During the current reporting period, the Activity focused on market resilience, promotion of women- and youth-focused initiatives, access to affordable finance, the promotion of e-commerce and e-information platforms, and the further use of LSPs to foster greater impact and long-term sustainability.

## **3. Activity goal and objectives**

The overarching goal of this Activity is to achieve inclusive aquaculture sector growth through a market systems approach. Its three specific objectives are:

1. increased productivity of aquaculture production systems
2. strengthened aquaculture market system, with particular attention to expanding opportunities for women and youth
3. increased awareness and adoption of nutrition-related behaviors, with a particular focus on women and youth.

## **4. Activity targets**

The Activity has had the following four higher-level targets during its implementation period:

1. 400,000 men, women and youth in the Feed the Future ZOI and ZOR have improved access to better quality aquaculture inputs, services, and/or market channels.
2. 30 percent expansion of investment by the private sector in the Feed the Future ZOI and ZOR in aquaculture production and market related to inputs and services (including seed, feed, production/market-related information and technology)
3. 30 percent increase in productivity from ponds and *ghers* in the Feed the Future ZOI and ZOR
4. 20 percent increase in the number of households adopting improved nutritional practices (consumption of nutritious food, dietary diversity and hygiene practices).

## **5. Approach**

The Activity applies a combination of market systems and supporting direct delivery approaches in its interventions, by engaging the private sector and NGOs to reach smallholder farmers and relevant market actors. In all but very thin markets in the ZOR, the Activity is facilitating the process rather than delivering the interventions directly, stimulating co-investment which will then transfer ownership to the private sector and NGOs. The approach includes analysis of the field context, identification of the problems and the underlying root causes of poorly functioning markets, and methods of catalyzing private sectors to bring market-based solutions. These challenges and solutions are interrogated through a series of regular co-creation meetings. The Activity Team regularly follows investment rationale steps that justify the Activity investments that should leverage co-investment by the private sector. The

approach in some areas of the ZOR involves initial direct support to catalyze activity in very thin or moribund markets, with interventions designed to stimulate some sustainable change after the initial support. This initial work should then trigger market activity which may then be further supported through a purer Market Systems approach.

The Activity is also sought sustainability from the start by building the capacity and resilience of local systems so that its interventions last beyond the Activity period. It follows the adopt, adapt, expand, respond (AAER) framework to underpin its market systems approach to the systemic change of aquaculture. It helps to analyze whether systemic change is happening or requires further program action to take hold. In the year-long pilot investment period, the Activity closely monitored and learned how the early systemic change symptoms in the adopt and adapt stage create win-win situations for market players such as private companies, as well as for small and poor farmers across the ZOI and ZOR. When the Activity starts to show promising results in terms of sustainability and profitability, it seeks further investment to strengthen the business model to move to the expand phase to push the boundaries of the model to re-engage to include new players or new areas to serve more market actors with more benefits.

## 6. Geographical focus

The Activity is being implemented across 21 south-western districts under three divisions, and two south-eastern districts under one division, known under the Feed the Future initiative as the Zone of Influence (ZOI) and Zone of Resilience (ZOR), respectively ( Table 2, Figure 2). These areas present significant challenges in relation to the development of aquaculture sector and livelihoods opportunities. The growth in aquaculture in these areas can play an important role in changing this scenario by increasing production and income opportunities, through catalyzing systemic change in the market.

Table 2. Aquaculture Activity working districts.

Division	District
Barishal	Barishal, Bhola, Jhalakathi, Pirojpur, Barguna, Patuakhali
Dhaka	Faridpur, Gopalganj, Madaripur, Rajbari, Shariatpur
Khulna	Jashore, Jhenaidah, Magura, Narail, Bagerhat, Khulna, Satkhira, Chuadanga, Meherpur, Kushtia
Chattogram	Cox's Bazar, Bandarban

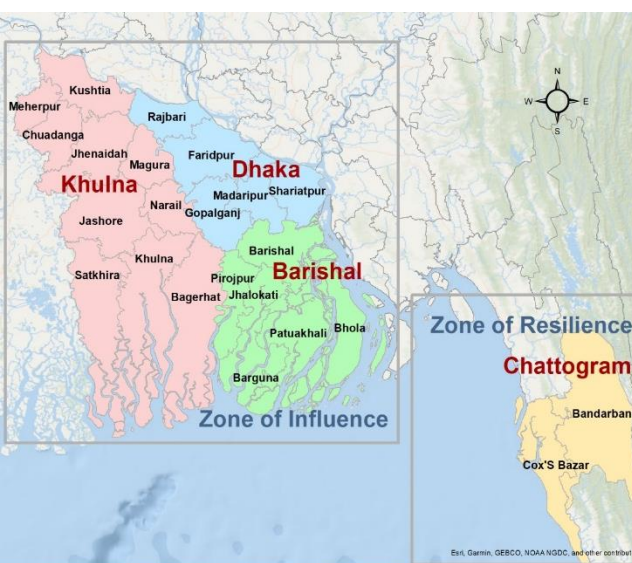


Figure 2. Aquaculture Activity working area.

## **7. Year 6 (October 2022–September 2023): progress against the approved workplan**

### **IR-1: Increased aquaculture productivity**

#### **Sub-IR 1.1: Increased availability of improved fish seed**

##### ***Output-1 Promoted high-yielding varieties of carp***

##### **1.1.1 Wider-scale promotion of G3 through marketing, promotion, supply chain development, demonstration and measuring performance**

Fish farmers encountered substantial obstacles due to the slow growth of the existing rohu fish strains in their ponds, which did not meet their anticipated levels of productivity and profitability. The Aquaculture Activity partnered with the NGO Rehabilitation Employment and Development for the Youth (READY) to address this issue. This collaboration aims to promote the adoption of >35 percent faster-growing Generation 3 (G3) rohu compared to the existing strains in the market, while enhancing fish productivity through improved supply chain practices and the implementation of BMP. During this reporting year, READY has successfully conducted training courses for 15 fish hatchery owners, 183 fry hawkers, and 3,249 fish farmers in the ZOI areas. These training sessions were carried out through 151 business promotion events, leveraging 20 OSSCs and engaging with 126 other fish farmer groups. READY has also facilitated valuable connections between 60 newly interested nursery owners and five hatcheries previously supported by the Aquaculture Activity. Consequently, during the year a total of 977 farmers have initiated commercial fish farming operations, utilizing 55 acres of pond area for G3 rohu cultivation. The increasing number of G3 rohu fish farmers experienced remarkable growth performance of this fish, with collaboration between hatcheries and nurseries having led to the purchase of 184 kg of G3 rohu spawned by these nurseries. As a testament to READY's efforts, a total of 2,133 fish farmers have embraced G3 rohu aquaculture in their ponds, representing a significant stride toward achieving higher fish productivity and profitability in the industry.

##### **1.1.2 HYV carp seed production and marketing in Bandarban**

Maa Mathsha Hatchery and Nursery (MMHN), a sub-partner of an NGO Tahzingdong, has successfully generated high-quality fish seed and is distributing it to farmers in Bandarban. MMHN aspires to serve as an exemplary hatchery, offering tangible business advantages to the entire aquaculture ecosystem, encompassing fish farmers, nurseries, seed agents, distributors, input suppliers, and consumers.

MMHN sourced 300 kg of broodstock for its hatchery from a reliable supplier in Feni, including common carp (100 kg), catla (55 kg), mrigel (60 kg), grass carp (75 kg) and Thai puti (10 kg). It established three dedicated brood ponds and procured PG and prerequisites to facilitating breeding and spawn production. MMHN installed sun-protecting shed nets over the nursing tank and used polythene bags featuring its printed logo. It also equipped the nursery tank with air blowers and water showers to facilitate fry nursing and hardening and set up an oxygen tower over the overhead water tank, resulting in an improved survival rate for the spawned fish.

MMHN received daylong training facilitated by the Activity on pituitary gland collection for its four hatchery staff. They also received training on Best Management Practices for the six hatchery and nursery staff.

MMHN achieved significant sales in its fish farming operations. It sold a total of 45 kg of common carp, catla, grass carp and Thai punti spawns, and 26 kg of G-3 Rui spawn, to a total of 41 fish nurseries, totaling BDT 355,000 (approximately USD 3,287). It also sold 45 kg of carp dhani, generating BDT 67,500 (about USD 625) in revenue, 500 kg of carp fingerlings, amounting to BDT 225,000 (around USD 2,083), and 755 kg of large fingerlings, resulting in BDT 344,000 (approximately USD 3,185) in sales. These sales reflect a thriving and diversified fish farming operation.

Through this intervention, fish seeds of various carp fish species with high quality were produced at MMHN, meeting the demand of fish and nursery operators in this region. MMHN contributed to the development of strong distribution channel of spawn and fingerling products in Bandarban and Cox's Bazar districts. Additionally, the hatchery and nursery operations adhered to BMP.

### **1.1.3 Capacity development of hatchery and nursery in the management and marketing of genetically improved rohu, carp and tilapia**

During this reporting period, the Aquaculture Activity team organized district-wise capacity-building events with the cooperation of DFOs at the DoF office premises on GI carp, BMP, and mono-sex tilapia farming.

A total of 719 participants attended these events, which were conducted across 20 districts. This diverse group included 22 hatchery owners, 245 nursery owners, 352 advanced farmers, and 100 Department of Fisheries (DoF) officials, with 44 of them being female and 135 representing the youth. As a direct outcome of this intervention, eight hatcheries acquired G3 rohu fry for their upcoming broodstock, while 57 nursery owners stocked G3 rohu spawns to rear and distribute fingerlings among their community fish farmers.

### **1.1.4 National workshop to launch G3**

Funded by USAID under Feed the Future Bangladesh Aquaculture and Nutrition Activity and coordinated by WorldFish, a workshop on “WorldFish Carp Genetic Improvement Program” was organized at the Bangabandhu International Conference Center in Dhaka on May 09, 2023. It brought together over 200 international and national participants from WorldFish, DoF, the Bangladesh Fisheries Research Institute (BFRI), the United States Agency for International Development (USAID), the Feed the Future innovation Lab for Fish, nongovernmental organizations (NGOs), carp hatchery associations, universities, fish hatchery owners, and farmers.

In the workshop, the Director General of Bangladesh Fisheries, KH Mahbubul Haque and Dr. Essam Mohammed, DG, WorldFish were present as Chief Guest and Special Guest, respectively. K.H. Mahbubul Haque officially received the rapidly growing WorldFish Generation Three (G3) Rohu on behalf of the Department of Fisheries. Haque thanked the team of researchers responsible for developing the genetically improved generation of fish and making it available for dissemination to both public and private sectors.

It is noteworthy that rohu is an economically and culturally important carp species for polyculture in Bangladesh. The G3 Rohu strains were grown in 19 hatcheries for an on-farm trial in 2022. The trial resulted in G3 rohu weighing 37 percent more than conventional varieties. The Carp Genetic Improvement Program’s research was first initiated under the USAID-funded Aquaculture Income and Nutrition Activity of WorldFish in 2013 and continued until 2017. From 2018 to 2020, the program was financially supported by the USAID-funded Bangladesh Aquaculture and Nutrition Activity. More recently, the Carp Genetic Improvement Program has continued with support from the Fish Innovation Lab, housed in the Global Center for Aquatic Health and Food Security at Mississippi State University, USA, and the CGIAR Research Initiative on Resilient Aquatic Food Systems for Healthy People and Planet.

### **1.1.5 Wider scale adoption and replication of indigenous carp pituitary gland to ensure access to quality pituitary gland locally**

Bangladesh boasts a rich availability of raw PG<sup>2</sup>; however, formal trade channels remain underdeveloped, thus impacting the nation’s economy. In response to this challenge, Fishtech Hatchery has forged a partnership with the Aquaculture Activity, aiming to facilitate capacity-building initiatives and engagement with PG harvesters and collectors across 21 districts within the ZOI. The primary objective of this collaboration is to establish a well-structured and formalized PG supply chain, thereby reducing the country’s dependence on costly synthetic hormone imports.

Throughout the year, Fishtech achieved significant progress by conducting nine capacity-building training sessions involving 226 PG harvesters and 46 collectors. Additionally, 30 essential meetings engaged 104 PG harvesters and 13 collectors and , two informative awareness workshops reached out

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<sup>2</sup> Pituitary glands are used to induce the fish to spawn. The hormone secreted by the pituitary gland stimulates the growth, development, maturity and ovulation of eggs.



to 50 hatchery owners and technicians, educating them on PG's benefits. These concerted efforts led to remarkable improvements in Fishtech's production and sales figures.

Over the year, Fishtech procured and sold 967 grams of dried PG to 89 fish hatcheries, resulting in sales revenue totaling BDT 4,486,000 (USD 40,968). This formalized supply chain significantly reduced hatchery owners' reliance on expensive imports, boosting PG harvesters' income by 30–50 percent. Looking ahead, Fishtech plans to increase production capacity to 8–10 kilograms next year through mechanization and conduct a comparative analysis of natural PG versus synthetic hormones.

In parallel, Fishtech Hatchery initiated the 'Strengthening the Artemia Supply Chain to Establish a Formal Market in Bangladesh' project in May 2023., with the primary goal to cultivate a robust Artemia market through awareness sessions and linkage events. This initiative positively impacted fish farmers, nursery operators, hatchery operators, and fish traders, raising awareness about the benefits of incorporating Artemia into fish feed.

During the current year, Fishtech conducted 30 awareness sessions, including 18 in the ZOI and 12 in ZOR regions. In the ZOI, 300 fish farmers, 23 nursery operators and 33 hatchery operators participated across Satkhira, Khulna and Bagerhat districts. In ZOR, 146 Artemia farmers, 69 salt farmers and 29 hatcheries were involved. Additionally, 12 linkage events engaged 80 fish farmers, 20 nursery operators, 10 hatchery operators, and 17 fish traders in Satkhira and Khulna districts in the ZOI, along with eight linkage events involving 48 Artemia farmers, 17 salt farmers, and 8 hatcheries in the ZOR region.

Furthermore, Fishtech aims to sell 20 kg of Artemia biomass to shrimp hatcheries and farms, contributing significantly to the development of the Artemia market.

### **1.1.6 Increase production and promotion of cultured shrimp & seabass in the mainstream market channels and export**

By entering into a partnership agreement with the Bangladesh Shrimp and Fish Foundation (BSFF), the Aquaculture Activity aims to enhance the productivity of shrimp and facilitate the domestication of seabass. Furthermore, this collaboration seeks to promote these high-value aquaculture species within both the domestic and international markets. A total of 5 clusters, each consisting of 20 shrimp farmers, were developed in different locations in Khulna and Bagerhat districts. The main objective of cluster farming was adopting better management practices for bio secure and safe shrimp production. The farmers in each of the clusters are being trained for stocking of shrimp post larvae. Three locations for seabass nursery and culture management have been selected at Khulna and Cox's Bazar for nursing of imported domesticated seabass fry. In total 18,675 domesticated seabass seed were disseminated to those selected areas. Besides this as a part of collaboration 1,040 pieces of seabass fries were handed over to Cox's Bazar DoF hatchery to develop those as future brood for the production of seabass seed to meetup domestic consumption.

The Bangladesh Shrimp and Fish Foundation (BSFF) made significant efforts to enhance the capabilities of 100 shrimp farmers of developed 5 clusters & 100 shrimp farmers of technology farmers. A total of 100 shrimp farmers received 1.2 million specific pathogen-free (SPF) post-larvae of shrimp to stock in their *ghers*<sup>3</sup>, which is essential for achieving higher yields and maintaining disease-free stocks. Additionally, BSFF extended its support beyond the clusters for the technical assistance of another 100 shrimp farmers outside these designated areas, where shrimp farming practices were very extensive. These farmers received training on modern culture management techniques and adopted GqP to enhance their current culture management practices. Moreover, they were provided with ICT materials to stay updated with the latest advancements in aquaculture practices.

Recognizing the significance of certifications for export market access, BSFF organized workshops on third-party certifications such as GAP and Hazard Analysis Critical Control Point (HACCP). This initiative aimed to increase farmers' capacity to meet the stringent requirements of the export market. Representatives from various organizations, including the Department of Fisheries (DoF), Bangladesh

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<sup>3</sup> A *gher* is a modified rice field (usually situated in flood plain) comprising a trench around the rice field and built up dikes to maintain a depth of around 1 meter in the trench.

Fisheries Research Institute (BFRI), universities, exporters, depots, and stakeholders from the shrimp value chain, attended these workshops to promote better management practices and foster a sustainable and competitive shrimp farming sector.

During the reporting period, the Activity conducted a feasibility study to establish a sea bass hatchery in Bangladesh to assess the current context and identify the opportunities to establish a new sea bass hatchery or renovate existing shrimp hatcheries (Annex 2). It shared the study findings and recommendations with DoF, BFRI, university professionals and hatchery owners through a workshop. To address the current challenges a capacity building training was conducted for shrimp value chain stakeholders (depo, *arrots*, cool chain management, exporters etc.) at Khulna and distributed the developed promotional materials on Shrimp and Sea bass through conducted two separate workshops for technology dissemination, develop forward market for shrimp, improve access to aqua inputs and domestic consumption to explore business and strengthen market linkages between buyers and exporters for shrimp and sea bass. For the latest technology and knowledge sharing, BSFF hired different levels of international consultants for its wider dissemination.

### **1.1.7 Market promotion and linkages of Artemia and seaweed**

On May 8, 2023, the Aquaculture Activity, in collaboration with ECOFISH II, hosted a workshop with the objective of promoting newly developed products to potential private sector participants. The focus of the workshop was to showcase the potential of seaweed and seaweed powder, and establish market linkages for these products. The event took place at Hotel Seagull, Cox's Bazar, providing a platform for stakeholders to explore the opportunities and benefits of incorporating seaweed-related products into their businesses. A total of 54 participants, representing various stakeholders, such as seaweed growers, sellers, seaweed processors, private sector representatives, restaurant owners, chefs, government officials, academics and researchers, attended the workshop.

The workshop facilitated insightful discussions and fruitful exchanges of information, where participants highlighted the significance of seaweed farming in benefitting fishing communities, protecting coastal ecosystems, and contributing to the growth of the aquaculture sector. The workshop facilitated a deeper understanding of the market linkages, value chains, and business opportunities associated with seaweed cultivation, paving the way for sustainable development and economic empowerment. The workshop also emphasized the importance of addressing key challenges such as access to finance, technology transfer, capacity building, and policy support. By harnessing the knowledge and insights gained from the workshop, stakeholders can work towards developing inclusive and environmentally responsible strategies for seaweed farming. This will help in enhancing livelihoods, promoting biodiversity conservation, and mitigating the impacts of climate change. Lack of availability of quality seedlings of seaweeds in time is one of the constraints to seaweed farming in Bangladesh identified by the workshop participants. To address this problem, ECOFISH II and Chattagram Veterinary and Animal Science University are working to produce quality seedlings of 2 genera (namely *Gracilaria* and *Ulva*) under laboratory conditions.

The Aquaculture Activity organized another workshop on Artemia biomass production and marketing in Bangladesh, in collaboration with the Artemia4Bangladesh Activity. This was held at CSS Ava Center at Khulna on May 24, 2023, and chaired by Professor Dr. Golam Sarwar, Chairman of the DoF and Marine Resource Technology, University of Khulna. The main objective of the workshop was to promote Artemia-aquaculture technologies among fish and shrimp stakeholders, including farmers, and to enhance cooperation and linkages among Artemia-aquaculture stakeholders and market actors. A total of 43 participants from Khulna and Barishal divisions, including professionals of DoF, Khulna University, Bangladesh Fisheries Research Institute, FAO, shrimp and carp hatcheries, farmers, nursery operators and hatchery consultants participated in the workshop. Frozen Artemia biomass was displayed and demonstrated practically as nutrient-enriched feed for shrimp (post-larvae, juvenile and broodstock), tilapia fry, koi fry, shing fingerling and magur fry. In 2024, the Artemia4Bangladesh Activity is expanding into southwestern Bangladesh, due to high interest from workshop participants and successful tests of Artemia cysts as a shrimp larvae food source; this will be in collaboration with local organizations NGF and BFRI, located in Paikgaccha *upazila*, Khulna district.

### **1.1.8 Increase production and promotion of mud crab through improving the capacity of hatcheries and linkages**

During the reporting period, the Activity signed a contract with Nowabenki Gonomukhi Foundation (NGF), located at Shamnagar, Sathkhira district, to increase the production of hatchery-produced crablets, conserve wild crablets, and maintain biosecure crab production for export. Through this intervention, the Activity facilitated training for a total of 1,270 crab farmers and related stakeholders in the Sathkhira and Cox's Bazar districts, through 50 courtyard training sessions and improved technology-based promotion materials dissemination. The key objectives of the initiative were to educate crab farmers in GaqP, improve nurseries, and grow out management and post-harvest management for safe crab nursing and culture management practices. NGF conducted two capacity building events on GaqP for crab farmers and nursery owners, by engaging 30 lead crab farmers. A total of 25 demonstration plots with hatchery-produced crablets were established to observe survivability and growth. Field trial findings indicated hatchery-produced crablets have 15 percent higher survival rate and 10 percent more growth comparing to wild crablets having the same management practices. A trial was conducted with a hatchery produced crab juvenile and wild crab Juvenile at 10 ponds, each spearing through bamboo slat, where in one part hatchery produced crab juvenile and another part wild crab juvenile were stocked. After a 60-day culture period, the hatchery-produced crab survival rate was better, with attractive color, and growth at least 5 percent more compared with wild crab. NGF hired an international consultant to educate crab hatchery technicians and managers, and conducted two inhouse and one hands-on training to develop the capacity of hatchery technicians in crablet production, water quality monitoring, grading and proper feeding to prevent cannibalism, in Shamnagar and Cox's Bazar. Following adoption of this technology, there appeared to be a positive change in crablet production at the hatchery (Annex 3, Annex 4, Annex 5).

### **Sub-IR 1.2: Increased availability of affordable quality feed**

#### ***Output-2 Increased availability of better quality feed with embedded services***

#### **1.2.1 Access to better quality inputs (feed and AMPs) and advisory services through strengthening distribution networks and use of digital platforms in the Zone of Influence and Zone of Resilience**

During the reporting period, Activity partner Aftab Feed promoted LSP-driven feed businesses and a call center service built around app-based advisory services for smallholder farmers. Aftab organized 747 product promotion events for fish farmers in the Feed the Future ZOI. These events were aimed at showcasing and promoting aquaculture products and technologies to benefit farmers, and were well-received, with a total of 21,209 participants attending. Notably, the events achieved significant gender inclusivity, with 7,326 female participants actively engaging in these promotional activities.

Besides this, Aftab organized 102 product promotion courtyard events for the Activity's fish farmers, attended by a total of 1,528 participants, including 293 women. These product promotion events provide an opportunity to discuss improved aquaculture technology, the performance of Aftab Feed, GIFT tilapia fry performance, call centers, the Aftab agro care app, and use of SKF's AMPs. The company organized 78 promotional events in local market places for different aquaculture actors, that is, farmers, feed sellers, fry traders, and nursery owners. A total of 1,170 participants attended. Aftab Feed also organized a capacity-building event for dealers and LSPs (30 participants) and a one-to-one business-to-business (B2B) linkage workshop for the five OSSCs and their linked 15 LSPs, with 20 (male) participants. In the ZOR, Aftab Feed organized a refresher capacity-building event for the Activity's Year 1 dealers and LSPs, with 30 participants.

Aftab Feed also conducted two TOTs events, on (1) technical, business management, and record-keeping, and (2) usages of apps and call centers (technical experts) for project staff and selected core Staff. It conducted two quarterly progress and project coordination meetings at the field level, attended by 29 men and 2 women, and eight capacity-building events for OSSC owners and LSPs (total of 199 participants, including 2 women). They also conducted trainings sessions on app usage and call centers, for 40 dealers attended by a total of 178 farmers. Aftab also organized five refreshers for dealers and LSP capacity building on BMP and usage of digital services, with a total of 129 (male) participants,

including 32 dealers and 97 LSPs. It also established, and continues to support, 40 model farm pond (average 15 *decimals* each) activities to demonstrate the feed performance of other farmers. The company conducted fourteen Farmer Field Days, with 748 male participants, including 267 women, and nine video shows with a total of 1,412 male participants, including 97 women in the Aquaculture Activity working areas.

Aftab provides advisory services to a total of 7,825 farmers, including 2,106 female farmers, through its call center. A total of 2,411 farmers, (of which 371 were women) gained access to the Aftab Agro Care App. A total of 1,115 farmers (including 149 women) avail services through 40 OSSCs and 49 dealers. During the reporting period, Aftab diligently recorded and created profiles for 3,342 farmers (including 759 women) within the app through 12 LSPs.

In this reporting year, as a result of above interventions Aftab sold almost 8,156.4 t of feed (around 10 percent higher than 2021 sales) worth USD 5.70 million, through 49 Aftab digital service centers, and approximately 3,218.7 t of feed worth USD 2.25 million through 40 OSSCs and 178 LSPs in the Activity working areas.

### **1.2.2 Ensuring affordable improved fish feed, services and linkages to increase profitability of smallholder farmers**

Padma Feed aims to produce improved, low cost feed by sourcing raw materials from reliable sources and increasing access to fish feed in communities, as well as providing water quality testing services and improved knowledge of BMP for the farmers. During the reporting period, the company accomplished one orientation meeting and two TOT events with 47 participants (five staff, 28 LSPs, and 14 OSSC owners). It conducted 140 batches of business promotion and BMP events, attracting a total of 2,962 farmers, including 39 percent female and 28 percent youth. It also completed two batches of B2B linkage events with 55 participants. To improve feed quality and adjust cost, Padma Feed developed five types of new feed formulations and tested 12 feed samples using a government testing laboratory. It established 14 demonstration (demo) ponds to observe the performance of different feeds and shared the results. It also developed video documentation and completed 14 batches of promotion campaigning. The company also established 14 OSSCs to provide services and smooth feed supply among community farmers, and sold 542 t of feed through the business model.

The intervention has had a significant impact on the aquaculture sector in the Barishal region. Farmers have learned about aquaculture techniques, low-cost feed and its management, and how to access services from OSSCs. The synergy meeting has also helped to strengthen the links between the aquaculture sector and the private sector. Padma Feed signed four MoUs with stakeholders Coast Foundation, Matshya Bangla, READY and ARITS Ltd. During the reporting period, Padma Feed invested around USD 0.2 million, which was six times higher than the committed intervention amount for its business growth as an outcome of the Activity interventions.

### **1.2.3 Develop feeding methods for high yielding carp–tilapia polyculture**

The carp–tilapia polyculture system has gained popularity as a means of combatting fish diseases, increasing production, and boosting profits. However, the recent surge in the cost of feed ingredients has led to a rise in fish feed prices. Unfortunately, the market price of fish has not increased proportionally, resulting in decreased profitability and, at times, losses in polyculture operations. Another contributing factor is the high feed conversion ratio, due to feed wastage and the lack of species–specific feeds.

This research aims to address these challenges through two primary approaches:

- (1) identifying suitable feeding methods for tilapia and carp within the polyculture system
- (2) developing a cost-effective feed recipe (feed formulation) to reduce feed costs.

This research is linked with a Ph.D. research program supported by private feed company Deheus Limited and registered at the University of Wageningen.

The research into feeding methods compares feed intake, feeding behavior and growth in carp–tilapia polyculture, particularly on variation in fish size, stocking density and pellet characteristics (size and buoyancy).

The findings of this research will be used as a guideline for farmers. It has also been accepted for publication in a scientific journal in two parts: (1) “Effect of targeted feeding by varying pellet size on fish growth, feeding behavior and natural food web in pond polyculture”, and (2) “Effect of pellet buoyancy and stocking ratio of tilapia on fish growth, feeding behavior and natural food web in carp–tilapia pond polyculture”.

The research into developing cost-effective feed recipes (feed formulation) investigated ways to reduce the use of high cost, protein-rich ingredients, and found that among commonly used ingredients in feed formulation, carbohydrate (NSP)-based ingredients are cheaper. The findings of this research will provide a guideline to feed nutritionists, enabling them to use carbohydrate (NSP) in tilapia feed efficiently, as it also contributes to pond primary productivity. Thus, using cheaper sourced ingredients, mainly carbohydrate (NSP), and taking into consideration digestibility and a net energy equation in pond systems, will reduce the cost of feed formulation.

This research involved four experiments. Of the two publications produced from this research, one is already published in Aquaculture journal, entitled “Effect of temperature on the energy utilization efficiencies of digested protein, fat, and carbohydrates in Nile tilapia (*Oreochromis niloticus*)”. The paper concluded that feed industries can apply one standard net energy equation for tilapia, irrespective of climatic region and/or season (for sure between 24°C and 32°C). It is published in open access format, at: <https://doi.org/10.1016/j.aquaculture.2023.739876>.

### **Sub-IR 1.3: Increased adoption of improved pond management practices**

#### ***Output-3 Farmers adopted improved fish farming practices***

##### **1.3.1 Strengthening aquaculture advisory services through promoting one-stop service centers operated by company distribution channels, especially women micro franchisees and dealers**

Aquaculture farmers in remote areas struggle to access quality input and advisory services. To address this, during the reporting period Petrochem Bangladesh Limited (PCL), with support from the Aquaculture Activity, extended advisory and aqua input services to small-scale aquaculture farmers through 40 OSSCs, dealer points, and 48 women micro-franchisees (WMFs). This business model of PCL will benefit 4,500 farmers with particular attention to women and youth in the aquaculture sector.

During the reporting period, PCL organized 228 “technical knowledge-sharing courtyard meetings with the participation of 5,373 farmers, to disseminate improved aquaculture technologies and appropriate usage of aquaculture inputs. It also organized 60 result demonstration events, attended by 927 farmers, as well as orientation and a two-day staff capacity development training on aquaculture and dyke cropping. The company selected 10 new potential dealers in the Barishal, Cox’s Bazar, Faridpur and Khulna regions, for establishing OSSCs to provide major services. These would include meetings and training, printing documents, water and soil testing facilities, aquaculture machinery and equipment, access to information about finance, access to aquaculture market to sell products and buy inputs. The PCL team organized four linkage building workshops with market actors, with the objective of disseminating information about organizations and finding connecting points between them to create business linkage. These events attracted 117 attendees, 19 of whom were women. The PCL team also organized three refresher technical capacity building trainings to build capacity of WMF, OSSC and project staff, with 69 participants. To contribute to a branding and awareness intervention, the team made a video documentary, broadcast on the ATM Bangla “Petrochem Sonali Din” (“Petrochem Golden Day”) program.

### **1.3.2 Promotion of small-scale aquaculture (fish and shrimp) and improving access to feed (e.g. establishing feed mills) through local service providers in Cox's Bazar**

Since October 1, 2022, the Aquaculture Activity, in collaboration with Prottayashi, has been developing initiatives in Cox's Bazar, with the following key objectives:

Promote small-scale fish and shrimp farming by improving feed access, establishing small feed mills, and supporting LSPs.

- Train farmers and market actors in improved small-scale aquaculture practices.
- Provide access to finance for aquaculture projects.
- Enhance access to quality fish seed by establishing a carp hatchery.

Key achievements during this reporting period included:

- organizing 5 bi-monthly coordination meetings and 2 quarterly progress review meetings.
- conducting two Training of Trainers (ToT) courses for 30 LSPs and staff on improved aquaculture and business development
- training and capacity-building for over 758 fish and shrimp farmers, including both experienced and new farmers
- organizing exposure visits and market linkage events to connect farmers with relevant stakeholders
- establishing 35 demonstration ponds for carp fattening
- facilitating access to loans totaling BDT 11,203,000 (approximately USD 103,731) for 170 beneficiaries with a remarkable loan recovery rate of around 99.5 percent
- celebrating events such as International Women's Day, National Nutrition Week and National Fish Week to promote nutrition awareness and community engagement
- providing support to LSPs with equipment and resources for water quality testing and nursery management
- establishing a carp hatchery and community feed center (CFC) to improve the supply of quality spawns, fingerlings, and fish feed in the region.

The results of a survey conducted by Prottayashi's MEL team indicate significant positive changes in productivity and income:

- annual productivity increased by 39 percent to 5.67 t per hectare
- farmers' income rose by 52.5 percent, leading to an improved standard of living
- increased collaboration with local authorities, fisheries experts, and private sector professionals
- promotion of nutritious fish and vegetable products in local markets to boost household-level consumption
- empowerment and capacity-building sessions, with a focus on women and youth participation.

In summary, the Aquaculture Activity, in partnership with Prottayashi, has made substantial progress in promoting sustainable aquaculture practices, improving income, and enhancing nutrition awareness in Cox's Bazar, benefitting a significant portion of the local community, particularly women and youth.

### **1.3.3 Strengthening of nutrition-sensitive aquaculture in Bandarban hill district**

Bangladesh Aquaculture and Nutrition Activity, in partnership with Tahzingdong, has made significant strides in strengthening nutrition-sensitive aquaculture in Lama, Alikadam, and Naikhongchari *upazilas*. Key achievements during this period include:

- conducting 7 training sessions on aquaculture, dike cropping, nutrition, and gender, benefitting 300 participants (183 women, 117 men); these sessions transformed participants into integrated nutrition-sensitive aquaculture entrepreneurs
- providing refresher training for 250 previously trained farmers (165 women, 85 men) on integrated nutrition-sensitive aquaculture and business planning

- distributing large-size carp fingerlings, mola broods, fish feed, and vegetable seeds to 300 aquaculture participants; these inputs have positively impacted nutrition-sensitive aquaculture and early marketing efforts
- training 15 fish nurserers, including 3 women, in fish nursery management and providing them with G-3 rui spawn and nursery feed, improving the quality of carp fingerlings available locally
- initiating training in post-harvesting technology and business strategy for fish-harvesting groups, leading to the provision of fishing nets and increased employment opportunities
- establishing two community-based creek aquacultures, involving 50 members (including 20 women), and providing training, fingerlings, and fish feeds
- creating two carp fattening demonstration ponds with stocked carp yearlings and fish feed, introducing carp fattening technology to hilly area fish farmers
- facilitating an exposure visit for fish nursery owners, promoting collaboration and knowledge sharing among them
- conducting six documentary shows on fish culture, nutrition, and the environment, reaching 233 individuals, including 93 women
- organizing six market linkage events to connect fish farmers with various aquaculture market actors, benefitting 234 participants, including 94 women
- hosting five Farmer Field Days to share aquaculture knowledge and best practices, involving 258 participants, including 181 women
- celebrating National Nutrition Week, National Fisheries Week, International Women’s Day, and International Men’s Day in different *upazilas* to raise awareness and promote gender equality
- successfully concluding the Activity with a learning-sharing and project closeout meeting attended by 31 participants.

Overall, Tahzingdong’s intervention has led to increased aquaculture productivity, improved access to quality fish seed and affordable fish feed, enhanced adoption of best pond management practices, a stronger aquaculture value chain, improved market linkages, better nutrition-related behaviors, increased awareness of nutrition practices, and improved access to diverse and nutritious food among rural households.

#### **1.3.4 Promotion of small-scale aquaculture and high valued small indigenous fish species in Bandarban**

The Bangladesh Aquaculture and Nutrition Activity, in collaboration with GRAUS, has promoted small-scale aquaculture and high-valued SIS fish species in Bandarban. Key achievements during the reporting period include:

- conducting 7 training sessions on aquaculture, dike cropping, nutrition and gender, with 250 participants (57 men, 193 women) from Bandarban sadar, Rowangchari, and Thanchi *upazilas*. These sessions empowered participants as integrated nutrition-sensitive aquaculture entrepreneurs.
- providing refresher training for 200 previously trained farmers (171 women, 29 men) on integrated nutrition-sensitive aquaculture and business planning.
- distributing large-size carp fingerlings and vegetable seeds to 250 aquaculture participants, encouraging nutrition-sensitive aquaculture and early marketing.
- training 12 fish nurserers (2 women) in carp–mola and SIS fish nursery management, improving the availability of genetically improved carp fingerlings
- offering a two-day training on high-valued SIS fish culture and business development for 20 SIS farmers (14 men, 6 women), along with providing 10,000 SIS fingerlings
- providing training on post-harvesting technology and handing over fish harvesting nets to fish harvesting groups, creating employment opportunities
- initiating four community-based creek aquacultures, engaging 91 members, including 23 women
- establishing four carp fattening demonstration ponds, introducing carp fattening technology to hilly area fish farmers



- organizing an exposure visit for fish nursery owners, promoting collaboration and knowledge sharing
- conducting “Smoke Fish Production and Marketing Training” for 10 female participants, reducing post-harvest losses and creating employment
- presenting six video documentaries on fish culture, nutrition and the environment to 203 viewers, including 86 women
- hosting six market linkage events involving 100 aquaculture market actors, facilitating access to quality fish seeds, feeds, and other aquaculture inputs
- organizing five Farmer Field Days with 262 participants, sharing aquaculture best practices and nutritional knowledge
- disseminating cohort tilapia broods among three tilapia hatcheries and celebrating National Nutrition Week, National Fisheries Week, International Women’s Day, and International Men’s Day
- concluding the Activity with a learning–sharing and project closeout meeting, involving 21 participants.

Through GRAUS’s intervention, aquaculture productivity increased, along with improved access to fish seed and quality fish feed. Pond management practices were enhanced, the aquaculture value chain strengthened, and better market linkages established. Additionally, nutrition-related behaviors improved, nutrition awareness increased, and access to diverse and nutritious food improved among rural households in Bandarban.

### **1.3.5 Promotion of small-scale aquaculture and high valued SIS fish species in Barishal and Faridpur**

In partnership with Coast Foundation, the USAID-funded WorldFish-led Activity promotes small-scale aquaculture and valuable SIS fish in Barishal. It addresses the knowledge gaps, market access, and technology skills of rural aquaculture farmers. It encourages successful nutrition-sensitive aquaculture and supports the development of LSPs for training and advice.

Key achievements during the reporting period were as follows. The Activity:

- was implemented in 9 *upazilas* across 5 districts
- conducted 6 Training of Trainers (ToT) sessions for 121 selected LSPs
- trained 6,000 homestead pond farmers, including women and youth, in enhanced aquaculture and nutrition
- undertook field-level initiatives, including signboard installations and market promotion activities
- observed National Fish Week to raise awareness of nutrition
- distributed fingerlings to 600 beneficiaries and summer vegetable seeds to 6,000 beneficiaries with a focus on nutrition
- established 600 signboards and 16 mola broods to promote easy access for fish farmers to mola seed
- strengthened connections with hatcheries, traders and government entities
- encouraged feedback from household fish producers to improve service quality
- promoted the inclusion of women and youth in aquaculture
- established a mola brood bank for reliable fish production
- encouraged vegetable cultivation in pond dikes and fallow ground.

The Activity’s outcomes include improved aquaculture practices, increased access to quality inputs, and enhanced nutrition, benefitting small-scale fish farmers in Barishal.

### **Challenges encountered while implementing activities in Year 6**

Implementing aquaculture projects in challenging environments such as Bandarban and Chakaria poses significant difficulties. In particular, in August 2023 the Activity encountered flash floods resulting from heavy rainfall and mountain runoff, which had severe consequences for the region’s aquaculture ponds and creeks. Key challenges included:

- Flash floods. Sudden and intense flash floods threatened the stability and productivity of aquaculture ponds, causing inundation and potential fish stock losses.
- Infrastructure damage. Flash floods damaged vital infrastructure like pond embankments and sluice gates, disrupting aquaculture operations and necessitating costly repairs.
- Fish stock loss. Rising water levels during floods led to fish stock displacement, impacting farmers' livelihoods, income, and food production.
- Environmental stress. Flash floods introduced environmental stressors, affecting water quality, temperature and nutrient levels, adversely affecting fish health.
- Activity disruption. Planned activities, including training and market linkages, were disrupted by flood recovery and rehabilitation needs.
- Progress delays. Flood-related damages delayed overall project progress, potentially affecting timelines and outcomes.
- Post-flood recovery. Additional resources were required for rehabilitation efforts, including infrastructure repair and restocking ponds.

In summary, unexpected flash floods in Bandarban and Chakaria posed significant challenges to the Activity, impacting infrastructure, fish stocks and project activities. Addressing these challenges required both immediate responses and long-term planning to enhance resilience against future natural disasters.

## **IR 2: Strengthened aquaculture value chains**

### **Sub-IR 2.1: Increased market linkages**

#### ***Output-4 Developed effective business linkage***

##### **2.1.1 Promote in-pond raceway system technology through education, research institutions, public sector and forward market actors**

Afil Aqua Fish organized two events to showcase the numerous benefits of IPRS to two groups, comprising 76 experienced fish farmers, an exporter, and five representatives from financial institutions. These initiatives were driven by the necessity to address the prevailing lack of knowledge of IPRS and the high associated costs. During the reporting year, Afil Aqua Fish achieved notable sales of 39 t of fish valued at BDT 9,873,738, equivalent to USD 91,319. Under the Memorandum of Understanding (MoU) established between Afil Aqua Fish and READY during their collaborative partnership meeting. READY's management has arranged a bilateral meeting with the top management of Afil Aqua Fish. As part of this collaboration, READY is diversifying into the fish feed business in the Bagerhat area and intends to become a dealer for Afil Aqua Feed. In future, READY aims to supply high-quality fish feed to 12,000 farmers at an affordable price by procuring it from Afil Aqua Feed.

##### **2.1.2 Processing, preservation and marketing of safe fresh and dry fish products**

Dry fish processors in Cox's Bazar are severely disadvantaged by the lack of storage facilities for fresh and dry fish, needed to avoid spoilage and maintain quality as safe and healthy for human consumption. To address this, the Aquaculture Activity partnered with Shah Amanath Traders (SAT) to promote safe and hygiene dry fish production, processing, preservation, and the storage, packaging and marketing of dry fish products. During the reporting period, SAT capacitated 360 dry fish producers (314 men, 46 women) in safe dry fish production technology and business development. It also conducted a training course on sorting, grading and cleaning for 400 (374 women, 26 men) dry fish workers, and organized 18 awareness programs focused on safe dry fish production technology, utilizing an organic solution made from chili and turmeric powder. These programs were attended by 540 individuals (200 women, 340 men) who were dry fish processors, workers, and fishermen. SAT provided hands-on training on RTC products such as *balachao* for 20 women dry fish entrepreneurs, and training for 20 fish meal producers on feed ingredient production technology and marketing techniques. The company also hosted a dried fish showcase in Sadar, Cox's Bazar, involving the establishment of a cold storage facility at the SAT factory site in Sadar, Cox's Bazar, to preserve dried fish. The initiative also supplied two

dry fish processing groups with vacuum machines. To promote safer dried fish production, SAT established 11 BMP facilities and upgraded the existing BMP infrastructure for dry fish processors.

SAT showcased the impact of enhanced fish drying techniques on the quality and profitability of dried fish products, specifically ribbon fish (*churi*). It also introduced modern storage solutions to 60 dry fish processors (11 women, 49 men). During the reported timeframe, SAT achieved sales of 80.81 t of dried fish, generating revenue of BDT 25.81 million (USD 239,003) through online and offline channels, as well as through its distributors. Utilizing various marketing approaches, including social media ads via Facebook boosts, website promotion, signage, and innovative packaging, combined with adhering to BMP, SAT successfully boosted its sales by an impressive 96 percent.

### **2.1.3 Introduce digital applications to strengthen linkages among aquaculture market actors**

Bangladesh Aquaculture & Nutrition Activity has partnered with IT company ARITS Ltd. to develop a groundbreaking mobile application, “OneFish”. This application encompasses all the features necessary to address the challenges faced in the market. As a comprehensive solution, One Fish provides farmers with legitimate farming information, while enabling them to buy and sell their products. On June 21, 2023, the highly anticipated OneFish app was released on the Google Play Store (Annex 6).

ARITS conducted four workshops in Jashore, Khulna, Rajshahi, and Cox’s Bazar districts to promote the OneFish app among stakeholders. A central workshop was also held in Dhaka, attended by participants from 12 private sector organizations, and ten potential private sector partners were onboarded as commercial supporters to ensure the App’s future sustainability.

Next, to ensure effective dissemination of the App at the grassroots level, ARITS organized a TOT program from June 3 to 4, 2023. This program trained 36 participants, equipping them with the proficiency to advocate for and teach about the app. Subsequently, a staggering 938 training sessions were conducted this year, with 19,267 farmers (12,650 men, 6,617 women) actively participating. These training sessions were designed to educate farmers on aspects such as utilizing the app to access valuable farming techniques, locating nearby retailers for essential aquaculture supplies including seeds, feed and medicinal products, and connecting with potential markets.

## **Sub-IR 2.2: Increased engagement of private sector in aquaculture markets**

### ***Output-5 Increased access to financial products and services***

#### **2.2.1 Scale-up micro-merchant and agent banking model to ensure formal financial products and services for smallholder aquaculture farmers**

To enhance access to finance for aquaculture stakeholders, Bank Asia has adopted a hybrid model. This approach scales up banking products and services based on group structures. The previous retailer-centric model is functioning and in addition, Bank Asia has formed a number of aquaculture farmer groups, facilitating the Bank to deliver banking products and services. These groups are led by local extension agents for fisheries (LEAF) and support farmers to continue connectivity through disseminating banking products and services.

To transform the Bank’s business within a rapidly changing technological environment and to give its customers better banking experiences, Bank Asia is starting a small-scale pilot of a new type of digital nano loans for the agent banking customer. Of note is that Bank Asia is the fifth bank to introduce digital loans in Bangladesh and will be the first to introduce this digital platform for aquaculture stakeholders. The proposed loan product shall facilitate access to formal financial services for aquaculture stakeholders and support them to achieve financial inclusion.

During this reporting period, in its aim to contribute to aquaculture community development, the Activity has achieved the formation of 60 farmer groups with a total of 1,951 aquaculture farmers. To educate them in financial literacy, the Activity conducted 43 training events, attracting a total of 1,410 aquaculture farmers. The Activity’s learning dissemination activities have resulted in 1,183 farmers already having opened an account with Bank Asia, 415 of these farmers having received loans worth to BDT 30 million and another 200+ loan files in the pipeline.

### **2.2.2 Improving access to finance and aquaculture business development through local business centers**

To address the primary challenges encountered by aquaculture farmers in Bangladesh, which include limited aquaculture expertise and financial literacy, along with inadequate market connections, during the reporting year the Feed the Future Bangladesh Aquaculture and Nutrition Activity joined forces with Khulna Mukti Seba Sangstha (KMSS). This collaborative effort aims to address these systemic challenges in a sustainable manner. KMSS provided capacity-building training to 50 women entrepreneurs on modern aquaculture techniques and financial literacy. During the intervention period, which spanned February 1, 2023, to August 31, 2023, these female entrepreneurs conducted 940 training sessions in the Mongla and Rampal *upazilas* of Bagerhat district, as well as in Terokhada, Rupsha, and Botiaghata *upazilas* of Khulna district. The sessions reached a total of 15,040 farmers, among whom 13,185 were women, and focused on improved aquaculture techniques and financial literacy. KMSS also arranged two synergy meetings with delegates from private sector companies (feed and AMP suppliers, hatcheries, disease diagnosis laboratories) and formal financial institutions (banks, MFIs) to link them with women-led aquaculture business centers and ensure sustainability. Subsequently, KMSS developed content to pitch to private sector companies (feed, AMPs, hatcheries) for working collaboratively with the aquaculture business centers. Six cooking demonstrations were held to demonstrate nutritious fish cooking techniques in Khulna and Bagerhat. As a part of the intervention, KMSS celebrated National Fish Week 2023, and to engage more women and youth in the aquaculture sector, organized events marking International Women’s Day and International Youth Day. It also distributed loans totaling USD 766,564 to a total of 2,522 individuals to ensure access to finance for aquaculture farmers. Finally, the company developed a photo storybook to illustrate its completed initiative and the intervention’s success.

The intervention has had a significant impact on the aquaculture sector of Khulna and Bagerhat districts in Bangladesh. Farmers have learned modern aquaculture techniques, improved their financial literacy, and gained access to new market opportunities. The synergy meeting has also contributed to strengthening the links between the aquaculture business centers and the private sector. The cooking demonstrations raised awareness of the nutritional benefits of fish, and the loans supported aquaculture farmers to finance aquaculture businesses.

#### ***Output-6 Build a sustainable farm-to-fork supply chain to promote processed fish foods***

### **2.2.3 Promote fish-based ready-to-eat and ready-to-eat foods in mainstream market channels with a focus on export markets**

The yield of freshwater aquaculture is gradually increasing, accompanied by a rise in production costs. at the same time however, the price of aquaculture products is gradually decreasing. In the current scenario, it is crucial to boost the price and demand for aquaculture products. This can be achieved through exporting and diversifying aquaculture products, such as RTC/RTE items.

Brother Seafood initiated a project, “Promoting fish-based Ready-to-Cook (RTC) and Ready-to-Eat (RTE) food products in mainstream market channels with a focus on the export market.” This project received financial and technical assistance from Feed the Future, WorldFish, and the BANA Activity for a period of eight months, from February 2023 to September 2023. The objectives of this intervention were to introduce GaqP and BMP into aquaculture systems on farms in order to establish traceable fish marketing, develop contract fish farming to supply fish for the company, establish a healthy cool chain for fish transportation, and develop and organize Fish Market Promotion Hubs in potential aquaculture and fish-producing areas. These hubs provide technical assistance on traceable fish production through GaqP and BMP, and facilitate the marketing of value-added RTC/RTE fish products.

The Activity conducted capacity development activities with 250 farmers and organized training sessions for 60 workers on fish handling, cool chain maintenance, and processing. Six Fish Market Promotion Hubs were developed during this intervention. Key impacts of this initiative include the availability of quality products produced under GaqP and BMP and traceable conditions in the consumer market, strengthened market linkages among stakeholders, increased collaboration with the private sector including farmers, traders, processors and exporters, and improved access to the export

market. During the reporting period, Brother Seafood purchased 830 t of white fish and 11.98 t of prawn for processing into RTC/RTE foods. The total amount spent on these purchases was BDT 18,594,738, equivalent to USD 171,247.

### **Sub-IR 2.3: Improved enabling environment for inclusive growth in aquaculture**

#### **2.3.1 Develop an “Access to Finance Forum” to enable financial inclusion of the small and marginal fish farmers; assess the impact of access to finance models in aquaculture**

The Aquaculture Activity took a significant step during the reporting period by partnering with Innovision Consulting Ltd. to establish an “Access to Finance Forum”. The primary objective of this forum is to serve as a platform where stakeholders in the aquaculture industry, including market actors and farmers, can access vital information related to financial packages, pertinent policies in aquaculture financing, and financial literacy. Additionally, the forum will play a crucial role in tailoring existing loan products to better suit the needs of those involved in aquaculture. Innovision arranged focus group discussions in the five areas as a means of conducting a need assessment for such a forum. Based on its findings, it drafted a need assessment report and presented it in the five regional workshops, July–August 2023. A final policy workshop was then arranged in Dhaka on August 28, 2023. This high-profile event attracted key stakeholders, including DoF, private sector representatives, industry associations, banks and other financial organizations. During the workshop, a critical decision was made to establish a convener committee for the Access to Finance forum. This committee will play a pivotal role in overseeing and coordinating the activities of the forum, ensuring that it serves as an effective platform for enhancing access to finance and promoting sustainable growth within the aquaculture sector (Annex 7).

The establishment of the “Access to Finance Forum” in collaboration with Innovision Consulting Ltd. represents a significant milestone in addressing the financial needs of aquaculture stakeholders. The thorough needs assessment and stakeholder engagement process undertaken through focus group discussions and regional workshops underscore the commitment to creating a forum that is responsive to the unique challenges and opportunities in aquaculture financing.

#### **Challenges encountered while implementing activities under IR 2 in Year 6**

In this reporting period, strengthening value chains faced several challenges, most of which were addressed through initiatives taken by the Activity. These challenges were:

- Non-aquaculture usage of the aquaculture loan was a key challenge for partners who dealt with aquaculture farmers. To minimize this issue, monitoring of loanees was increased to ensure they used the loan for aquaculture. KMSS also came up with the idea to provide loans in-kind (such as inputs) which minimized this issue.
- Afil was looking for the opportunity to diversify its export market from the existing market of India. With the introduction of IPRS, it was able to produce more, which would need other export markets. To address this issue, the Activity linked Afil Aqua with Brother Seafood and both agreed to export their products to the Middle East market. However, price negotiations did not go well (the price offered by the Middle East was lower than India) and Afil Aqua decided to continue with the existing market.
- IPRS technology was not included in the list of the technologies that the Central Bank approved for financing by the banks. The challenges remain, as resolving this requires a change to banking policy, which will take time.

## **IR 3: Improved nutrition related behavior in rural households**

### **Sub-IR 3.1: Improved nutrition awareness and practices**

#### ***Output 7 Improved access to information on nutrition***

##### **3.1.1 Strengthening nutrition-sensitive aquaculture through enhancing nutritional behaviors and private sector engagement**

The absence of appropriate initiatives has led to a knowledge gap among aquaculture farmers and their families. They are often unaware of the importance of nutrition, the need for varied dietary intake, and the advantages of incorporating nutrition-sensitive aquaculture to enhance family health. Mainstream health service providers are often not well-acquainted with the indigenous, nutrient-rich fish varieties and their intake benefits. To address this, the Aquaculture Activity intervened to promote nutrition-sensitive quality food production including fish, increase consumption of diverse food items, and improve nutritional and hygiene practices at the community level. The target was to involve a total of 9,250 aquaculture farmers in Satkhira, Khulna, Barishal, Barguna and Patuakhali districts under the Feed the Future ZOI.

During the reporting year, Activity partner Shushilan conducted extensive training sessions for farmers, with 5,994 receiving training on aquaculture and fish nutrition, out of which 5,926 were women and 68 were men. In addition, 138 batches of single-session training on aquaculture and fish nutrition were conducted to train a total of 3,127 farmers, primarily women. To support farmers financially, Shushilan disbursed loans amounting to BDT 29,295,000 (equivalent to USD 281,683) to a total of 973 aquaculture farmers (955 women, 18 men), and Shushilan field staff visited 10,695 households to provide consultative support on nutrition-sensitive aquaculture practices to aquaculture farmers.

##### **Promotion of nutrition and hygiene practice engaging private sector**

In collaboration with private company Akij Toiletries of Akij Group Ltd., Shushilan completed 50 hygiene promotion campaigns to improve handwashing and other hygiene practices among aquaculture farmer communities. These were participated in by 2,500 individuals (2,324 women, 176 men). Shushilan organized two coordination meetings with a total of 65 (40 men, 25 women) community healthcare providers from the Department of Health, to enhance dissemination of nutrition and hygiene messages within communities. As a result of the meetings, the sensitized health professionals started disseminating key messages on the nutritional benefits of fish consumption.

##### **Nutrition message dissemination through pot song**

To address knowledge gaps among community members and to promote the importance of indigenous fish consumption, proper cooking methods, and intake of balanced meals, Shushilan took a useful approach, using traditional pot songs as a medium for message dissemination. The pot song team conducted performances at five different locations in Khulna, Satkhira, Barishal, Barguna and Patuakhali. During these performances, the team effectively conveyed valuable nutrition messages to 815 individuals (589 women, 226 men). The messages emphasized the significance of maintaining a balanced diet and adopting nutrition-sensitive aquaculture practices.

The primary aim of this promotional intervention was to promote positive behavioral changes and healthier nutrition practices among aquaculture farmers and their families. The initiative is expected to have a significant impact by raising awareness, changing attitudes, and promoting sustainable aquaculture practices, leading to improved nutrition outcomes and inclusive community involvement.

##### **Capacity-building training on nutrition-sensitive aquaculture**

The Activity, in collaboration with Shushilan, took an initiative to increase nutrition knowledge and improve household nutrition through increased aquaculture production. To achieve the objectives, 83 “Capacity-building training on nutrition-sensitive aquaculture” sessions were conducted in the Activity’s working area for marginalized rural farmers. Shushilan provided aquaculture loans to 1,895 farmers, of whom 1,418 attended the training and enhanced their capacity to increase their aquaculture production and income, and improve nutrition practices.



### **Larger carp production demonstration**

To promote larger carp production by stocking ponds with larger-sized carp fingerlings, along with the integration of pond-dike cropping in the communities of southern districts, the Aquaculture Activity in partnership with Shushilan implemented an intervention to demonstrate production techniques. Under the intervention, 10 women in Dumuria and Shyamnagar *upzilas* were supported to establish demonstration ponds for carp polyculture and growing vegetable on pond dikes. The women received large-sized (averaging 250 gm) carp fingerlings and fish feed as input support. A total of 1359.95 kg of carp fingerlings and 3,475 kg of fish feed were distributed among 10 demo farmers. This intervention created enthusiasm among the local farmers to adopt the techniques of larger carp production with pond-dike cropping and learn about improving nutrition through consumption of fish.

### **National Fish Week 2023**

To contribute to improving nutrition through creating nutrition awareness, the Aquaculture Activity participated in National Fish Week 2023, July 24–30, 2023, in Khulna (Dumuria *upazila*), Satkhira (Shyamnagar *upazila*), Barishal, Patuakhali and Barguna districts. The initiative included meetings, rallies and nutrition awareness creation events, with the participation of government officials and local community people. The Activity directly provided 245 community participants (59 men, 186 women) with information and knowledge on nutrition-sensitive aquaculture.

#### **3.1.3 Facilitate coordination meetings with the government stakeholders to increase the message dissemination on the benefits of fish consumption**

The government Department of Health and Family Planning takes a critical role in providing healthcare services, including educating the community on essential nutrition actions and essential hygiene actions. However, there is a lack of sufficient information about the health benefits of fish consumption. During the reporting period, the Activity organized 15 coordination sessions with over 450 healthcare professionals in Faridpur, Rajbari, Madaripur, Shariatpur, Gopalganj, Bagerhat, Jhalokathi, Pirojpur, Magura, Jhenaidah, Kushtia, Narail, Chuadanga, Meherpur, and Jashore districts. 5 Activity staff participated in 17 national-level events to raise awareness among government stakeholders regarding nutrition-sensitive aquaculture.

#### **3.1.4 Disseminating nutrition messages through 100 community clinics**

The Government of Bangladesh established over 13,000 community clinic to improve primary healthcare access for rural residents, serving around 6,000 people in each clinic, with a focus on women, adolescent girls, and children.

During the reporting period, the Activity, in collaboration with Shushilan, facilitated five sensitization meetings with 134 community health care providers (CHCP), where respective district civil surgeons and *Upazila* Health and Family Planning Officers (UH&FPOs) also participated and sensitized on the importance of fish nutrition incorporating the message dissemination within the existing health services. The sensitized health professionals started delivering key messages on the nutritional benefits of fish consumption from their respective service facilities. Through this intervention, they started playing a positive role in the community in improving household nutrition. Moreover, the Aquaculture Activity installed 100 signboards with essential nutrition messages at selected community clinics. The Activity also collaborated with Shushilan to conduct follow-up visits to these clinics.

#### **3.1.5 National Nutrition Week April 23–29, 2023**

The Aquaculture Activity set up a pavilion at the National Nutrition Week 2023. Visitors included the Honorable Minister of Health and Family Welfare, Mr Zahid Maleque, and the Honorable Minister of Agriculture, Dr. Md. Abdur Razzaque, who heard about the Activity's nutrition-sensitive aquaculture initiatives.

Also to mark the importance of National Nutrition Week, a good number of events were organized in Khulna (Dumuria *upazila*), Satkhira (Shyamnagar *upazila*), Barishal, Patuakhali, and Barguna districts. The initiatives included meetings, rallies and nutrition awareness creation events, with the participation of government officials and local community people. The Activity, with the support of Shushilan,



organized an information dissemination event, “Aquaculture, Fish Nutrition, and Gender in the Community on National Nutrition Week 2023”, conducted at 80 community clinics. The event fostered a collaborative learning environment, allowing participants to interact, share experiences, ask questions, and exchange ideas related to aquaculture, nutrition and gender. A total of 3,685 individuals (2613 women, 982 men) attended the event in 80 locations. In addition, in five upazilas, 250 community participants (212 women, 38 men) engaged in a discussion focused on nutrition-sensitive aquaculture and the importance of incorporating fish into their diets.

## **Sub-IR 3.2: Improved access to diverse and nutritious food**

### ***Output-8 Increased nutritious food intake***

#### **3.2.1 Supporting moringa cultivation on pond dykes and in homestead gardens of aqua-farmers in ZOI and ZOR districts**

Moringa (*Moringa oleifera*), a native plant of the Indian subcontinent, is rich in protein and micronutrients, and commands a good market price. It can be cultivated with minimal care on pond dikes and fallow land. As part of the nutrition initiative, the Aquaculture Activity initiated mass production of moringa in pond dikes and homesteads within ZOI and ZOR. In this reporting year, the Activity hired Adhuna Bangladesh Limited to distribute moringa cuttings/saplings to the fish farmers in the Activity’s working area. They distributed around 10,270 moringa cuttings among more than 2,500 farmers in Bandarban, Cox’s Bazar, and Patuakhali districts. During the first round of delivery, 7,600 cuttings were distributed, and in the follow-up round, 2,755 cuttings were distributed. Adhuna Bangladesh Limited made significant efforts in providing capacity-building support to the farmers and stakeholders after distributing the cuttings. Meetings, informative materials, training sessions, and follow-up visits were conducted to equip the recipients with knowledge and skills for successful moringa cultivation. Additionally, a moringa social media platform was established. This platform is expected to serve as a hub for communication and follow-up support. It also offers a dedicated number to support farmers for moringa cuttings plantation and caretaking.

#### **3.2.2 Supporting women entrepreneurs to develop and popularize nutrient-rich fish-based products as a sustainable income-generating opportunity**

The Aquaculture Activity, in partnership with Shushilan, supported women entrepreneurs to develop and promote nutrient-rich, fish-based products in the community. This intervention aimed to create sustainable income opportunities, empower women and increase fish consumption. Under this intervention, 10 women each received essential items, namely, a blender, gas stove, display box, fry pan and water drum, to introduce fish-based snack products as a business alongside their small-scale tea, betel leaf and other light snack businesses. The intervention also provided relevant capacity building training support for entrepreneurship and fish-based value-added product business development. As a result of this support, the women have already been able to start selling fish-based snack products along with tea and other snacks at their small facilities, supporting them to earn an additional income.

#### **3.2.3 Establish demonstration pond dikes for vegetable cultivation with the support of IPs in ZOI and ZOR**

Considering the huge potential of vegetable cultivation on pond dikes, the Aquaculture Activity in partnership with Shushilan began an initiative to promote integrated pond dike cropping with nutrition-sensitive carp–mola polyculture. Under the intervention, a total of 10 women in Dumuria and Shyamnagar received support to establish demonstration ponds for carp–mola polyculture and grow vegetables on pond dikes. The Activity provided each smallholder farmer with 12–18 kg of large (5–6 in.) carp fingerling as input support, 2.5–4 kg of mola fry, and some vegetable seeds. The intervention is expected to support neighboring farmers to learn and increase their fish and vegetable production, which will ultimately contribute to increasing income and improve household nutrition by encouraging the consumption of diverse foods.

### **3.2.4 Facilitating school-based nutrition events with RTE/RTC fish-based products sampling and nutrition message dissemination**

To introduce healthy snack food items among the school-going young generation, the Aquaculture Activity in collaboration with Shushilan started promoting fish-based RTC and RTE snack products. In the reporting period, Shushilan organized 20 school-based nutrition events, including the testing of fish-based RTE/RTC snack products and the dissemination of nutrition messages to popularize fish-based RTC/RTE snack products and replace conventional unhealthy snacks; 1,004 students (320 male, 684 female) participated.

#### **Challenges encountered while implementing activities in Y6:**

- The fish cultivation season faced setbacks due to a delayed rainy season, which postponed the distribution of larger-sized carp fingerlings to the Activity's demo farmers.
- Private sector engagement took longer than anticipated, causing a delay in organizing school-based nutrition events to promote fish-based RTE/RTC products and disseminating nutrition and hygiene awareness messages.
- Migration has led to an incomplete list of loan recipients for aquaculture training.

## **8. Project management and cross-cutting**

### **8.1. Activity management**

#### *Common Programs*

#### **8.1.1 Year 6 planning workshops**

Emphasizing the importance of tasks of Year 6 – the final year of the Activity – and on-time implementation, the Aquaculture Activity conducted a workshop from March 21–22, 2023 at Dream Squire Resort, Gazipur, with the participation of 40 staff. The key objective of the workshop was to plan work, including exit strategy and synergistic partnerships, for the time remaining, taking into consideration overall work status, priorities, challenges, and lessons learned. Intensive participatory discussions and work on the scheduled topics supported all staff to finalize the interventions within the specific timeframe. The initiative was supportive for the Activity in terms of efficient implementation in Year 6.

#### **8.1.2 Progress review workshops**

In compliance with the workplan, the Activity organized a workshop from June 4–7, 2023 at Mozaffar Garden Resort, Satkhira, with the participation of 35 staff, to conduct detailed discussions on the progress made on the planned interventions, challenges and way forward. The event enabled participants to share the progress of the planned interventions, discuss associated issues and determine way forward, which eventually guided the Activity to ensure the on-time implementation for rest of the implementation period.

#### **8.1.3 Project closeout workshop**

As per the plan, the project closeout workshop will be held during the fourth week of October 2023 in Dhaka. The closing workshop will provide a platform to showcase the accomplishments, lessons learned, and impact of our joint efforts over the course of this Activity. It is also an opportunity for stakeholders, including esteemed organization, to engage in meaningful discussions, share insights, and chart the way forward for continued cooperation towards sustainable development.

#### **8.1.4 Exit strategy, synergy and OneStop Service Center (5 regional and 1 central) workshops**

All these workshops were completed including the central workshop at Six Seasons Hotel Dhaka.

As part of the exit strategy, Bangladesh Aquaculture Activity organized four workshops on synergistic partnerships in Khulna, Barishal, Cox's Bazar and Dhaka. The objectives of these workshops were to:

- Describe the concept of synergy, its advantages, and how it can be incorporated into a strategy.
- Facilitate group work to determine which partners should work together.
- Share the outline of a Memorandum of Understanding and facilitate its signing.

The first workshop on synergistic partnership with partners was held at City Inn Hotel, Khulna on 12 April 2023. , Barishal on May 25, 2023. A total of 26 partners participated in the workshop, where Bangladesh Aquaculture Activity facilitated the signing of an MoU between Afil Aqua Fish Ltd and Ready

The second workshop on synergistic partnership with partners was held at Hotel Grand Park, Barishal on May 25, 2023, with 14 partners participating. In this workshop, the Aquaculture Activity facilitated the signing of two MoUs, between (1) Matshya Bangla Hatchery and Padma Feed, and (2) COAST Foundation and Padma Feed.

The third workshop on synergistic partnership with partners was held at Seagull Hotel, Cox's Bazar on May 31, 2023, with 14 partners participating. In this workshop, the Activity facilitated the signing of three MoUs, between (1) Satata Poultry and Maa Matsha Hatchery and Nursery, (2) Gram Unnayan Sangathan (GRAUS) and Maa Mathsha Hatchery Nursery, and (3) Palongki Konna and Shah Amanat Traders (SAT).

The fourth and final workshop on synergistic partnership with partners was held at Six Seasons Hotel, Gulshan-2, Dhaka on July 31, 2023, with 17 partners participating. Here, the Activity facilitated the signing of one MoU, between Metrix Business Development Ltd. and Petrochem Bangladesh Ltd.

#### **8.1.6 Team meetings, exposure visits, demonstration and others**

All-staff, senior management team and other meetings, including with USAID, were held regularly. These contributed to solving issues, generating better options, and enhancing the pace of implementation. The Activity arranged exposure visits for 59 potential farmers from the ZOI and ZOR regions, and eight Activity and partner staff, to observe and learn about the success of a carp fattening program in Natore and Rajshahi. From the initiative, the visitors were able to learn about the benefits of stocking large-sized carp fry, sourcing large-sized fry, stocking methods, stocking density, feeding, culture practices and periods, selling fish, and the overall planning of the carp fattening practice. Many visitors have already started stocking large-sized carp in their ponds and report having observed positive changes as a result. This has created enthusiasm about the new practice among neighboring farmers in the region. This initiative is expected to help increase aquaculture production and productivity in the southern districts of the country.

## **8.2. Finance & grants**

### ***Budget***

#### **8.2.1 Year 6 and NCE period budget development**

The Activity Year 6 and no-cost extension (NCE) period budget was rigorously developed, with the program and senior management team having the detailed list of interventions and activities set in the workplan as a main reference. The information used in budget development came from historical data, previous activity costings and assumptions. The Activity's Year 6 and NCE period budget is USD 4,309,757.

By the end of Year 6, Activity will have an estimated remaining budget of USD 568,521. Table 3 (below) shows the balance for the rest of the Activity period.

The Activity requested a budget realignment from USAID to reflect mortgage amounts and additional activities required in Year 6 and the NCE period.

Table 3. Aquaculture Activity budget throughout its duration (Years 1–6).

Cost Categories	Agreement budget (USD)	1st revision total budget (USD)	2nd revision total budget (USD)	Year 1 (Feb 2018-Sep 2018) (USD)	Year 2 (Oct 2018-Sep 2019) (USD)	Year 3 (Oct 2019-Sep 2020)	Year 4 (Oct 2020-Sep 2021)	Year 5 (Oct 2021-Sep 2022)	Year 6 & NCE (Oct 2022-Nov 2023)	Revised budget	Mortgage
Direct labor	5,474,565	5,474,565	5,944,477	414,022	926,710	1,082,060	1,162,779	1,199,747	1,108,635	5,893,951	50,526
Fringe benefits	1,765,430	1,765,430	1,882,292	131,311	294,843	375,758	360,918	346,070	324,587	1,833,486	48,806
Consultants	288,593	288,593	411,838	-	70,998	73,348	57,419	160,074	31,347	393,185	18,653
Supplies, equipment and operating	1,570,245	1,741,916	1,535,050	153,671	478,943	325,368	173,893	162,835	216,369	1,511,080	23,970
Travel and <i>per diems</i>	419,507	967,676	916,663	51,841	206,295	141,701	103,476	179,772	206,822	889,906	26,757
Other direct costs (Activity)	2,753,016	4,282,319	3,164,654	112,324	695,954	333,383	599,437	554,553	721,449	3,017,100	147,554
Sub-grants	8,049,508	5,800,365	6,465,890	-	1,274,492	1,607,383	1,248,560	1,332,757	971,512	6,434,704	31,186
<b>Total direct cost</b>	<b>20,320,864</b>	<b>20,320,864</b>	<b>20,320,864</b>	<b>863,168</b>	<b>3,948,235</b>	<b>3,939,001</b>	<b>3,706,481</b>	<b>3,935,807</b>	<b>3,580,721</b>	<b>19,973,412</b>	<b>347,452</b>
Indirect cost	3,657,756	3,657,756	3,657,756	155,370	710,682	709,020	667,167	708,445	644,530	3,595,215	62,541
CGIAR cost-sharing fee [@ 2% of total direct + indirect cost]	479,572	479,572	479,572	20,371	93,178	92,961	87,474	92,885	84,505	471,373	8,199
<b>Total activity cost</b>	<b>24,458,192</b>	<b>24,458,192</b>	<b>24,458,192</b>	<b>1,038,909</b>	<b>4,752,095</b>	<b>4,740,982</b>	<b>4,461,122</b>	<b>4,737,136</b>	<b>4,309,757</b>	<b>24,040,000</b>	<b>418,192</b>

## 8.2.2 Quarterly forecasts

The Activity has performed well so far in Year 6, achieving 83 percent of its forecasted expenses of USD 3,741,235, submitted to USAID from October 2022 to September 2023 (Table 4).

Table 4. Quarterly forecasts: Year 6 and NCE period.

Months	Revised budget (USD)	OCS budget (USD)	Forecast (USD)	Actual expense (USD)	F vs. E variance (USD)
	A	B	C	D	E=C-D
<b>October-22</b>	165,302	533,763	390,007	165,302	224,705
<b>November-22</b>	203,208	533,763	407,734	203,208	204,526
<b>December-22</b>	236,674	533,746	425,462	236,674	188,788
<b>January-23</b>	216,712	216,712	267,354	216,712	50,642
<b>February-23</b>	361,294	361,294	355,026	361,294	(6,268)
<b>March-23</b>	303,687	303,687	298,695	303,687	(4,992)
<b>April-23</b>	316,243	316,243	343,164	316,243	26,921
<b>May-23</b>	339,256	339,256	362,512	339,256	23,256
<b>June-23</b>	384,672	384,674	401,382	384,672	16,710
<b>July-23</b>	407,574	407,574	420,605	407,574	13,032
<b>August-23</b>	331,560	331,560	362,000	331,560	30,440

Months	Revised budget (USD)	OCS budget (USD)	Forecast (USD)	Actual expense (USD)	F vs. E variance (USD)
September-23	439,225	437,756	449,479	475,052	(25,573)
<b>Total</b>	<b>3,705,408</b>		<b>4,483,420</b>	<b>3,741,235</b>	

### 8.2.3 Activity budget review

#### Midyear budget review

The midyear budget review was completed on (June 5, 2023 and June 6, 2023 and September 26, 2023) and a few updates and changes on activities presented in the revised Year 6 budget and NCE period which was submitted to AOR in September 13, 2023. The budget review was conducted to remind the whole team of its achievements so far. It provides the senior Management Team with information on the strategies they need to develop to catch up on the completion of Year 6 and NCE period workplan. It also provided midyear information on the financial performance of the Activity. This midyear budget review allows the Activity to adjust achieve a more accurate budget for the current fiscal year, resulting in greater budget transparency and guidance to the management in shaping the remaining period budget.

#### Quarterly budget review

The information below analyzes the financial performance of Activity based on the submitted budget and actual expenses. The Activity Year 6 actual expense stands at USD 3.7 million or 87 percent of the total budget of USD 4.3 million.

Year 6 and NCE period	Amount in USD
Total budget	4,309,757
Total expense	3,741,236
<b>Budget balance</b>	<b>568,521</b>
<b>Burn rate</b>	<b>87%</b>

#### Total award balance

The accumulated expenses from 2018 to date are recorded at USD 23,471,479 leaving an available budget balance of USD 568,521 as of September 30, 2023 (Figure 3).

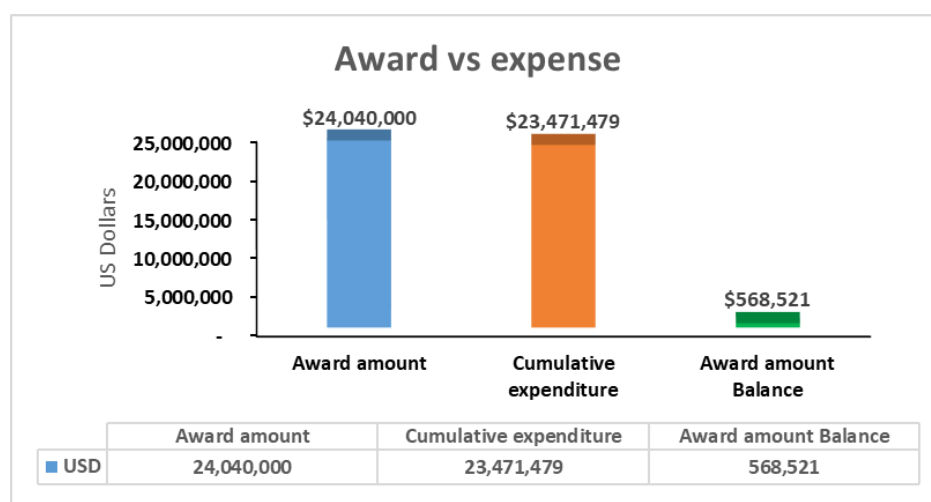


Figure 3: Award and expense balance as of Year 6

#### Sub-grants

The Activity established and continued 17 sub-grant partnerships with a total value of USD 1,375,861 invested, with Aquaculture Activity contributing 34 percent of the total in the form of cost-sharing grants. A list of partnerships signed during Year 6 and the NCE period is provided below (Table 5).

Table 5. Partnerships signed in Year 6.

SI	Sub-grantee name	Feed the Future contribution (BDT)	Feed the Future contribution (USD)	Grantee contribution (BDT)	Grantee contribution (USD)
1	Afil Aqua Fish Ltd.	1,345,650	12,884	13,555,140	129,350
2	Aftab Feed Products Limited	8,331,009	78,545	9,848,441	92,719
3	Gram Unnayon Sangathon (GRAUS)	8,388,385	79,388	416,300	3,958
4	Petrochem Bangladesh Limited	4,869,459	46,453	5,971,663	57,217
5	Bank Asia Limited	3,312,400	31,709	2,743,400	26,262
6	TAHZINGDONG	7,372,489	69,734	644,000	6,095
7	Protyashi	8,735,319	82,032	2,986,000	27,875
8	Ms. Shah Amanath Traders	2,811,759	26,650	3,277,991	31,170
9	FishTech Hatchery Limited	1,658,823	15,810	2,204,965	21,014
10	Shushilan	8,857,135	83,937	2,497,572	23,708
11	Rehabilitation Employment and Development for The Youths (READY)	4,350,411	40,935	-	-
12	Bangladesh Shrimp & Fish Foundation	11,467,768	106,978	-	-
13	Padma Feed	3,561,930	33,695	3,562,600	33,270
14	COAST Foundation	8,364,331	78,792	-	-
15	Nowabenki Gonomukhi Foundation	5,409,938	50,827	-	-
16	Khulna Mukti Seba Sangstha	6,632,223	62,482	1,277,854	12,179
17	Brother Seafood	378,000	3,619	686,900	6,576
	<b>Total fixed grants</b>	<b>95,847,029</b>	<b>904,468</b>	<b>49,672,826</b>	<b>471,392</b>

To date, the Activity has signed a total of 116 sub-grants (99) and service contracts (17) with a total value of USD 11,990,991, where the Activity invested USD 7,181,024 and the sub-recipients' investment is USD 4,809,967. Among these, four were terminated; five final payments were under process at the end of September, 2023. A total of USD 6,366,769 was expended under the sub-grant budget, resulting in a remaining budget balance of USD 67,935. This will be liquidated by November 30, 2023.

#### 8.2.4 Financial Audit 2022-2023

WorldFish engaged financial audit team for 2022-2023 and start their work from October 4, 2023.

#### Workshops and Training

#### 8.2.5 Sub-grant orientation

The orientation program for new sub-grantees took place on April 5, 2023. The project focal and project finance from the newly signed agreement were invited to the training. WorldFish Aquaculture Activity employees were invited to join this training, which had 41 participants. The training was facilitated and conducted by Ms. Faria Islam, Grants Accountant of Aquaculture Activity; Ms. Sally Mallari, Accounts

Manager (Finance and Grants) conducted and facilitated the training. The training covered key discussion areas such as sub-grant management process, documentation, financial management and compliance, and payments.

### **8.2.6 Compliance and Fraud Prevention workshop**

Training on compliance and fraud prevention was conducted on April 11, 2023, facilitated by Ms. Faria Islam, Grants Accountant of Aquaculture Activity and conducted by Ms. Glenda Munyukwi, Global Risk and Compliance Lead and Ms. Sally Mallari, Accounts Manager (Finance and Grants), with 41 attendees. The training covered key discussion areas, including definition of fraud and its impact, policies to prevent fraudulent activities, consequences of fraud, identifying risk and risk management. Topics discussed included key definition, corruption index, examples of fraud and unethical behavior in the workplace, red flags, consequences of fraud, how to respond to fraud, risk management strategy, importance of internal control, role of project focal, finance focal and senior management in risk management. The training materials were later shared among the participants for their reference and guidance (Annex 8).

### **8.2.7 Procurement planning and execution**

On April 10, 2023 training on procurement policy and process was conducted. The project focal and project finance from the newly signed agreement were invited to the training, as well as WorldFish staff, including from core administration and procurement. There were 41 participants, and the training was facilitated and conducted by Ms. Sally Mallari, Accounts Manager (Finance and Grants) of the WorldFish–Aquaculture Activity. The topics presented were procurement planning, key definitions, procurement process and documentation, retention of documents, responsibilities of procurement committee, terms and conditions, inventory management, disposal of equipment, and additional guidelines. The training materials were later shared among the participants for their reference and guidance.

### **8.2.8 Project closeout**

Project close-out trainings were held on July 19, July 25 and August 3, 2023. The project focal and project finance from ongoing partners and WorldFish–Aquaculture Activity employees were invited. The total number of attendees was 71.

The training was facilitated and conducted by Mr. Md Hafijur Rahman, Sr. Project and Grants Accountant and Mr. Md. Didarul Islam, Grants Accountant, both of the Aquaculture Activity. The training covered key discussion areas, including steps to be followed for close out, documents and preservation, inventory and property management, disposition plan, final technical and financial reports if any, and final payment (Table 6).

Table 6. Summary of trainings held in Year 6.

<b>Training/workshops</b>	<b>No. of trainings</b>	<b>Timeline</b>	<b>Dates</b>	<b># Attendees</b>
Sub-grant orientation to new sub-grantees	1	Y5Q3	April 5, 2023	41
Compliance and Fraud Prevention workshop	1	Y5Q3	April 11, 2023	41
Procurement planning and execution	1	Y5Q3	April 10, 2023	41
Project close-out training	3	Y5Q4	July 19, July 25, August 3, 2023	71



### **8.3. Monitoring, evaluation and learning (MEL)**

#### ***Strategic MEL Activity***

##### **8.3.1 Review and update MEL Activity in annual work plan**

The Activity's MEL plan is annually updated to reflect new targets against the indicators, as new partnerships are formed or contracts are extended. In this reporting year, the Activity team initiated the process for learning capturing and harvesting systemic change information. Details of the mechanism have been incorporated in the updated Year 6 MEL plan.

##### **8.3.2 Review and update Aquaculture Activity Theory of Change**

During this reporting period, the Theory of Change for the Activity was updated, with a specific emphasis on thematic areas. This update aimed to enhance the understanding of how the program's interventions contribute to the desired outcomes and impact, aligning them with broader development goals. The updated Theory of Change underlines the significance of adaptability, enabling adjustments based on continuous evaluation and new information. It also emphasizes crucial partnerships and activities essential for accomplishing the goals of the Bangladesh Aquaculture and Nutrition Activity.

##### **8.3.3 USAID DQA activity**

The Activity is preparing to report results for FY 2023 on DIS/FTFMS/PPR reporting following the USAID mandated format.

#### ***Routine MEL Activities***

##### **8.3.4 Maintaining the Activity IP MEL Matrix**

The Activity MEL team has developed an MEL matrix, using an Microsoft Excel file to track the IP's activities in one place. The MEL matrix is a living document that contains data relating to different activities taking place in the field.

##### **8.3.5 Monthly IP activity progress monitoring**

Specific key performance indicators (KPIs) that were outlined in the agreement terms were used to track the IPs' progress. MEL deliverables were routinely monitored using the KPIs and pertinent time frames, and the KPI matrix was regularly updated. A single matrix database containing program, grant, and MEL aspects was also maintained to track progress. Utilizing verification tools and the MEL standard formats, the quality of the deliverables was ensured. MEL feedback was shared with the IPs to assist them in understanding the process and improving the data quality of the MEL deliverables. The MEL team also monitored training events organized by IPs in ZOR and ZOI.

##### **8.3.6 Programmatic data collection from IPs and relevant stakeholders**

In addition to the set deliverables, the MEL team collects data from IPs as per the requirement of any other teams of the Activity. The MEL team has developed a suitable tool to gather data in this regard. Such programmatic data may include but is not limited to capacity development initiatives, types of services provided by LSPs, dealer points and/or one stop service points, the beneficiaries who received loans, demo ponds and many more.

##### **8.3.7 IP MEL deliverables review and field monitoring**

The MEL team reviews all MEL-related deliverables when they are received from the IPs at the end of each month. The team follows two primary methods for examining these deliverables: desk reviews and field visits. Desk review requires a thorough examination of MEL inputs presented by IPs' in their monthly progress report. Field visits verify the MEL inputs provided by IPs to monitor the efficacy of the interventions. It is the MEL team's intent to check and verify at least five percent of IP interventions.

##### **8.3.8 Regular MEL updates sharing with Activity team**

Regular MEL updates are essential to ensuring that Activity operations are functioning efficiently and achieving anticipated targets. They also guarantee that the required data is available to provide to donors and other stakeholders. During the reporting period, the MEL team shared the MEL-related updates

with all participants at the end of each week, to ensure they were aware of where field activities were not meeting expectations and where they had succeeded.

### 8.3.9 MEL team meeting and workshop

The MEL team held weekly team meetings throughout the reporting period. It also employed its teamwork approach in convening, need-based team meetings, using the official MS Teams platform when necessary.

### Management Information System

#### 8.3.10 Updating the MEL Management Information Systems platform

The web-based Management Information Systems (MIS) platform was upgraded periodically in order to collect and compile Activity information (Figure 4). The following URL leads to the MIS platform: [www.melinsight.com](http://www.melinsight.com).

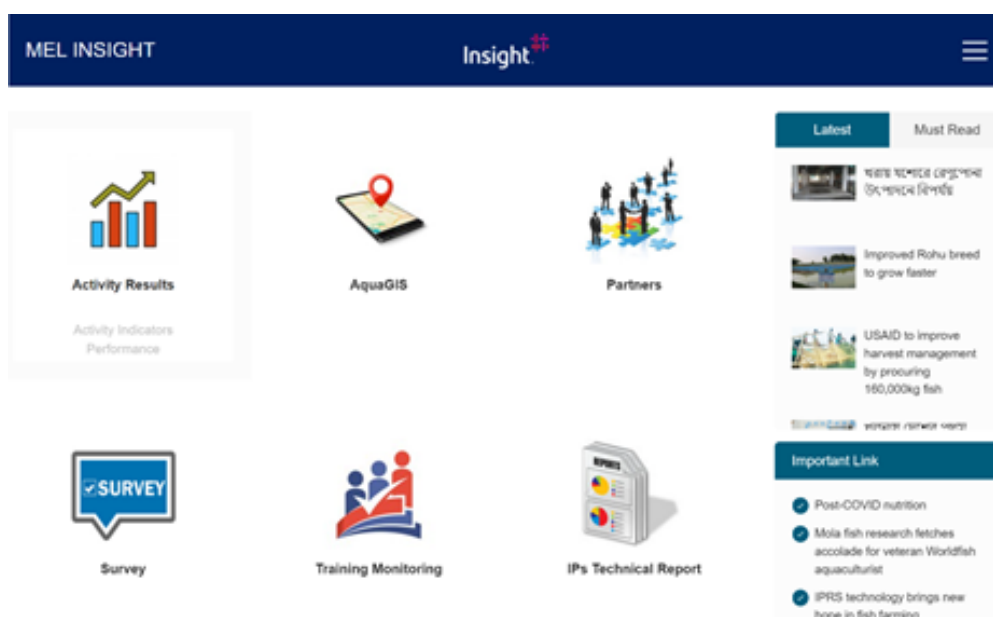


Figure 4: Activity MEL MIS

#### 8.3.12 Implementing partners' progress monitoring dashboard

During the reporting period, the Aquaculture Activity developed a MIS-based dashboard in order to maintain and manage its IPs' monthly progress reports. The MEL team has made the MIS platform accessible to Activity staff, enabling them to receive the most recent updates on IP activities. In the second quarter of this reporting year, the reporting format was revised, and now provides a succinct summary of partner interventions.

#### 8.3.13 Training events tracking

The MEL team has developed an event tracking matrix to track IP field activities. The event monitoring matrix is being updated within the first week of each month with IP-based monthly field activities. The MEL team uses this matrix sheet to receive regular updates and to record data on field travel.

#### 8.3.14 Integrating GIS into the Activity MEL platform

Google Maps was utilized to get a holistic picture of aquaculture market actors supported and covered by the Activity. Interactive maps, showing the concentration of Bangladesh Aquaculture Activity

beneficiaries in geographic area across the Feed the Future areas into the MIS platform, were developed and completed in the first quarter of Year 6.

### *Survey*

#### **8.3.15 Quarterly performance survey**

The MEL team has worked extensively to customize sales and leverage investment data collection tools for FY2023, considering the nature and type of IPs and relevant market actors. Accordingly, six separate tools have been developed/updated to collect sales data from aquaculture medicinal products (AMP): sales point, fish feed sales point, carp hatchery, tilapia hatchery, processed/value added fish-based products, and aqua machineries and equipment. These tools are further customized for each IP, as well as for their sales point. The MEL team will continue to capture the additional investments made by the IPs in the last quarter of the Activity's reporting year.

#### **8.3.16 Annual performance survey (Farm Productivity)**

The fish farming/production season was successfully completed in March/April 2023. Before conducting the annual performance survey, the data enumerators underwent a comprehensive three-day training on survey approaches, data collection tools, and standards to ensure data quality.

Subsequently, the annual performance survey was carried out at the producer's level in May 2023, with the data enumerators actively involved in gathering relevant data. The collected data will be submitted to the designated Data Information System (DIS) platform in November 2023 for analysis and evaluation.

By conducting the annual performance survey and ensuring the data's accuracy and quality, the Activity will gain valuable insights into the outcomes and impact of its interventions during the fish farming/production season. This data-driven approach will facilitate informed decision-making and further enhance the effectiveness of the program in achieving its goals and objectives.

#### **8.3.17 Annual performance survey (enterprise/company/firm/NGO)**

This firm-level survey covers sales and leveraged investment data. The MEL team collects IP sales data periodically, based on their business dynamics/patterns and reporting preferences (e.g., quarterly or annually). The sales data was gathered from IPs for the reporting of FY 2023 to demonstrate the results between October 2022 and September 2023.

#### **8.3.18 Measuring change in the market system: qualitative assessment**

The Aquaculture Activity engaged Human Development Research Center to assess the changes in the aquaculture market system resulting from the Activity's interventions. The goal is to understand the impact, effectiveness, and performance of interventions, ensuring a comprehensive analysis of both intended and unintended outcomes. This assessment, conducted in Activity partners working area, combines qualitative and quantitative methods, with a focus on qualitative insights. It evaluates the performance of implementing partners, market actors, and fish farmers affected directly or indirectly. The study aims to uncover deeper effectiveness, impact and innovations, emphasizing evidence of copying and crowding-in effects, market resilience, and private sector business opportunities generated by the Activity interventions.

#### **8.3.19 Need-based surveys/study per programmatic priority requirements**

The Aquaculture Activity aimed to consolidate insights gathered from various initiatives and business models used by its partners. As part of this learning process and in alignment with programmatic priorities, surveys were conducted throughout the reporting year. During the first quarter, a survey was carried out to assess the impact of access to finance, analyze the financial performance of aquaculture entrepreneurs, evaluate training outcomes, and disseminate aquaculture knowledge and practices. To study the impact of access to finance on farmers and dry fish producers, a comprehensive questionnaire was developed. Twenty data enumerators received training on access to finance data collection methods. The data collected from this survey served as a resource for a third-party entity hired for the aquaculture activity, facilitating the establishment of a platform to enhance financial inclusion for

market participants in the aquaculture sector. Additionally, an evaluation of the operational/functional status of the OSCC points was conducted at the last quarter of the reporting year.

### ***MEL Reports***

#### **8.3.20 Periodic MEL reports (weekly/quarterly/annual)**

MEL team provided inputs into the weekly/quarterly/annual reports, incorporating MEL updates.

#### **8.3.21 FTFMS report**

Data analysis and reporting for the Year 6 Annual Performance Survey (FY 2023) will be completed in November 2023 followed by data verification and data cleaning. Standard indicator results including appropriate disaggregates, respective deviation narratives, and out-years target (FY 2023) will be entered into the FTF module on the newly introduced Development Information Solution (DIS) platform (Annex 9).

#### **8.3.22 USAID Development Information Solution (DIS) report**

Results for FY 2023 were uploaded into the DIS system of USAID. Disaggregated data for nine standard indicators and associated deviation narratives against FY 2023 results, along with the out-year targets were reported into the system.

### ***Geographic Information System (GIS)***

#### **8.3.23 Aquaculture Activity beneficiaries GIS data collection and submission to USAID**

The MEL team worked to update the activity participants GIS data and collected beneficiary data from field survey. The GIS data collection tools were updated based on the type of beneficiary to collect programmatic data. A total of 27,726 participants' databases have been developed to date (Annex 10). During the reporting year, GIS data of fourteen new sales points were added.

#### **8.3.24 Develop GIS-based interactive maps for Aquaculture Activity stakeholders**

In the current reporting period, the Activity developed two maps to showcase crab farmer villages and crab sales points in the ZOI and ZOR.

### ***Data collection pool***

#### **8.3.25 Hiring 22 data enumerators and engaging them to produce surveys**

The MEL team renewed contracts with 22 data enumerators for the current reporting year. The pool of enumerators is under continuous in-service training to ensure data quality across the Activity's interventions. They were engaged to collect quarterly and annual performance data, and to verify the data/information as submitted by the IPs. They also collected GIS data, such as the location of sales points, G3 rohu farmers, village landmarks, demo ponds, and other relevant programmatic data. The data enumerators are also engaged in training monitoring conducted by partners.

### ***MEL Capacity development***

#### **8.3.26 Training provided to survey pool on data collection and MEL issues**

The MEL team facilitated capacity strengthening training courses for all data enumerators throughout the reporting year (Table 5). The training courses included collection techniques of annual sales data, CFC surveys, GIS data, and capacity building training of the LEAF. MEL training sessions conducted for data enumerators in Year 6 are presented below (Table 7).

Table 7. MEL training sessions for data enumerators conducted during the reporting period.

Date	Title	Mode of Training	Participants		
			Total	Male	Female
Oct 17, 2022	Training on CFC and environmental compliance survey	in-person	8	6	2
Nov 17, 2022	Training on KMSS OSSC points GIS data collection	virtual	3	2	1
Dec 7, 2022	Training on IPs farmers training monitoring in the field	virtual	11	10	1
Jan 8, 2023	Training on field training monitoring checklist and GIS data collection	virtual	12	11	1
Feb 10, 2023	Training on field training monitoring checklist	virtual	15	14	1
Mar 3, 2023	Training on field training monitoring checklist	virtual	22	20	2
Mar 29, 2023	Training on MEL data collection methods and modalities	In-person	22	20	2
Mar 30, 2023	Training on farmers tracking survey and data collection tools.	in-person	22	20	
Apr 1, 2023	LEAF capacity building training on aquaculture technology and business promotion	virtual	04	04	0
Apr 4, 2023	Training on field training monitoring checklist	virtual	09	07	02
Apr 11, 2023	Capacity building training on hatchery sales data collection	virtual	14	14	0
May 6, 2023	Training on nursery and seed sales agent data collection	virtual	17	16	1
May 11, 2023	Training on <i>patilwala</i> sales data collection	virtual	19	18	1
May 20, 2023	Training on village list preparation for farmer tracking	virtual	16	15	1
May 23–25, 2023	Training on annual performance data collection	in-person	18	16	2
Aug 7, 2023	Training on OSSC points assessment	virtual	15	15	0
Aug 17, 2023	Training on demo pond GPS point data collection	virtual	8	7	1
Oct 1, 2023	Training on annual sales data collection	in-person	18	16	2

### 8.3.27 Capacitate IPs on MEL

The MEL team members extended backstop support to Activity IPs as and when needed, conducting desk and field checks of IP data and sharing feedback with them to facilitate necessary adjustments. In the final quarter of the reporting period, the Activity MEL and Grants teams jointly conducted an orientation session to capacitate IPs on issues relating to MEL and Grants compliance. MEL team members also conducted field visits and observed farmer training sessions organized by different IPs (e.g., Shushilan, M/S Shah Amanat Traders, Tazingdong, GRAUS, Prottyashi, Petrochem), sharing observations with the IPs and the program team members in order to address any challenges.

## 8.4. Capacity building

### 8.4.1 Arrange capacity building training, workshop for IPs and Aquaculture Activity staff

Realizing the need for extension workers at field level, the National Agricultural Technology Programme (NATP) first introduced field level extension staff (local extension agents for fisheries, or LEAF) in the DoF. As part of its collaboration with DoF, the Aquaculture Activity successfully conducted 120 farmer events in the IP coverage regions, organized in collaboration with 60 selected LEAF. In total, 2,988 fish farmers directly benefitted from these events, gaining valuable knowledge and insights into improved pond management, feed application practices, and household pond dike cropping.

The impact of these events extended further, as the trained farmers served as valuable conduits of knowledge dissemination. Indirectly, with the support of these trained farmers, an additional 14,940 fish farmers were reached with technology dissemination and BMP. This outreach effectively improved the farming practices and productivity in the aquaculture sector, leading to sustainable growth and improved livelihoods for the farming communities.

The Aquaculture Activity's focus on knowledge sharing and capacity building through these events has contributed to the overall development and enhancement of the aquaculture industry in the targeted regions, fostering a more resilient and inclusive fish farming community.

### 8.4.2 LEAF capacity enhancement training

The Aquaculture Activity is dedicated to enhancing the capacity of 250 selected local extension agents for fisheries (LEAF) in the Feed the Future ZOI. The primary focus was to improve current pond management practices, promote GAqP, and instill effective post-harvest management practices for safe fish production.

To achieve this, the following key activities were undertaken:

- *Comprehensive training workshops.* These were organized for 250 LEAF participants, and covered various aspects of pond management, GAqP and post-harvest practices, equipping them with up-to-date knowledge and techniques.
- *Hands-on learning.* Practical sessions and field visits were incorporated into the training program, allowing LEAF members to apply their learning directly to real-life situations and gain valuable hands-on experience.
- *Aquaculture message dissemination.* Trained LEAF members were tasked with conveying updated, accurate aquaculture messages to neighboring fish farmers. They serve as a bridge between the program and the wider fish farming community, disseminating valuable information to improve practices and boost productivity.
- *Farmer training.* As part of their capacity-building role, LEAF members conduct training sessions for fish farmers in their respective areas. These are farmer-focused and tailored to address specific needs and challenges faced by farmers, guiding them towards BMP and improved fish production.

By building the capacity of these 250 LEAF participants, the Activity aims to create a ripple effect in the aquaculture community, spreading knowledge and BMP that will contribute to safe and sustainable fish production. This capacity-building approach is key to the overall development and growth of the aquaculture sector, promoting food security, livelihood improvement, and enhanced nutrition for the local communities in the Feed the Future Zone of Influence.

## 8.5. Gender and youth

### ***Output-9 Increased access to productive economic resources for women and youth***

#### **8.5.1 Training of Trainers/refresher training on gender inclusion in BAA for all IPs**

During the reporting period, the Aquaculture Activity conducted five two-day refresher training sessions on gender inclusion for implementing partner staff. A total of 17 partners from the ZOI and ZOR participated, with 95 attendees receiving training on basic gender concepts and aquaculture-related gender issues. The training promoted gender inclusion within the BAA, encouraging participants to prioritize the involvement of women and youth. Various methods, including group exercises, brainstorming, games and presentations were used to explore the root causes of gender inequality. Participants committed to monitoring the program through a gender lens and enhancing the inclusion of women and youth with a focus on quality gender inclusion in their initiatives.

#### **8.5.2 Support in ZOI and ZOR in marking International Women's Day to create an enabling environment for women in the aquaculture sector**

The Aquaculture Activity, in collaboration with implementing partners in the ZOI and ZOR celebrated International Women's Day 2023 with the theme “DigitALL: Innovation and technology for gender equality”. Throughout March 2023, a series of events, including rallies, discussions, art, game shows and cultural programs, was organized by 11 running partners in the Activity’s working areas (Annex 11). These events featured discussions on women’s achievements and challenges in aquaculture, with approximately 1,019 participants, including 721 women, the majority of whom were aquaculture entrepreneurs from the ZoI and ZoR. The initiative aimed to inspire women to combat gender inequality and societal norms, while at the same time encouraging men to support women’s roles in aquaculture, technology, and household responsibilities. Additionally, it aimed to strengthen women's connections with relevant government institutions, including the *upazila parishad* and Department of Women's Affairs. Participants pledged to unite against gender discrimination and inequality, working towards a more equitable aquaculture sector in Bangladesh.

#### **8.5.3 16 days of activism to end gender-based violence, that affects women's ability to thrive and success**

In 2008, the Secretary General of the UN launched a campaign popularly known as UNiTE 2030. The theme of the campaign for this year is “UNiTE! Activism to end violence against women and girls.” To popularize the campaign, on November 29, 2022, the Activity organized a day-long workshop at a local hotel at Cox’s Bazar, attended by 35 participants from nine IPs working in the ZOR. The workshop’s key objectives were to sensitize partners and participants to the 16 Days of Activism, embedding the scope of addressing GBV in their interventions, to raise awareness of violence against women and girls and GBV, and related issues such as their impact on children and nutrition. A group exercise was conducted to demonstrate to IPs how to address GBV in their interventions.

As a result, the participants showed their interest in including GBV issues into their visual platforms such as drama, documentary, photography, and cultural event/theater, and in engaging key community people in campaigns, social meetings, and/or training on GBV to create better impact.

A special session was held to demonstrate the mandate (including roles and responsibilities) of the Activity’s Gender and Youth Team, and the methodology to roll this out at the field level. All participants reported including gender and youth issues in the meetings and trainings held in December 2022, where 404 community people (including 272 male) were sensitized on GBV issues.

#### **8.5.4 Coordination meeting with MoWCA and/or Department of Fisheries to orient BAA and obtain their support for sustainability**

The Aquaculture Activity is working with DoF and other relevant departments (Department of Women and Child Affairs, Department of Youth Development) and local administrations through activities at the sub-national and local levels. Coordination meetings between Women and Youth Aqua Business Actors and relevant government departments is an important activity, and during the reporting period, the Activity organized three meetings in Barisal, Khulna and Jashore. During these meetings,



discussions centered around Activity outcomes at the district level, involving stakeholders from the Ministry of Women and Children Affairs (MoWCA) and Department of Youth Development. The primary objectives were to seek support from these respective departments for women entrepreneurs and to gain a comprehensive understanding of gender and women empowerment concepts, along with the associated constraints and opportunities, through engaging with district level stakeholders.

These meetings also focussed on the activities and Activity gender and youth integration work, the engagement and empowerment of poor women and youth entrepreneurs, including sensitizing them to how to support beneficiaries to achieve gender equality and social inclusion. GOB officials from MoWCA, Department of Youth Development, Women and Youth Entrepreneurs, partners NGOs, Youth journalist members participated in the events. There were a total of 111 participants, of whom 40 were female. Sessions included a presentation by the WorldFish Senior Program Manager and Senior Gender and Nutrition Specialist, which provided an overview of the need for gender and social inclusion, basic gender understanding.

These meetings effectively conveyed essential information, recommendations and findings derived from the outcomes achieved in the BAA Activity to a broader spectrum of stakeholders. They had a pivotal role in facilitating stakeholders and communities to grasp opportunities for involvement in diverse aquaculture activities linked to the BAA initiative.

#### **8.5.5 National workshop on women empowerment and aquaculture in Bangladesh: Constraints and opportunities**

The national level workshop on women's empowerment and aquaculture in Bangladesh, focusing on constraints and opportunities and scheduled for September 2023, has been postponed due to budget limitations.

#### **8.5.6 Gender sensitization workshop for all female LSPs to increase their leadership and sustain their activity related with aquaculture**

During this reporting period, the Activity successfully organized three gender sensitization workshops involving women entrepreneurs in the ZOI and ZOR. The first workshop was held in the ZOI on May 28, 2023, at Hotel City Inn in Khulna; the ZOR workshop took place on June 15, 2023, at Hotel D'more in Bandarban. Finally, the last one was conducted in Hotel Grand Park, Barishal on August 7, 2023. The objective of the workshops was to sensitize women entrepreneurs to gender issues, women empowerment and their role in gender mainstreaming, and to support them to increase their leadership skills development. A total of 100 women entrepreneurs participated in these workshops. These entrepreneurs are currently running their own aqua business centers and possess the potential to emerge as leaders in the aquaculture sector of Bangladesh.

The workshops commenced with an emphasis on gender and women empowerment issues, sensitizing participants to the importance of women's leadership in the aquaculture industry. The main objectives were to enhance the leadership skills of the women entrepreneurs, improve their problem-solving techniques, strengthen group decision-making processes, and equip them with effective communication and negotiation skills to excel both within their families and in external settings.

As a result of the workshops, each woman entrepreneur developed a comprehensive business action plan for the next six months. The workshops also provided valuable guidance on effective strategies and approaches to tackle challenges that might arise while implementing their plans, to support their success and growth in the aquaculture sector.

#### **8.5.7 Workshop to International Youth Day observation/Youth Linkage Event**

Under the theme of 'Green Skills for Youth: Towards a Sustainable World', the Aquaculture Activity organized a workshop with its youth beneficiaries and entrepreneurs in Khulna on 27 August 2023. The workshop aimed to highlight youth concerns, celebrate the achievements of young entrepreneurs, and inspire others to engage in aquaculture. Approximately 50 youths participated in this event.

It began with a discussion on the background and importance of observing International Youth Day, by the Activity's gender team and management. Youth partners Plenary Aqua and Green Biofloc shared

their journey and success so far, and other youth entrepreneurs discussed the challenges and ways forward for youth involvement in the aquaculture sector, to motivate others to pursue success. The workshop finished with a sports program and raffle, and prize-giving ceremony. It was noteworthy that the young participants engaged in the workshop with joy, energy and enthusiasm, asking many questions of youth partners and entrepreneurs to learn the process of success. The Assistant Director, National Human Rights Commission, Bangladesh presented Government of Bangladesh initiatives and opportunities for youth empowerment, meaning the young participants were provided with motivational input from both government and non-government organizations, to encourage their engagement in the field of aqua business and the smart, green solutions for the future that it implies.

#### **8.5.8 Gender learning workshop with partners in the Zone of Resilience**

Promoting women's participation as fish growers and entrepreneurs is crucial for achieving gender equality and equity in the aquaculture market system. To this end, the Activity conducted a Gender Learning Workshop on November 28, 2022 in the ZOR. The workshop aimed to gather partners' insights regarding the inclusion of women in their intervention and implementation processes. A total of 35 participants from nine of the Activity's partner organizations attended the workshop. Participants reviewed their knowledge of gender and women and girl's empowerment, the gender Collaborative, Learning, and Adaptive (CLA) approach of USAID (which they has been introduced to in July 2022), and explored opportunities for including women and youth in their implementation plans (Annex 12).

During the workshop, participants shared their experiences and lessons learned regarding initiatives related to women and girls' inclusion. Key topics of discussion included fundamental gender concepts, gender integration strategies, and the Activity's MEL indicators. Three rural women entrepreneurs shared their practical experiences and insights, and group exercises were conducted to identify challenges and potential solutions for enhancing women and girls' inclusion in the aquaculture sub-sector.

Participants identified various constraints, including restrictions on women's mobility, limited access to and ownership of ponds, and the need for approval and support from their families to engage in aquaculture in ZOR. Other challenges included slow growth in fish production by smallholders, unequal wages for women aquaculture workers, and limited access to technical knowledge and information for women involved in homestead pond aquaculture as a business. However, participants noted that the Activity had started to increase women's involvement in aquaculture in ZOR. They highlighted the Activity's role in women's empowerment through specialized training, financial support, improved access to quality inputs, affordable transportation options, and the establishment of community-level collection/aggregating points.

Participants emphasized that sustained and meaningful participation of women in the aquaculture sub-sector would require strategic support from government agencies and the private sector.

### **8.6. Environment and Climate Change**

WorldFish is responsible and accountable for ensuring that none of the interventions of the Activity leaves negative impacts on the environment and/or on human health.

#### **8.6.1 Conduct environmental due diligence and set environmental mitigation and climate risk management actions against the agreed interventions to be instrumented in the SGAs**

As part of establishing partnership, WorldFish conducts Environmental Due Diligence (EDD) to screen out the potential risk on environment and human health. This EDD facilitates embedding environmental compliance and climate risk management (CRM) into the implementation process. As part of the EDD, each of the proposed interventions by sub-grant applicants were analyzed and screened out for setting 'determinations/threshold decisions' based on the anticipated risks that might be left on environment and/or human health. Apart from environmental risks, potential climate/weather-induced risks on the proposed interventions were also analyzed to prevent hindering the opportunities of the interventions. All that required tools were used to comply with the respective regulations of USG and GOB, in this connection.

Based on the identified environmental and/or climate-induced risks, appropriate mitigation actions along with responsibility and schedule against each of the proposed interventions were illustrated in a matrix. The output of EDD procedure against the detail proposal of sub-grant applicants were documented precisely and compact fully. The EDD documents were then attached with the SGAs so that the environmental compliance and CRM are become instrumented officially.

During the reporting period, 21 EDDs were conducted for either new sub-grants and/or for the existing sub-grantees for time extension.

### **8.6.2 Capacity building on environmental compliance and climate risk management**

Developing a common understanding about the procedures of environmental compliance and CRM is very important to ensure the requirements of USG are met. As part of the process, WorldFish conducted training courses for its partners enabling them to articulate the scope of environmental compliance and CRM. As a result, partners have become sufficiently competent to roll out the approved Environmental Mitigation and Monitoring Plan (EMMP) of the Bangladesh Aquaculture Activity. The training courses comprise 6 modules: (a) Importance of Environmental Compliance and Climate Risk Management, (b) Identification of Environmental and Climate Risks, (c) Mitigation of Environmental and Climate Risks, (d) Understanding Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP), (e) Environmental Compliance Procedure, and (f) Understanding Climate Service for Aquaculture.

During the reporting period, a formal training session was held, with the participation of 13 representatives from the sub-grantee. In addition to the formal training, informal discussion, knowledge sharing, and other types of backstop support were extended (Annex 13).

### **8.6.3 Conduct surveys to assess the state of environmental compliance being practiced by partners who are involved in fish seed and feed production**

As part of conducting a survey on evaluating the environmental compliance and CRM issues being practiced by the partners who are involved in dry fish production, a questionnaire was developed, and the local MEL and program team members were oriented. A participatory approach is being followed to conduct the survey so that the dry fish producers can internalize their current state of environmental compliance practices in their day-to-day production procedures, and hence to visualize the scope of further development. The study is to provide suggested practices we believe will promote traceability, health and safety of the workforce, workplace sanitation, and environmental compliance issues.

The study followed a structured questionnaire that was filled out through conducting key informants' interviews (KII), visiting and inspecting the current facilities, and recalling the contexts that were being observed by the WorldFish POCs and MEL team members over their previous periodic visits to the respondent partners.

The collected field data and the collated information and messages were scrutinized and analyzed carefully in order to visualize the current practices of producing dry-fish and other fish-based products. The survey report is attached herewith in the annexure.

### **8.6.4 Provide backstop support to popularize environmental compliance and CRM**

Backstop support was provided to the partners through the program POCs as and when required. The support included – (a) review the training and communication materials developed by the partners, and provide inputs to ensure that the environmental and climate issues are embedded into the documents; (b) assist partner hatcheries in establishing or upgrading water filtration and recirculating systems; (c) assist partners in identifying the potential scope of further development in their production systems; etc.

## **8.7. Knowledge management and communications**

### **8.7.1 Quarterly Newsletter development and dissemination**

The Aquaculture Activity prepares and publishes the quarterly newsletter to share the major events, interventions, progress against targets, key achievements, notable visits, major success stories, lessons learned, etc. The Activity already published the issues of year 6, which portrayed how the Activity interventions, through a market systems approach, helped increase production, income and improve nutrition of fish farmers and other aquaculture market actors (Annex 14).

### **8.7.3 Organize journalist visits to the Activity interventions sites (e.g., Fishtech lab, Mach Gari, women/youth inclusion) to document progress, changes and learning**

Media coverage is crucial for disseminating the work of the Aquaculture Activity. During this reporting year significant number of media coverage on different interventions and events were made from local to national level through print, online and broadcast media. This year the Aquaculture Activity received a total of 50 media coverage from local and national media outlets.

A group of journalists visited both the ZoR and ZoI to witness and document the impact of women's empowerment through Aquaculture Activity interventions. Following their visits, they produced documentaries and news articles that were broadcasted on a prominent national in Bangladesh. These documentaries highlighted the success stories of women involved in harvesting, a female hatchery owner, and a successful youth partner. Moreover, important events throughout ZOI and ZOR were also featured in local and national media.

### **8.7.4 Social media campaign and maintenance of social media platforms and contents generation (e.g., posts, stories, blogs, articles, news, events, reports and IEC materials, etc.) for social media and website**

USAID Bangladesh and WorldFish Bangladesh official social media platform published 20 updates and success stories of the Aquaculture Activity through social media posts. Through social media disseminations the overall reach of the Activity increased, which helped boost the impact of different interventions across the Activity working areas. Also, implementing partners of the Aquaculture Activity promoted their activities and results using their own platforms (Annex 15).

### **8.7.5 Celebration of National Fish Week including other relevant national days to raise awareness and promote aquaculture and nutrition practices**

In this reporting year, National Nutrition Week was celebrated widely. The Aquaculture Activity, jointly with other projects of WorldFish, participated in the rally organized by the Department of Fisheries to raise awareness regarding nutrition and fish at national level. A special talk show was arranged, aligning with the government declared theme of Safe Fish, in partnership with Channel i. Kh. Mahbulul Haque, Director General, Department of Fisheries, Dr. Yahia Mahmud, Director General, Bangladesh Fisheries Research Institute (BFRI) and Dr. Manjurul Karim, Chief of Party of the Aquaculture Activity participated in the talk show as guests. Along with regular broadcast, the program was also live telecasted from Channel-i Facebook page. The Activity field offices took part in different events and discussions to celebrate the event.

### **8.7.6 Produce and disseminate blogs, infographics, articles, and other knowledge products on a regular basis**

As part of celebrating International Women's Day 2023, WorldFish Headquarters published a blogpost on women-led fish harvesting groups formed by the Activity. The write-up focused on women-led fish harvesting groups established in Bandarban district with the support of WorldFish. These groups not only empower women but also contribute to local fish farming and nutrition by providing affordable harvesting services.

### **8.7.7 Print and distribute IEC materials, signboards, billboard and promotional materials for events, awareness building, website and social media platforms, publication and sharing success stories, reports and other products to showcase successes and learning sharing**

This year, the Aquaculture Activity and its partners created and distributed information, education and communication materials to disseminate messages to fish farmers and relevant stakeholders.

A one-pager on OSSCs was developed in Bangla and English with details of the services that these centers provide. More than 20,000 copies of the one-pager were distributed among fish farmers and other relevant stakeholders across the ZOI. The Activity also designed, printed and distributed a pamphlet on moringa, which presents details on moringa cultivation and its nutritional facts. It also designed, printed and distributed a tri-fold brochure, which presents types of fish feed, feeding rates and ways of feed application in ponds for different fish species.

Through Activity partner KMSS, a booklet was drafted and developed for improving access to finance and aquaculture business development through local business centers; this will be distributed among potential aquaculture entrepreneurs. A brief result, both text-based and audio-visual versions, capturing the key results of the Activity, has been developed to disseminate in the closeout workshop and to key stakeholders up to November 2023.

To capture and document its interventions, the Aquaculture Activity designed 11 audio-visual clips and disseminated them in the ZOI and ZOR. Of these, 10 featured separate interventions<sup>4</sup> and one presented a summary of the Activity's achievements. These videos have been disseminated to government, donors, and other relevant stakeholders. Additionally, a story journal with over 60 briefs on successful interventions was designed and edited in the last quarter; this will be published and shared at the Activity's closeout event.

Aligning with USAID guidance, during the reporting period the Aquaculture Activity collaborated with two other projects, ECOFISH II and Artemia4Bangladesh, for the promotion of Artemia and seaweed. The Activity designed and had printed two banners and eight festoons for display at promotional events, which were also promoted through social media.

Also aligning with USAID guidance, during this reporting period the Activity collaborated with WorldFish implemented projects, funded by Bill and Melinda Gates Foundation, and European Union, to design the mobile OneFish Application, to create access to aquaculture production and business-related information for stakeholders, including smallholder farmers. The App will be launched this year to provide substantial help to all market actors in the aquaculture industry. The OneFish App Activity leaflet was developed and printed for mass distribution; it depicts the App's features, which create access to aquaculture production and business-related information for stakeholders including smallholder farming households.

### **8.7.8 Reprint better management practices materials and IP info guidebook**

In this reporting year, most of the required BMP materials were successfully printed. In addition, taking into consideration field requirements and the need for LEAF training purposes, an additional printing of 110 sets of Aquaculture Training festoons was carried out. Each set consisted of 7 individual festoons, resulting in a total of 770 festoons. These printed materials will be utilized by 60 LEAF members and the partner organizations, to conduct training sessions in both the ZOI and ZOR.

By providing these informative and educational materials, the Bangladesh Aquaculture and Nutrition Activity aims to enhance the knowledge and skills of LEAF members and partner organization in promoting BMP in aquaculture. These training festoons will play a crucial role in disseminating important information and guidelines to fish farmers, ultimately contributing to improved aquaculture practices and better outcomes in the targeted regions.

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<sup>4</sup> Access to feed, Access to seed, Access to finance, Access to information, Safe dry fish, Successful women entrepreneurs, Women fish harvesting group, One Stop Service Center, Bottom sludge removal technology, Carp pituitary gland, G3 Rohu.

## **9. ANNEX**

Annex 1: List of Aquaculture Activity IPs (attached)

Annex 2: Feasibility study to establish sea bass (attached)

Annex 3: Value chain assessment of mud crab in Bangladesh (attached)

Annex 4: Report on crablet nursing demonstration (attached)

Annex 5: Report on mud crab growth and survivability comparison trial (attached)

Annex 6: OneFish App: digital applications to strengthen linkages among aquaculture market actors (attached)

Annex 7: Forum to accelerate financial inclusion for aquaculture market actors (attached)

Annex 8: Post-award orientation program for sub-grantees (attached)

Annex 9: Bangladesh aquaculture activity indicators (attached)

Annex 10: Aquaculture activity participants GIS information (attached)

Annex 11: Aquaculture Activity celebrates IWD 2023 (attached)

Annex 12: Report of refresher training on gender inclusion for partner staff (attached)

Annex 13: Capacity building on environmental compliance and CRM (attached)

Annex 14: Bangladesh's aquaculture renaissance (attached)

Annex 15: Social media coverage of the Aquaculture Activity (attached)

Annex 16: Media coverage (attached)

Annex 17: Photos (attached)



# FEED <sup>THE</sup> FUTURE

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