Project Completion Report

on

"Increase Production and Promotion of Cultured Shrimp and Seabass in the Mainstream Market Channels"

Submitted to

USAID Feed the Future
Bangladesh Aquaculture and Nutrition Activities (BANA)
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Abbreviation

AHCAB	Animal Health Companies Association of Bangladesh
AS	Aquaculture Specialist
BANA	Bangladesh Aquaculture and Nutrition Activity
BAPCA	Bangladesh Aqua Product Companies Association
BBS	Bangladesh Bureau of Statistics
BDT	Bangladeshi Taka
BFFEA	Bangladesh Frozen Foods Exporters Association
BFRI	Bangladesh Fisheries Research Institute
BSFF	Bangladesh Shrimp and Fish Foundation
BSTI	Bangladesh Standards and Testing Institution
BT	Black Tiger
CRM	Climate Risk Management
DAE	Department of Agricultural Extension
DCoP	Deputy Chief of Party
DGDA	Directorate General of Drug Administration
DLS	Department of Livestock Services
DO	Dissolved Oxygen
DoF	Department of Fisheries
ED	Executive Director
FAO	Food and Agriculture Organization of the United Nations
FCR	Food Conversion Ratio
FGD	Focus Group Discussion
FRSS	Fisheries Resource Survey System
GAP	Good Aquaculture Practices
GDP	Gross Domestic Product
GFvP	Good Fishing Vessels Practices
GPS	Geographical Positioning System
HACCP	Hazard analysis and critical control points
INGO	International Nongovernmental Organizations
IT	Information Technology

KII	Key Informant Interview
MEL	Monitoring, Evaluation and Learning
MoA	Ministry of Agriculture
MoFL	Ministry of Fisheries and Livestock
NBR	National Board of Revenue
NGO	Non-Government Organization
PL	Post Larvae
PoC	Point of Contact
SPF	Specific Pathogen Free
UN	United Nations
USAID	United States Aid
WDB	Water Development Board

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Executive Summary

Fisheries and Aquaculture sector in Bangladesh occupies an important place in the economy of the country with significant contribution to her GDP, labour force absorption, export from the sector and a whole range of economic activities all along the value-chain in the sector. The sector's contribution to the life and livelihoods of the people in the coastal areas is especially important. The dominant fish species cultured in coastal region is Bagda (*Penaeus monodon*) and this is also the main export item from the fisheries sector. The per hectare production of shrimp in the coastal region of Bangladesh however remains quite low (about 360 kg/ha) and the coastal aquaculture is also known for the diversity of its products/fish species mix. This has important consequence for limited export growth from the sector. Rich and extensive research indicates that poor resource endowment, knowledge gap on Good Aquaculture Practices and inadequate and assured supply of vitally needed inputs are major supply side constraints afflicting the shrimp sector and very limited successful initiatives have been taken to encourage product diversification. The project entitled **'Increase production and promotion of cultured shrimp and seabass in the mainstream market channels'** was implemented by Bangladesh Shrimp and Fish Foundation and WorldFish with financial support from USAID Feed the Future Bangladesh Aquaculture and Nutrition Activity to address these major constraints.

Implemented over a period of eight months from February, 2023 to September, 2023, the project had two (2) major components implemented in the coastal belt of Bangladesh i.e., Khulna, Bagerhat and Cox's Bazar. The first main component of the project on shrimp involved the formation and mobilization of five (5) clusters with 100 members to empower the small-scale shrimp farmers who became active members of the clusters. They were assisted in the formation of the clusters, on effective management practices and were also trained on modern production techniques involving such areas as scientific pond preparation, biosecurity arrangements, scientific water management, use of good quality seeds, feeds, and other aqua inputs as well as effective feed administration regimes. For this purpose, 100 shrimp cluster farmers, 100 non-seed supported shrimp farmers, 40 shrimp and fish value chain actors were provided trainings. In connection with shrimp industry development workshops on digital traceability implementation, shrimp forward market development, market linkages with the buyers and exporters, shrimp third party certification were also organized. A key part of the training component on shrimps also involved intensive awareness on Third Party Certification for which expert international consultant services were arranged with a view to empower stakeholders in the sector with knowledge on how can they improve production techniques and meet rigorous requirements to be able to obtain Third Party Certification. Knowledge was also imparted on credible traceability arrangements and record keeping. The pilot scale initiative to form the clusters, though challenging, was successful and production gain in the enlisted farms in the clusters increased from the previous average 145 kg/ha to 1005 kg/ha in the cluster farms. The subject specific training workshops were also successful with training of a total of 340 participants a sizeable number of which were women.

The second component of the project comprised pilot scale initiatives taken to introduce commercial modern feed-based production of seabass in the pilot area. Traditionally in Bangladesh seabass is produced using trash fish as feed. In the pilot project on introduction of modern feed-based seabass farming practices implemented in 3 locations- 2 in Cox's Bazar and 1 in Khulna commercial feed-based nursing of seabass fry was tried in hatchery condition which were then transferred to hapas. Following the completion of the nursing process of the fries, they were transferred to selected grow-out ponds. The entire process spread over eight months during the project period from February, 2023 to September, 2023. The entire piloting exercise apart from introduction of re-oriented commercial feed-based fries involved a whole range preparatory works like preparation of a user-friendly production manual, skill development for prospective farmers and technical hands and preparation of a feasibility study on establishing a seabass hatchery in Bangladesh. Services of an International Consultant and a National Expert from the academia were arranged for undertaking these and other pilot related activities. For the effective implementation of feed-based seabass nursery and culture management 6 local

technicians along with project field staff were provided on hand training on seabass nursery management in the cemented tank as well as pond side hapa nursing by the designated international consultant. For the dissemination of seabass grow-out culture technology seabass cultivable 100 interested farmers were also provided training in Khulna and Cox'sBazar regions. In connection with the introduction of feed-based seabass culture technology in Bangladesh and to make it cost effective and sustainable feasibility study on seabass hatchery establishment in Bangladesh, seabass culture technology dissemination and capture production of seabass to explore business concerned workshops were also organized. The duration of the pilot interventions on seabass was for eight months. During this period, the hatchery and field level exercise has indicated that commercial feed-based seabass production is eminently suitable for introduction in the congenial specific Bangladesh condition if all the required scientific nursing and production protocols are maintained and suitably dedicated and trained technical hands are used for the purpose. The pilot exercise was largely successful. A total of 14400 fingerlings were procured for the field level trials and 12400 no. survived during the project period between 19 July, 2023 to 30 September, 2023. As the importation and stocking of seabass fingerling in the pond delayed because of many constraints related to sourcing, fulfilment of importation requirement and other associated issues so partial capture of production of seabass has been done during the project period. However, the pilot culture will be continued by the entrepreneurs and full capture of the same will be done by the BSFF. A wealth of data analyses was generated during the pilot exercise which can form the basis of scaling up such pilots eventually leading to commencement of commercial modern feed-based production of seabass after due comprehensive assessment of domestic and international market potential of the species adding to the diversity of production and export base of aquaculture and seafood products of Bangladesh.

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1.1 Project Background

Fisheries and Aquaculture sector constitute an important sub sector of broader aquaculture sector in Bangladesh. The sector contributes significantly to the national GDP, supply of animal protein and employees about 10% of the national workforce. Historically the sector also was an important source of the country's export earnings, especially during the 1980s. In order to accelerate the development of the country the government of Bangladesh is attaching high priority to modernize the sector and increase export from the sector. The government is working with the private sector stakeholders and interested development partners to achieve growth specific objectives of the sector. The project entitled "Increase production and promotion of cultured shrimp and seabass in the mainstream market channels" implemented by Bangladesh shrimp and Fish Foundation together with WorldFish with support from USAID Feed the Future Bangladesh Aquaculture and Nutrition Activity has also been undertaken to achieve some of these broad objectives. The project was implemented from 1st February 2023.

Sectoral constraints addressed by the project component

The project implemented between 1st February 2023 to 30 September 2023 had two broad components. The first component focused on achieving growth-oriented target related to shrimp production in the coastal belt of Bangladesh practiced mainly by small scale farmers. Their average production is about 360 kg/hector nationally which is much below comparable production of other regional and international producing and exporting countries where per hector production performance is much higher. The main constraints encountered by small scale shrimp farmers in Bangladesh all reflect their relative economic weakness and resource base. They have low income, under developed infrastructure, inadequate access to concessional institutional finance, inadequate resource position to procure high quality SPF fingerling, feed and other much needed aqua inputs. In most cases they don't have access to power and the lack knowledge about good aquaculture practices including knowledge on modern and bio-secured pond preparation, water management and post-harvest output management and marketing. They also suffer from exploitation from the middle men, occasional outbreak of diseases and adverse consequences of abrupt climate related disasters like unpredictable variation in temperature and incidence of cyclones and inundation of farming water bodies and ponds during natural disasters.

Presently fisheries and aquaculture sector in Bangladesh specially in the coastal area is also dominated by the production of one single species i.e., *P. monodon* or Bagda the relative export share of which in global market is gradually declining in the face of losing market share to its alternative completive species i.e., vannamei. From this perspective Bangladesh faces a major challenge standing in the way of increasing her export from the sector. The challenge appears to be specially for dining as production pattern in the coastal aquaculture of Bangladesh remains confined to traditional production practices and mostly undiversified. There is also important weakness in the value chain with highly under developed nature of the backward and forward linkage in the sector and inability of the Bangladeshi farmers and processors.

The project implemented under the broad title "Increase production and promotion of cultured shrimp and seabass in the mainstream market channels" has been so designed to address all these constraints future pilot scale interventions with potential for future upscaling and replication with benefits accruing to wider body of small-scale farmers. The cluster-based intervention has been incorporated in the project to empower the small-scale farmer so that they are able to overcome their physical, financial and lack of knowledge on *technology* related constraints. Innervations have also been incorporated to enlighten them about requirements for modern market linkages involving buyers and exporters, third party certification and elements of digital traceability in the shrimp value chain. A key component of the project has been to undertake implementation of a pilot intervention to introduce commercial feed-based seabass production success of this invention. It is hoped would enable Bangladesh to achieve product

diversification efforts of Bangladesh through the commercial production of feed-based seabass production in Bangladesh.

1.1.A. Shrimp

Coastal aquaculture specially shrimp farming has also been experiencing consequences because of siltation and deposition of heavy wastes in the pond/gher (impoundment) bottom mud, scarcity of suitable aquaculture sea and fresh-water, poor infrastructure, cost effective balanced shrimp feed, appropriate aqua-medicine, conflict of interest among agriculture and other agencies and capacity of farmers and other value chain actors in terms of better management practices, improved post-harvest management, fulfilment of criteria for shrimp export, etc.

Moreover, due to adverse effect of climate change agriculture activities become lower in the coastal area of Bangladesh and hampering the socio-economic conditions of the coastal people. The coastal area of Bangladesh covers 19 districts facing or near the Bay of Bengal, encompassing 148 sub districts and the Exclusive Economic Zone, accounting for 32 percent of the land area and 25.7 percent of the population of Bangladesh (BBS 2011). It has been estimated that the coastal area sustains the livelihoods of more than 37 million people. Poverty in the coastal area is high: 14 of the 19 coastal districts have poverty rates greater than the national average. Due to the adverse effect of climate change income generating activities of the people of coastal area is reducing continuously. At present people are suffering from scarcity of food, malnutrition, insufficiency of wealth. Ensuring, nutrition and economic security for the vast number of poor and vulnerable, particularly women and children in rural areas remains a challenge.

In this situation coastal aquaculture is vital to the country to overcome the adverse effect of climate change if it can effectively be explored. Moreover, coastal aquaculture specially expansion of shrimp farming both vertical and horizontal can help the coastal community to enhance their socio-economic conditions, nutritional demands, countries export earnings, employment generation and other livelihood interventions. Present shrimp productivity about 367 kg/ha (FRSS, DoF, 2022) which is very low compared to many of the Indo-Pacific shrimp growing countries can easily be increased to double or triple even more through better management practice.

The present proposed project with cluster approach having modern culture method, good seed, better feed and optimum management, market linkages along with digital traceability will be a model to ensure the maximum production of shrimp in the coastal area of Bangladesh which ultimately will promote its export and domestic consumption. The project with stipulated objectives is very timely and worthy intervention in the coastal aquaculture of Bangladesh.

1.1.B. Seabass

Due to adverse effect of global climate change Bangladesh coastline is being affected by saline intrusion. In Bangladesh, salinity affected 83.3 million hectares of land in 1973 which increased to 102 million hectares in 2000. In 2009, the amount has increased to 105.6 million hectares. Due to adverse effect of climate change agriculture activities become lower in the coastal area of Bangladesh which is hampering the socio-economic conditions of the coastal people. The coastal area of Bangladesh covers 19 districts facing or near the Bay of Bengal, encompassing 148 sub districts and the Exclusive Economic Zone, accounting for 32 percent of the land area and 25.7 percent of the population of Bangladesh (BBS 2011). It has been estimated that the coastal area sustains the livelihoods of more than 37 million people. Poverty in the coastal area is high: 14 of the 19 coastal districts have poverty rates greater than the national average. At present people are suffering from scarcity of food, malnutrition, insufficiency of wealth. Ensuring, nutrition and economic security for the vast number of poor and vulnerable, particularly women and children in rural areas remains a challenge.

In this situation coastal aquaculture specially, the seabass has very high culture potentiality both in pond and cages and it can help the coastal community to enhance their socio-economic conditions as well as helps them to meet the nutritional demands. Seabass (*Lates calcarifer)* is a euryhaline native species that can tolerate wide range of salinity (0-35ppt). Currently in Bangladesh seabass culture is following traditional methods collecting seeds from nature which is detrimental in consideration of ecological

balance. Modern feed-based culture method, good seed, better feed and optimum management will help to ensure the maximum production of seabass in the coastal area of Bangladesh. The very popular indigenous fish is tasty and lucrative in Bangladesh and aboard. The unsaturated fatty acid enriched with no intramuscular bone is well accepted by the consumers with high value in the domestic market as well as in the global market. The main constraints of seabass culture are year-round seed availability, appropriate feed and proven feed-based culture technology with minimization of cannibalism. As the proposed project focusing all these aspects along with feasibility of seabass hatchery establishment, so successful project implementation with positive output can find the way out for establishing seabass hatchery or renovating some of our hatcheries as seabass hatchery, advocacy services to the local feed industries to produce seabass feed and appropriate feed-based culture technology through trial and error will certainly open new era in coastal aquaculture as well as overall sectoral growth.

1.2 Rational of the intervention/model/business idea what will potentially fit the need of constraints

The fisheries sector of Bangladesh constitutes an important sub sector of aquaculture which contributes significantly to meet animal protein and nutrition demand of people, employment generation, foreign exchange earning along with contribution in national GDP despites many constraints of the sector. The project has taken up coastal aquaculture development work especially Black Tiger Shrimp and commercial feed-based seabass pilot culture in Khulna and Cox'sBazar regions. The constraints faced by the small-scale shrimp farmers are lack of technical know-how, low income, under developed infrastructure, inadequate access to finance, inadequate resource position to procure high quality SPF fingerling, feed and other inputs. In most cases they don't have knowledge about good aquaculture practices including knowledge on modern and bio-secured pond preparation, water management and post-harvest management and marketing. They also suffer from exploitation from the middle men, occasional outbreak of diseases and adverse consequences of abrupt climate related disasters. On the other hand, the main constraints of seabass culture are year-round seed availability, appropriate feed and proven feed-based culture technology with minimization of cannibalism.

To combat the aforesaid constraints and enhance coastal aquaculture development, the project activities had been covered (i) organizing farmers, formation of shrimp clusters and selection of seabass nursery and pilot culture sites, (ii) capacity building of shrimp and seabass farmers through training, demonstration, guidance by project personnel, (iii) SPF shrimp PL collection, stocking, feeding with good feed, sampling, harvesting, value chain development and post-harvest management, marketing, (iv) traceability implementation, awareness on third party certification, forward market development and market linkages for export promotion and domestic consumption, (v) nursery and culture management techniques of seabass including seed transportation, acclimatization, feeding, water quality monitoring, etc. with support from international seabass consultant, (vi) shrimp and seabass culture technology dissemination through demonstration, training and workshops. The project interventions had been implemented in the private ponds of the selected regions which had insignificant environmental impact and with positive social impacts. The project tried to improve existing shrimp culture practices from extensive to improved extensive method having digital traceability system implementation along with introduction of potential new coastal culture species, seabass (*Lates calcarifer)* as a means of diversifying fisheries export product. The social and environmental risks and impacts those have been experienced during project implementation did not harm the community and livelihood.

The project intervention on Black Tiger shrimp has therefore been implemented with cluster approach having modern culture method, good seed, better feed and optimum management, market linkages along with digital traceability was proved to be a model to ensure the maximum production of shrimp in the coastal areas of Bangladesh which ultimately promoted production and consumption. On the other side, the project intervention having commercial feed-based nursery management and grow-out culture along

with feasibility study of seabass hatchery establishment in Bangladesh to produce seabass seed locally certainly will play vital role for the introduction of new coastal culture species and its expansion. The project provided way out for establishing seabass hatchery or renovating some of our hatcheries as seabass hatchery, advocacy services to the local feed industries to produce seabass feed and appropriate feed-based culture technology through trial and error will open new era in coastal aquaculture as well as overall sectoral growth. The project findings as well as the promotional materials prepared by the project will serve as the base literature based on practical knowledge from the field through 'learning by doing' with opportunity of periodic improvement based on lessons learnt from the project.

1.3 Project objectives

The project has said the following broad objectives with regards to shrimp and seabass.

A. Shrimp

1. Organize farmer clusters for shrimp farming as well as organize farms
2. Develop the capacity of shrimp farmers on better management practices, improved post-harvest management and criteria for shrimp export.
3. Support farmers' access to better quality inputs including fingerlings, feed and aqua medicinal products through promotion and marketing.
4. Introduce and pilot digital traceability in the shrimp value chain.
5. Conduct forward market development activities including promotion for increased domestic consumption and export.
6. Facilitate market linkages with buyers and exporters.
7. Provide technical guidance for certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand

B. Seabass

1. Piloting of modern feed-based seabass culture technology in Cox's Bazar, Khulna and Bagerhat regions of Bangladesh.
2. Skill Development Event for the Nursery and Grow out Farmers in Cox's Bazar and Khulna region of Bangladesh.
3. Knowledge dissemination events (Khulna, Cox's Bazar) for wider scale adoption by public and Private
4. Workshop on domesticated sea bass culture technology dissemination to explore business
5. Carry out feasibility study to establish seabass hatchery in Bangladesh
6. Capture the production and economic performance of seabass farming

1.4. Geographical coverage

The project activities have been implemented in the countries south-western Dumuria, Botiaghata Upazila of Khulna, Kaliganj Upazila of Satkhira and Bagerhat Sadar, Fakirhat Upazila of Bagerhat districts and south-eastern Teknaf Upazila of Cox'sBazar districts of Bangladesh. The different coastal geographical locations were chosen for the implementation of project interventions to observe potentiality and performance of Black Tiger Shrimp and Seabass culture.

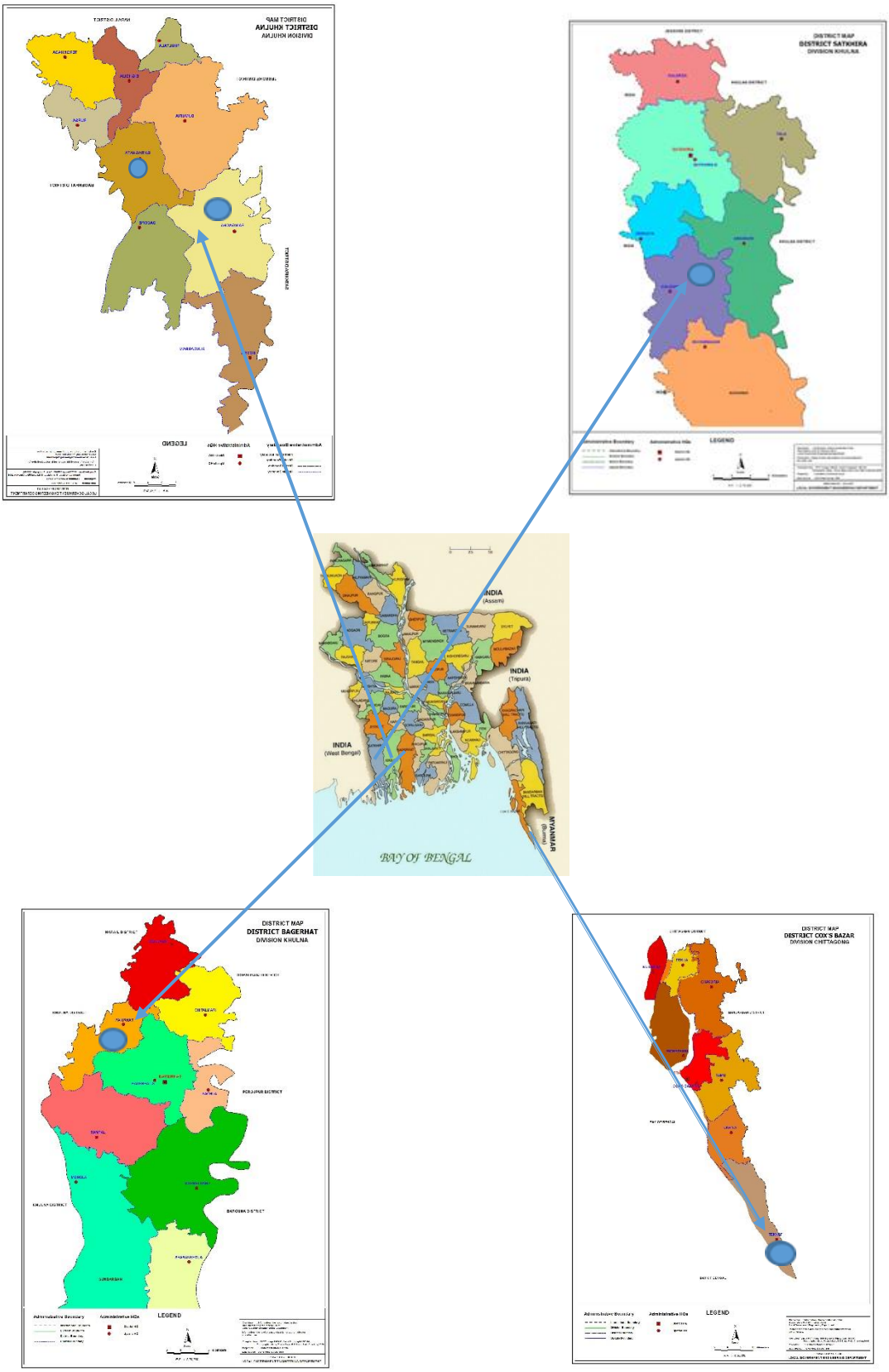


Fig:1.4.01 Project intervention area:

1.5 Key matrices achieved

Table: 1.5.01 shrimp cluster formation

Cluster No.	Name of Cluster	No. of Farmers	Total Water Area (Acre)
01.	Kadamtola Female Shrimp Cluster, Dumuria, Khulna	20	9.75
02.	Kadamtola Male Shrimp Cluster, Dumuria, Khulna	20	10.55
03.	Baroikati Shrimp Cluster, Dumuria, Khulna	20	10.36
04.	Sholgatia Shrimp Cluster, Dumuria, Khulna	20	9.34
05.	Dema Shrimp Cluster, Sadar, Bagerhat	20	10.00
Grand Total		100	50.00

Table:1.5.02 Production status of different shrimp clusters under the project

Sl. No	Cluster Name	No. of Farmer	Total Water Area (ha)	Production and income after intervention		Baseline production and income		Remarks (Production and income increased by)
				Produc. (mt)(≈4 months)	Income (Tk.) (≈4 months)	Produc. (mt))(≈4 months only shrimp)	Income (Tk.) (≈4 months only shrimp)	
01.	Kadamtola Female, Dumuria	20	09.75	4.014	26,09,100	0.553	3,31,600	Produc.-7.2 times; Income-7.8 times
02.	Kadamtola Male, Dumuria	20	10.55	4.413	28,68,450	0.512	3,07,200	Produc.-8.6 times; Income-9.3 times
03.	Baroikathi, Dumuria	20	10.36	4.377	28,45,050	0.518	3,10,600	Produc.-8.4 times; Income-9.1 times
04.	Sholgathia, Dumuria	20	09.34	4.234	27,52,100	1.050	6,30,000	Produc.- 4 times; Income-4.3 times
05.	Dema, Bagerhat	20	10.00	3.303	21,46,950	0.309	1,85,400	Produc.-10.7 times; Income-11.5 times
Grand Total		100	50.00	20.341	132,21,650	2.942	17,64,800	Produc.- 6.9 times; Income-7.5 times

Table: 1.5.03 Culture and production related information under the project

Sl. No.	Description	Quantity/Amount/Unit	Remarks
01.	PL stocking	12,00,000 Nos.	6/m^2
02.	Average survival	56%	
03.	Average weight at harvest	30.27g	
04	Average production in all clusters	1005 kg/ha	6.9 times than baseline
05	Average baseline production	145 kg/ha	
06	Average shrimp price per kg	BDT 650.00	

Capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers

Table: 1.5.04 Seed supported cluster farmers training detail

Sl. No.	Title of the Training	Venue	Date	Male & Female No.	Total No.
1	Pond Preparation and Culture Management of BT Shrimp	Kadomtola Female Cluster	21/03/23	M=0, F=20	20
2	Pond Preparation and Culture Management of BT Shrimp	Kadomtola Male Cluster	21/03/23	M=20, F=0	20
3	Pond Preparation and Culture Management of BT Shrimp	Baruikati, Dumuria	22/03/23	M=15, F=5	20
4	Pond Preparation and Culture Management of BT Shrimp	Sholgatia, Dumuria	23/03/23	M=20, F=0	20
5	Pond Preparation and Culture Management of BT Shrimp	Dema, Bagerhat	28/04/23	M=17, F=3	20

Table: 1.5.05 Non-seed **supported farmers training detail**

Sl. No.	Title of the Training	Venue	Date	Male & Female No.	Total No.
1	Capacity Development Training for shrimp farmers on good aquaculture practices (GAP), improved post- harvest management for grow-out farmers	Faltita, Bagerhat	19/5/2023	M=20, F=0	20
2	Capacity Development Training for shrimp farmers on good aquaculture practices (GAP), improved post- harvest management for grow-out farmers	Chohera, Dumuria	20/5/2023	M=15, F=5	20
3	Capacity Development Training for shrimp farmers on good aquaculture practices (GAP), improved post- harvest management for grow-out farmers	Ranai, Dumuria	16/6/2023	M=20, F=0	20
4	Capacity Development Training for shrimp farmers on good aquaculture practices (GAP), improved post- harvest management for grow-out farmers	Kulbaria, Dumuria	12/7/2023	M=20, F=0	20
5	Capacity Development Training for shrimp farmers on good aquaculture practices (GAP), improved post- harvest management for grow-out farmers	Kaliganj, Shatkhira	8/6/2023	M=17, F=3	20

Table 1.5.06 Capacity development training for value chain stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)

Sl. No.	Title of the Training	Venue	Date	Male & Female No.	Total No.
1	Capacity Development Training for Value Chain Stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)	Dumuria Upazila Parishad	16/04/23	M=19, F=0	19
2	Capacity Development Training for Value Chain Stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)	Batiaghata Upazila Parishad	27/05/23	M=17, F=3	20

Table 1.5.07 Production cost of seabass fry nursing (Indoor and outdoor hapa) (19.07.23 to 01.09.23- 45 days); Number of fry/fingerling/animals: 14400

Sl. No	Head of item	Quantity & Rate	Amount in BDT	Remarks
1	Cleaning of tanks (15000 Liter), hapa, etc.	EDTA-100 gm	100	
2	Water oriparartion by Bleaching	20 kg bleaching per kg @ 50/-	1,000	
3	Hapa making	9 Nos. @ 1000/-	9,000	Initially 3 hapas for each site
4	Seabass fry (Imported from Thailand)	14400 Nos. @ 40/-	576,000	
5	Feed	160 kg (0.5mm, 0.8mm, 1.2mm and 2.3mm) @ average 300/- per kg	48,000	
6	Scoop net	3 Nos. @ 300/-	900	
7	Bowl	3 Nos. @ 100/-	300	
8	Local Greader (Aluminium Perforated Bowl)	1 Nos @ 500/-	500	
9	Labour (Man days)	Indoor: 27 man-days and outdoor-3 sites 54 man-days: Total 81 man-days @ 700/-	56,700	
10	Others	Lumpsum	5000	
11	Total expenditure in the 45 days nursing period		697,500	

Table:1.5.08 Projected grow-out production cost (Total 3.0 Acre): phase-1 (02.09.23 to 21.09.23- 20 days-Under the project); Phase-2 (22.09.23 to 14.03.24-175 days-to be operated by the concerned entrepreuners)

Sl. No	Head of item	Quantity & Rate	Amount in BDT	Remarks
1	Hapa making	9 Nos. @ 1000/-	9,000	
2	Hapa, cat walk, aerator setting, etc	Lumpsum	10,000	
3	Seabass fry for stocking	12714 Nos. (Approx. 93kg)	0	Stocking from nursing
4	Feed	(12000-93 = 11907 x 1.2 FCR = around 14288 kg (3 sites) (Category-901,902,903,904,905) @ average 240/- per kg	3,429,120	
5	Labour (Man-days)	Hapa: 20days x 3 sites- 60 man-days; Ponds: 50% of 175 mandays-88 x 3 sites -Total-324 man-days @ 700/-	226,800	
6	Others	Lumpsum	10,000	
7	Total expenditure in the 195 days grow-out culture period		3,684,920	

Table:1.5.09 Projected production cost and benefit of seabass

A. Nursing			697,500
B. Grow-out			3,684,920
Total Cost (A + B)			4,382,420
Production Performance			
01	Survival Rate	83%	
02	Expected harvesting Size	Average 1 kg in 8 months	
03	Expected production	12000 kg from 3 acre ponds	
04	Expected price per kg (BDT)		550
05	Gross Return	12000 kg @550 BDT/kg	6,600,000
06	Net profit (BDT)		2,217,580

Table:1.5.10 Average sampling record and estimated production (Average of three sites) of seabass

Sl. No	**Stocking/Sampling date**	**Stocking/Sampling Nos.**	**Size (Cm)**	**Av. Wt. (g)**	**Duration between sampling (Days)**	**Estimated standing crop (Kg)/Times growth**	**Survival rate (%)**	**Remarks**
01.	19.07.2023	Stocking: 14400	≈1.5	0.4	-	5.76/Initial	-	
02.	14.08.2023	Sampling: 13300	4.5-10	4.5	27	59.85/≈10 times	92	Nursing period: 45 days
02.	01.09.2023	Sampling: 12400	8.2-10.3	7.5	18	93.00//≈1.5 times	93	
03.	14.09.2023	Sampling: 12000	9.5-16.5	21.5	13	258.00/≈2.7 times	96	Grow-out period-1; 1000 handed over to DoF on 3.9.23
03.	21.09.2023	Sampling:	13.5-18.5	45	7	558/.00/≈2.1 times (112.5 times in about 2 months)	-	Grow-out period-1;
04.	22.9.2023-14.3.24: 175 Days	Sampling:	-	-	-	-	≈83	Grow-out period-2 (About 12000 kg in 8 months from 3 acres)

Table: 1.5.11 Details of skill development training of seabass farmer

SL. No.	Title of the Training	Venue	Date	Participants	Total
1	Skill Development Training for the nursery and grow-out farmers for Seabass Farming	Ghona, Banda	22/03/23	M=14, F=6	20
2	Skill Development Training for the nursery and grow-out farmers for Seabass Farming	Sahos Maddhyapra, Dumuria	25/03/23	M=20, F=0	20
3	Skill Development Training for the nursery and grow-out farmers for Seabass Farming	Hasanpur, Dumuria	23/03/23	M=20, F=0	20
4	Skill Development Training for the nursery and grow-out farmers for Seabass Farming	Napitkhali, Chokoria, Cox's Bazar	17/04/23	M=20, F=0	20
5	Skill Development Training for the nursery and grow-out farmers for Seabass Farming	Rongikhali, Teknaf, Cox's Bazar	27/05/23	M=20, F=0	20

1.6 A bit about the subgrantee

Bangladesh Shrimp and Fish Foundation (BSFF) is a Non-Profit Private Organization Focused on Research, Advocacy and Targeted Actions at all level of fisheries and aquaculture sector of Bangladesh. Created to help growth and development in the fisheries sector, the organization was registered in 2003 under Trust Act 1882. It was also registered with Social Welfare Directorate in 2008. The organization started functioning from June 2003. For more than a decade BSFF has been consistently working to generate much needed dynamism to the fisheries and aquaculture sector in Bangladesh with a view to realizing its rich potential.

BSFF is an organization committed to extend a wide range of services to the country's fisheries and aquaculture sector promoting pro-growth initiatives, building up capacities, introducing new technologies and production processes, facilitating trade and ensuring social inclusion in the sector, compliance with relevant sector specific norms and standards and environmental sustainability imperatives. Over the years, BSFF work has been planned broadly to promote development of the fisheries sector in Bangladesh within the broad framework of Bangladesh's development priorities for the fisheries sector. BSFF has facilitated research, dialogue, policy advocacy, organized training, Aqua Input, Safe aqua farming, Market promotion, Shrimp farming, Cluster farming, Investment promotion, Traceability, Biodiversity Conservation and field level intervention and implement concrete projects to enhance production, trade promotion initiatives and other initiatives to overcome challenges faced by the sector. BSFF activities so far has resulted in tangible impacts in many ways and its on-going and projected works are expected to be equally useful. BSFF has also a rich experience of working together with the government of Bangladesh, its concerned ministries, academia and international development partners which it has concluded MoU of cooperation to carryout work on shared objectives. Beside these BSFF Provide technical assistance, arrange training of trainers, training fisherman on Good Aquaculture Practices (GAP) for fish/ shrimp farms, Good Fishing Vessels Practices (GFvP) for industrial trawlers and HACCP for processing plants. The Foundation provides an effective institutional arrangement to internalize and capitalize on specific project outputs being implemented or planned to benefit the sector making a lasting contribution to sustainable growth and development of the shrimp and fisheries sector in Bangladesh.

Since 2003 BSFF is working closely with the Government agencies of Bangladesh who are in the leading position in the agro-fisheries sector of Bangladesh i.e., DoF, DLS, DAE, besides these BSFF has very good relationship with BBS, DGDA, NBR, BSTI. Moreover, BSFF has been maintaining very good relationship with INGO UN agencies and Donor organizations since its journey in the development fields. Beside these BSFF has very good relationship with private sector stakeholders (BAPCA & AHCAB) and farmers. BSFF has wide range of experience in the area of aquaculture, shrimp farming, training, and workshop and awareness activities. The organization has already been implemented projects of different donor's i.e., Swiss contact, Solidaridad Network Asia, Winrock International, USAID, FAO, World Fish Center and World Bank. BSFF has extensive experience in coastal aquaculture and very good knowledge about the coastal region of Bangladesh. Bangladesh Shrimp and fish foundation implemented successful cluster shrimp farming in coastal region of Bangladesh from 2019-2020 and congregated a lot of experience about the pond preparation, feed & seed management, water quality management, post-harvest management. Being a project implementing organization BSFF will use its recent and previous experience of coastal aquaculture to implement the proposed project activities.

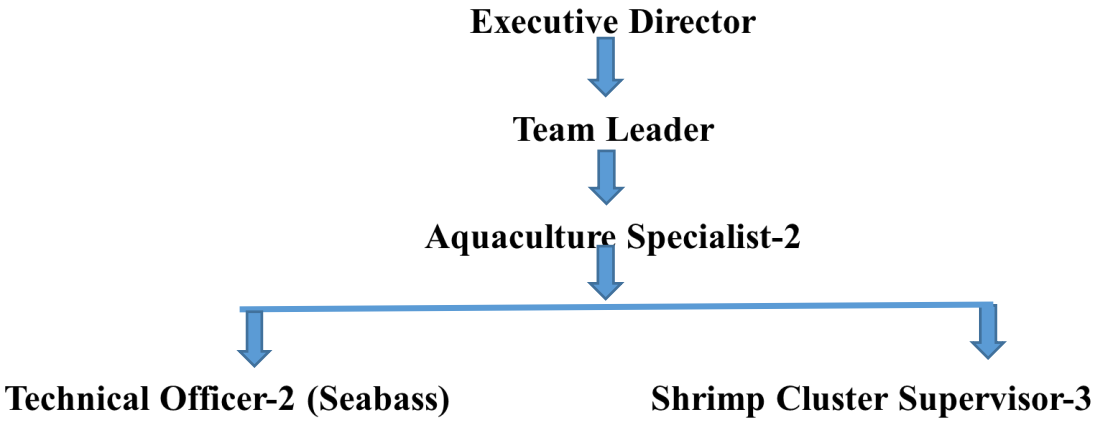
BSFF enhanced the skill and knowledge of its staff members profoundly in the area of coastal aquaculture. Alongside of these BSFF has a set of skilled professional and consultant who will help BSFF to implement the project activities in the coastal area of Bangladesh. The organization has extensive experience in the area of training management. Previously BSFF provided training to the farmers, private sector investors, and government officials (DoF officials). BSFF will be able to provide training on shrimp culture and management to the stakeholders on basis of current documents, knowledges and previous experiences.

BSFF has already implemented several projects with the support from of World Fish Center Bangladesh. It has implemented the project "Carrying forward work on ensuring optimal and sustainable utilization of aqua inputs in Bangladesh with a focus on compliance related issues" from September 2021 to March 2022 and "Work on policy consolidation, improvement of licensing, management process and effective use of aqua inputs from June 2019 to May 2020. So BSFF has profound knowledge about the working modality of World Fish Center and USAID, the organization has very good understanding about the reporting and documentation mechanism of World Fish Center as well as USAID. BSFF has been maintaining very good working relation with World Fish Center. All of these will assist BSFF to implement the project in the field level especially in the coastal region of Bangladesh.

BSFF has conducted a lot of awareness meeting, seminars, workshop with the participations of farmers, government officials, private sector stakeholders, NGO, INGO and donors in divisional, sub districts region and capital of Bangladesh. Moreover, BSFF is also working for the market promotion and business development in World Bank project and has very good understanding of the market system of Bangladesh for aquaculture products as well as the market system of abroad. It also has very good connection with the university academia and researchers of different agricultural universities of Bangladesh.

All of these dimensions are strengthening the capacity of Bangladesh shrimp and Fish Foundation to implement the projects of different donors smoothly. Organization hopes it will implement the project "Increase production and promotion of cultured shrimp in the mainstream market channels" smoothly.

1.7 Field implementation team



1.8 Brief budget summary

Table: 1.8.01 Brief budget summary

		Negotiated Budget (December 01, 2022 to August 31, 2023)												
					Investment Ratio						FtF BAA Contribution		Grantee Contribution	
#	Summary Budget	LOE / #	UNIT COST (Excl. VAT)	No of units	% of World Fish	% of Grantee	Total	FtF BAA	Grantee	Remarks & Budget Note	Cash	Kind	Cash	Kind
A	Staffs Salary				100%	0%	4,737,575	4,737,575	-		4,737,575	-	-	-
B	Staffs Benefits				100%	0%	396,772	396,772	-		396,772	-	-	-
C	Equipment, Supplies and Operation Cost				100%	0%	281,600	281,600	-		281,600	-	-	-
D	Travel				100%	0%	1,072,000	1,072,000	-		1,072,000	-	-	-
E	Activity Cost				100%	0%	6,033,950	6,033,950	-		6,033,950	-	-	-
F	Direct Cost				100%	0%	12,521,897	12,521,897	-		12,521,897	-	-	-
G	Others Cost			-	0%	0%	-	-	-		-	-	-	-
H	Total Cost (BDT)				100%	0%	12,521,897	12,521,897	-		12,521,897	-	-	-
I	Total Cost (USD)		Ex Rate	100.96	100%	0%	124,028	124,028	-		124,028	-	-	-

2.0 Project Implementation

2.1 A brief about the pictorial business model/activity model/ intervention model and its description

A. Black Tiger Shrimp culture and technology dissemination:

Improved extensive method of BT Shrimp culture in cluster approach with traceability has been implemented in three villages of Dumuria Upazila under Khulna district and one village of Bagerhat Sadar Upazila. The farmers were provided trainings with strong supervision by the project personnel. The intervention covered traceability and the technology has been disseminated among the nearby farmers through demonstration and awareness building.

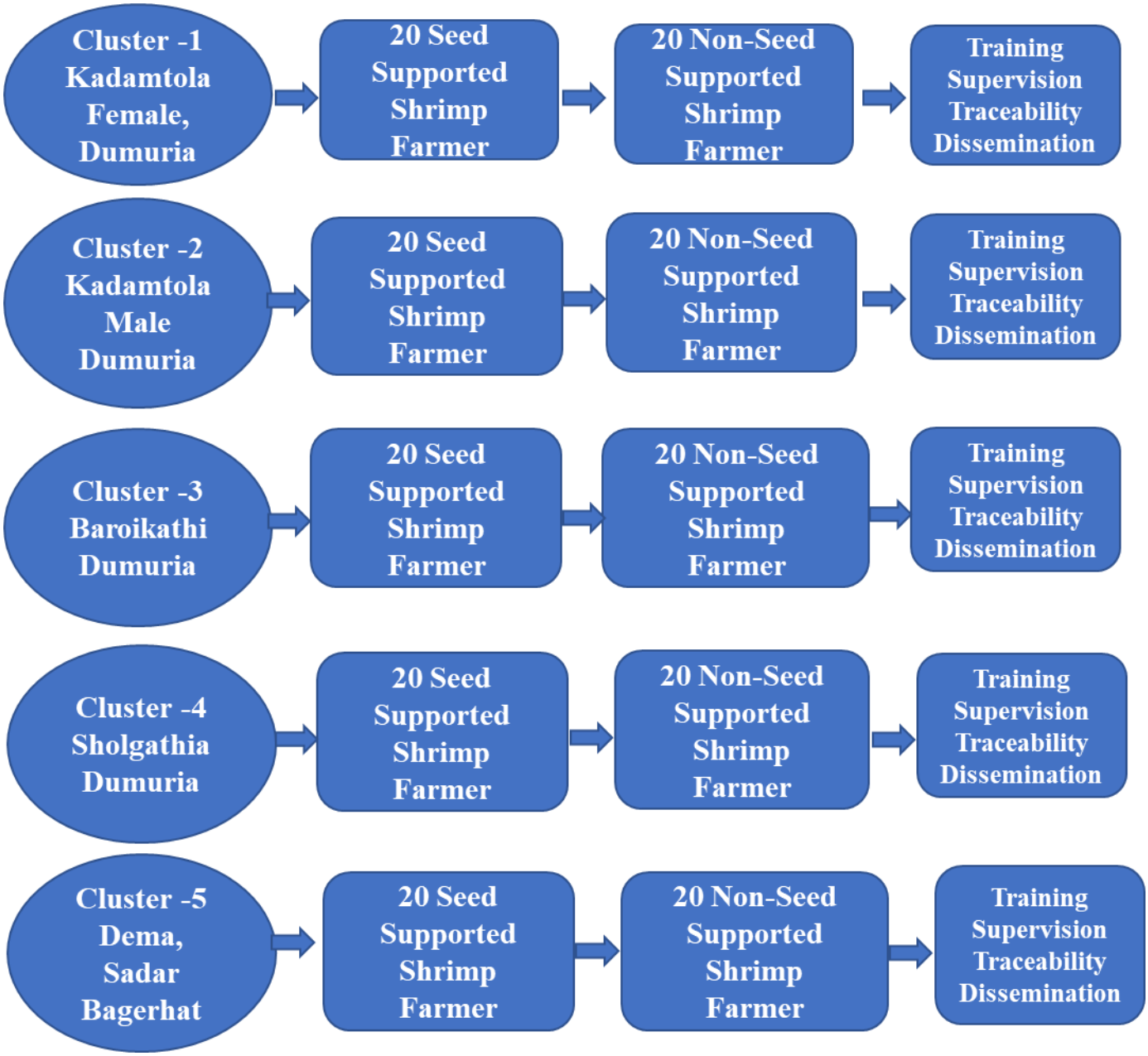


Fig. 2.1.01 BT Shrimp culture model

B. Seabass (*Lates calcarifer*) pilot culture and technology dissemination:

Feed-based domesticated seabass pilot culture has been implemented in three locations each with two ponds at Hoikong, Teknaf Cox'sBazar; Yunchprang, Teknaf, Cox'sBazar and Bandha, Dumuria, Khulna. The pilot farmers were provided trainings on nursery management and grow-out management of seabass with strong supervision by the project personnel. The technology has been disseminated among the nearby farmers through demonstration and awareness building.

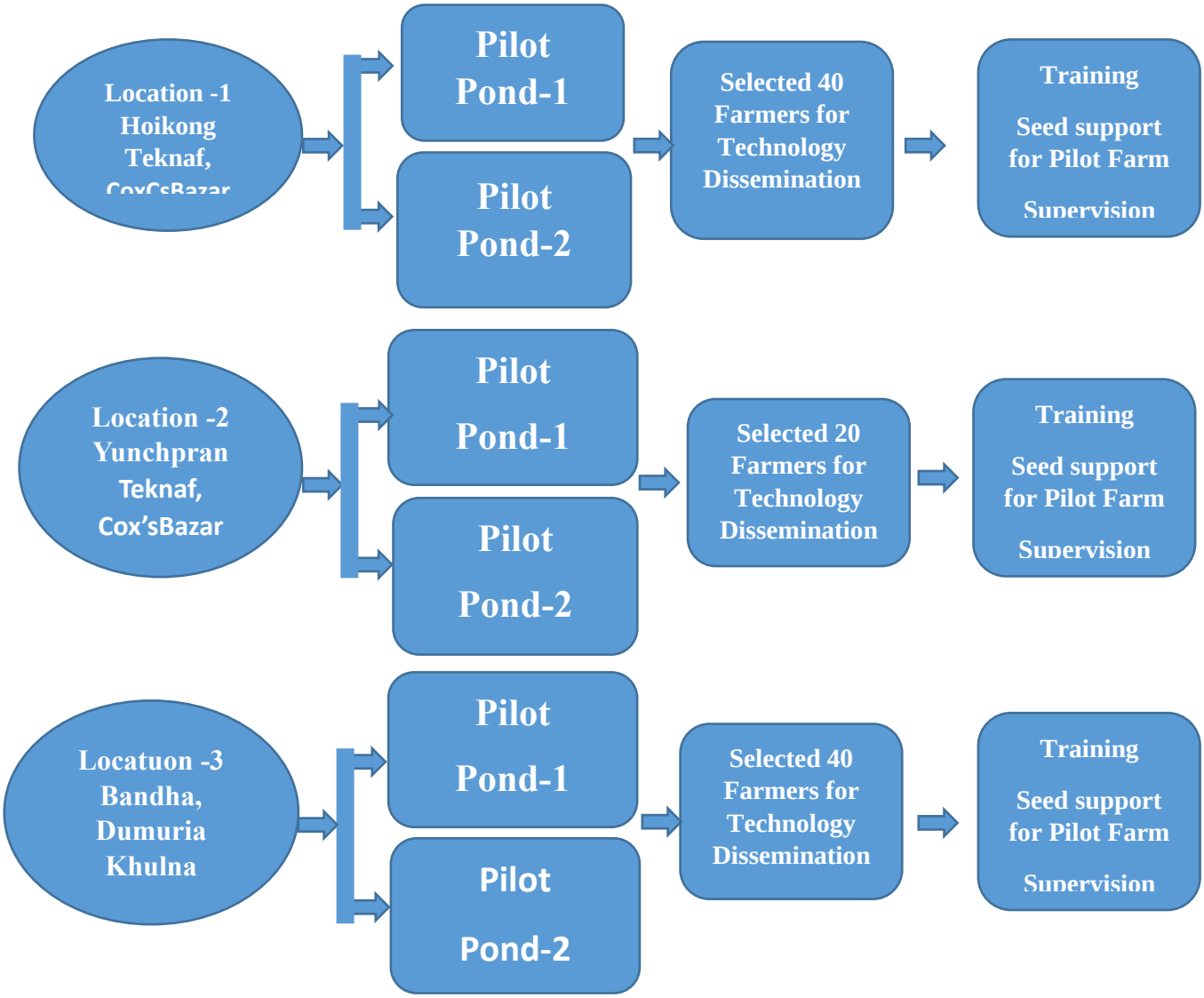


Fig. 2.1.02 Seabass pilot culture model

2.2 Approved Gantt chart for the intervention

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.01	**Preparatory work for cluster formation, site selection, farmer introduction on activities sharing and agreement signing and GPS Mapping**	Report, Group Photos, Selection Criteria, Farmers Pond details list	5	Milestone-1	5				5							
5.02	**Pond preparation and culture management BT shrimp**				-											
5.02.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	Report	100	Milestone-1	100				25	75						
5.02.02	Shrimp PL (SPF)	Procurement Package, report and master roll	1,200,000	Milestone-2	1,200,000						1,200,000					
5.02.03	Feeds	Report	36,000	Milestone-2	36,000						36,000					

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.02.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	Report	40 40 20	Milestone-2 Milestone-3 Milestone-4	100						20	20	20	20	20	
5.03	**Capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers (100 selected 100 technology dissemination)**	Report, Group Photos, Attendance list	4 3 3	Milestone-1 Milestone-2 Milestone-3	10					4	1	2	2	1		
5.04	**Capacity development training for value chain stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)**	Report, Group Photos, Attendance list	2	Milestone-2	2						1	1				
5.05	**Workshop for forward market development for**	Report, Group Photos,	1	Milestone-3	1								1			

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
	shrimp, farmers access to aqua inputs and domestic consumption to explore the business at Khulna	Attendance list														
5.06	**Workshop to facilitate market linkages with buyers and exporters for shrimp and sea bass at Dhaka**	Report, Group Photos, Attendance list	1	Milestone-3	1								1			
5.07	**Develop technical guidelines on certification i.e. GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand**	ToR, Agreement, Deliverables, Report	15	Milestone-1	15					15						

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.08	**Workshop for guidance for third party certification i.e. GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand at Khulna**	Report, Group Photos, Attendance list	1	Milestone-1	1					1						
5.09	**Introductory workshop on pilot digital traceability in the shrimp value chain**	Report, Group Photos, Attendance list	1	Milestone-1	1					1						
5.10	**Development of tool and programs for collection and storing on input source and output source data**	Report (if any)			-											
					-											
5.11	**Consultancy services to Capture the production and**	ToR, Agreement, Deliverables, Report	60 30	Milestone-2	90						30	30	30			

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
	economic performance of seabass farming			Milestone-3												
5.12	**Carry out feasibility study to establish seabass hatchery in Bangladesh**	ToR, Agreement, Deliverables, Report	10 10	Milestone-1 Milestone-2	20					10	10					
5.13	**Pond preparation and culture management Sea bass**				-											
5.13.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc)	Report	3 3	Milestone-1 Milestone-2	6					3	3					
5.13.02	Sea bass fry (around 1 gm)	Procurement Package, report and master roll	14,400	Milestone-2	14,400						14,400					
5.13.03	Feeds	Report	9,000	Milestone-2	9,000						9,000					
5.13.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	Report	3 3	Milestone-2 Milestone-3	6						2	1	2	1		

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.14	**Nursery management of sea bass fry 45 days**				-											
5.14.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc)	Report	4	Milestone-1	4				4							
5.14.02	Feeds	Report			-											
5.14.03	Water quality management (sampling, Labor, water/sample testing, aqua medicine, etc.)	Report	4	Milestone-2	4						4					
5.14.04	Fry collection and transportation (Local and Cox's Bazar)	Report	2	Milestone-2	2						2					
5.14.05	Nursing technology dissemination for technician (Accommodation, food, transportation, etc.)	Report	6	Milestone-2	6						6					
5.15	Skill Development Training for the Nursery and Grow	Report, Group Photos,	32	Milestone-1	5					3	1	1				

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
	out Farmers for sea bass farmers	Attendance list		Milestone-2												
5.16	**Workshop on sea bass culture management technology dissemination**	Report, Group Photos, Attendance list	1 1	Milestone-3 Milestone-4	2									1	1	
5.17	**Workshop on domesticated sea bass culture technology dissemination to explore business**	Report, Group Photos, Attendance list	1	Milestone-3	1								1			
5.18	**Workshop on feasibility study findings and recommendation for sea bass hatchery establishment in BD**	Report, Group Photos, Attendance list	1	Milestone-2	1						1					
5.19	**Promotional activities**				-											
5.19.01	Booklet- Shrimp & Sea Bass (Design and printing)	Printed IEC Materials (Soft and Hard copies)	3,000	Milestone-1	3,000					3,000						

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.19.02	Leaflet- Shrimp & Sea Bass (Design and printing)	Printed IEC Materials (Soft and Hard copies)	6,000	Milestone-1	6,000					6,000						
5.19.03	Training manual- Shrimp & Sea Bass (Design and printing)	Printed IEC Materials (Soft and Hard copies)	500	Milestone-1	500					500						
5.20	**Project Orientation and Progress Review Meeting**	Report, Group Photos, Attendance list	1 1 1	Milestone-1 Milestone-2 Milestone-3	3				1		1			1		
5.21	National Fish Week and Day Observe (International Women's Day and Youth Day)	Report	1 1 1	Milestone-1 Milestone-3 Milestone-4	3					1				1	1	
5.22	**Attending training on environment and climate organized by WorldFish**	Report (if any)			-											

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
5.23	**Closeout Workshop**	Report, Group Photos, Attendance list	1	Milestone-4	1										1	
5.24	Monthly Progress Report	Report	2 2 2 2	Milestone-1 Milestone-2 Milestone-3 Milestone-4	8				1	1	1	1	1	1	1	1
5.25	Project Completion report	Report	1	Milestone-4	1										1	
5.26	MEL data collection, processing and submission (as applicable)	Report (If any)		Each Milestone (if any)	-											
5.27	Success story collection and dissemination (as applicable)	Stories (If any)		Each Milestone (if any)	-											
5.28	Management Cost (Personnel, Supplies, Travel)	Appointment Letter, Travel plan for Project staffs	2 2 2 2	Milestone-1 Milestone-2	8				1	1	1	1	1	1	1	1

Approved Gantt Chart																
									Milestone-1		**Milestone-2**		**Milestone-3**		**Milestone-4**	
#	**Activities**	**Deliverables**	**Activity Allocation**	**Milestone**	**Total Activities**	**Note**	**Dec-22**	**Jan-23**	**Feb-23**	**Mar-23**	**Apr-23**	**May-23**	**Jun-23**	**Jul-23**	**Aug-23**	**Sep-23**
				Milestone-3 Milestone-4												

Milestone	**Deliverables**	**Milestone Due Date**	**Milestone Amount (WF)**	**Milestone Amount (BSFF)**	**Payment Due Date**
01	Above mentioned deliverables under each milestone	1-Feb-23	1,339,225	-	10-Feb-23
		31-Mar-23	1,339,225	-	10-Apr-23
02		31-May-23	5,142,600	-	10-Jun-23
03		31-Jul-23	2,618,250	-	10-Aug-23
04		30-Sep-23	2,106,597	-	31-Oct-23

Amount in BDT		**12,545,897**	**-**	

Amount in USD		**121,959**	**-**	

2.3 List of activities conducted

Table: 2.3.01 List of activities conducted

Sl. No.	Activities Conducted	Remarks
5.01	Preparatory work for cluster formation, site selection, farmer introduction on activities sharing and agreement signing and GPS Mapping	
5.02	Pond preparation and culture management BT shrimp	
5.02.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	
5.02.02	Shrimp PL (SPF)	
5.02.03	Feeds	
5.02.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	
5.03	Capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers (100 selected 100 technology dissemination)	
5.04	Capacity development training for value chain stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)	
5.05	Workshop for forward market development for shrimp, farmers access to aqua inputs and domestic consumption to explore the business at Khulna	
5.06	Workshop to facilitate market linkages with buyers and exporters for shrimp and sea bass at Dhaka	
5.07	Develop technical guidelines on certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand	
5.08	Workshop for guidance for third party certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand at Khulna	
5.09	Introductory workshop on pilot digital traceability in the shrimp value chain	
5.10	Development of tool and programs for collection and storing on input source and output source data	
5.11	Consultancy services to Capture the production and economic performance of seabass farming	Partial completion
5.12	Carry out feasibility study to establish seabass hatchery in Bangladesh	
5.13	Pond preparation and culture management Sea bass	
5.13.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	
5.13.02	Sea bass fry (around 1 gm)	
5.13.03	Feeds	
5.13.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	
5.14	Nursery management of sea bass fry 45 days	
5.14.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc)	
5.14.02	Feeds	
5.14.03	Water quality management (sampling, Labor, water/sample testing, aqua medicine, etc.)	
5.14.04	Fry collection and transportation (Local and Cox's Bazar)	
5.14.05	Nursing technology dissemination for technician (Accommodation, food, transportation, etc.)	
5.15	Skill Development Training for the Nursery and Grow out Farmers for sea bass farmers	
5.16	Workshop on sea bass culture management technology dissemination	

2.3 List of activities conducted (Contd.)

Sl. No.	Activities Conducted	Remarks
5.17	Workshop on domesticated sea bass culture technology dissemination to explore business	Not held
5.18	Workshop on feasibility study findings and recommendation for sea bass hatchery establishment in Bangladesh.	
5.19	Promotional activities	
5.19.01	Booklet- Shrimp & Sea Bass (Design and printing)	
5.19.02	Leaflet- Shrimp & Sea Bass (Design and printing)	
5.19.03	Training manual- Shrimp & Sea Bass (Design and printing)	
5.20	Project Orientation and Progress Review Meeting	
5.21	National Fish Week and Day Observe (International Women's Day and Youth Day)	
5.22	Attending training on environment and climate organized by WorldFish	
5.23	Closeout Workshop	
5.24	Monthly Progress Report	
5.25	Project Completion report	
5.26	MEL data collection, processing and submission (as applicable)	
5.27	Success story collection and dissemination (as applicable)	
5.28	Management Cost (Personnel, Supplies, Travel)	

2.4 Activity wise implementation details with pictures

2.4.01 Preparatory work for cluster formation, site selection, farmer introduction on activities sharing and agreement signing and GPS Mapping

At the very outset of project implementation, a series of formal and informal meetings with the different community stakeholders were organized by BSFF for BT shrimp cluster formation and site selection. The project authority had to paid much effort for convincing the farmers towards cluster approach of farming with traceability. A total of five shrimp clusters have been selected for the purpose in consideration of technical feasibility, farmers interest, environmental and social issues as per criteria set by the project. After selection of clusters the selected farmers were briefed and shared the activities of the intervention. The agreement signing with the farmers were done as well as GPS data were recorded for each of the selected farmers pond to trace the produce of the farm to meet the compliance need of buyers and exporters as a part of traceability implementation.

The detail of shrimp cluster formation is shown in Table: 1.5.04.

Site visit and meeting at Kadamtola village, Dumuria, Khulna.

2.4.02 Pond preparation and culture management BT shrimp

2.4.02.01 Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)

Scientific pond preparation for the culture management of black tiger shrimp is of prime importance to prevent diseases and enhance productivity. Re-excavation and or/ removal of bottom sludge, liming at the rate 250 kg/ha, 4-6 feet 5-10 ppt saline water filling by straining, bleaching at the rate 125-250 kg/ha for water treatment, dyke repairing, net fencing work was done in most of the ponds to make it bio-secured and suitable for shrimp cultivation. The project seed supported 100 shrimp ponds were prepared by the farmers under direct supervision of project technical team.

Pond preparation at Dema, Bagerhat and Baroikathi, Dumuria, Khulna.

2.4.02.02 SPF shrimp PL stocking

The 59 ponds under Kadamtola female, Kadamtola male and Baroikathi shrimp clusters were stocked on 14 April, 2023. While, the 21 ponds under Kadamtola male and Sholgathia shrimp clusters were stocked on 17 May, 2023. On the other hand, the remaining 20 ponds under Dema shrimp cluster, Bagerhat Sadar were stocked on 12 June, 2023 and thus a total of 100 ponds under the project have been stocked with a total of 1,200,000 SPF shrimp PL. The PL's were well packed with polybag, one third water, two third oxygen keeping two poly bags each with 1000 PL in an insulated box for transportation. The stocking density was 6/m^2. The PL's were acclimatized properly and release in the ponds/nursery areas scientifically in the morning when temperature was favourable for shrimp PL.

SPF shrimp PL stocking at Dema, Bagerhat Sadar and Baroikathi, Dumuria, Khulna.

2.4.02.03 Feeds for shrimp nursery and grow-out

Proper nutrition is the key factor for better shrimp PL survival and to enhance production. For the nursery and grow-out management of shrimp in 100 ponds of 5 clusters the farmers provided the feed. All the farmers could not provide feed in full to the shrimp as planned because of their investment incapability due to poverty. Repeated guidance and motivation of farmers by the project personnel required to provide feed to their farms. Nursery feed and different size of pellet feed with different feeding frequencies was used in the farms.

2.4.02.04 Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)

A. Sampling

Water quality and shrimp sampling was done regularly as per project provision. The water quality parameters e.g., pH, Temperature, Dissolved Oxygen, Ammonia, Secchi disk reading was recorded regularly during the culture period which was favourable for shrimp culture. The sampling data are submitted to WorldFish through sampling report duly.

B. Production and Harvesting

The shrimp farms were operated following improved extensive method with SPF PL having a stocking density of 6/m^2. Pond drying, bottom sludge removal, liming along with fencing of clusters were done to make it bio-secured. In some cases, bleaching of pond water, application of prebiotics and probiotics were also done for the improvement of water quality and productivity. The shrimp was harvested in different times depending on size, market access and farmers need of money. Though there was no disease incidence yet some of the farmers was worried about disease as there were some incidences of diseases in some of the nearby shrimp farms. In some cases, early harvesting also caused lower production as anticipated by the project.

Shrimp harvesting from Sholgathia cluster, Dumuria, Khulna

The details of baseline and post intervention shrimp production data are enclosed in Appendix I & II and synopsis of the same is presented in Table: 1.5.02.

*In baseline production farmers stocked carps in their ponds at the end of their shrimp harvest either after the shrimp crop or even along with shrimp and the carp culture continued for the whole culture season which has not been included in baseline production and income data.

The culture and production related other information's under the project are presented in Table 1.5.03.

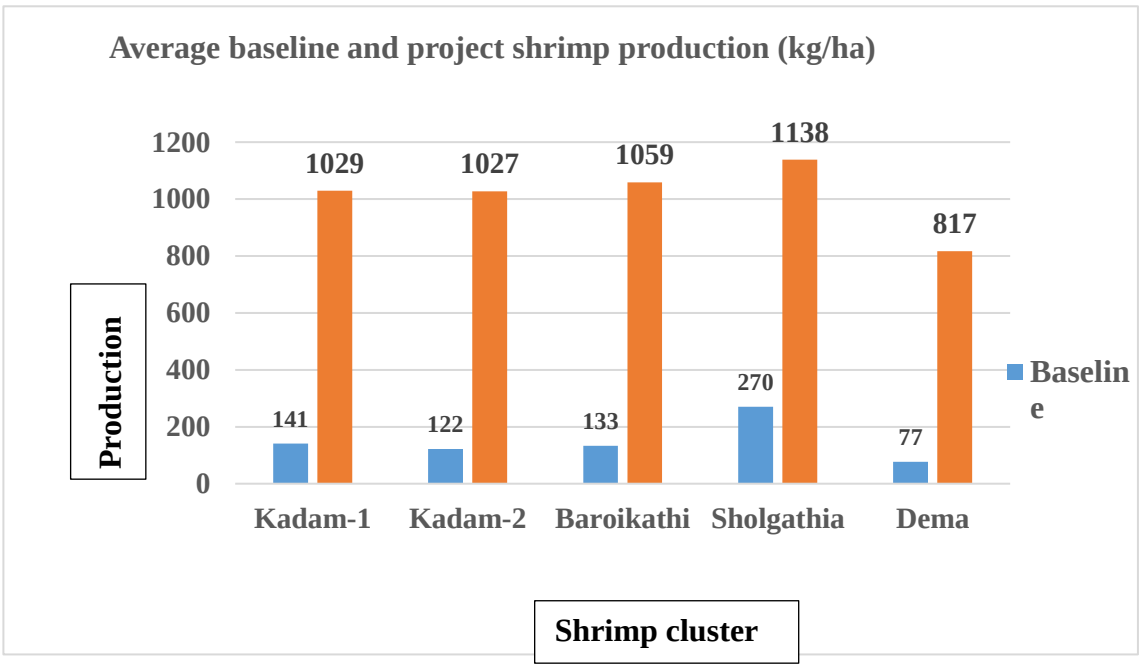


Fig: 2.4.01 Average baseline and project shrimp production in the shrimp clusters

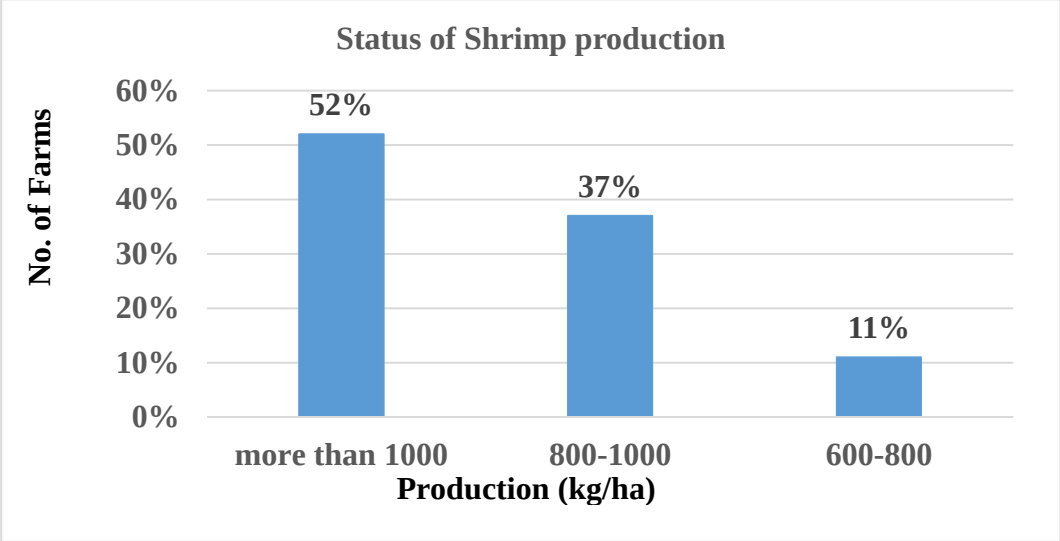


Fig: 2.4.02 Overall status of shrimp production in the shrimp clusters

2.4.03 Capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers (100 selected 100 technology dissemination)

Technical know-how was pre-requisite for effective implementation of BT shrimp nursery and grow-out management because most of the selected farmers did not receive any training on the subject earlier. That is why as per project provision capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers of 100 selected seed supported cluster farmers and 100 non-seed supported shrimp farmers were conducted during the project period in different locations of Khulna, Satkhira and Bagerhat regions. Local DoF officers were present in the trainings as resource person along with project technical team. The trainings were very useful for the positive change of their attitude, knowledge and skill to run the culture activities. The seed supported cluster farmers and non-seed supported farmers training detail are presented in Table: 1.5. 04 and 1.5.05 respectively.

Non-seed supported shrimp cluster farmers training at Faltita, Bagerhat**.**

Seed supported shrimp cluster farmers training at Chohera, Dumuria, Khulna

2.4.04 Capacity development training for value chain stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)

Scientific value chain management is of greatest importance for the improvement of product quality and compliance of buyers and exporters. Under the project 40 shrimp value chain actors (Depo, arrad, cool chain mgt, exporter, etc.) were provided training for their capacity development to enhance export as well as domestic consumption. Local DoF officers were present in the trainings as resource person along with project technical team.

The details of capacity development training of shrimp value chain stakeholders are shown in Table: 1.5.06.

Shrimp value chain at Botiaghata & Dumuria, Khulna

2.4.05 Workshop for forward market development for shrimp, farmers access to aqua inputs and domestic consumption to explore the business at Khulna

As part of the project intervention forward market development activities including promotion for increased domestic consumption, export of shrimp and farmers' access to better quality inputs a workshop was organized on 18 June, 2023 at Hotel Castle Salam, Khulna with the participation of DoF, BFFEA representatives and other concerned stakeholders. In this regard the undermentioned issues have been discussed in the workshop in a participatory manner followed by recommendations.

Key discussion points:

- Status of shrimp Exports from Bangladesh
- Shrimp Export Trend of Bangladesh from 2003/04-2020/21
- Snapshot of Global Shrimp Trade and Bangladesh
- Forward Market
- How a Forward Market Works
- Forward Market Importance
- Problems in forward market
- Development of Forward Market
- Communication Tools of Digital smart Marketing
- Segmentation Alternatives of a Communication Strategy
- Marketing and Communication Mood and Tools that Bangladesh Aquaculture and Seafood Products Exporters Can Utilized
- Modern marketing and Communication Tools

International Consultant Mr. Bala Chandra Mohan shared his experience of India regarding forward market development and provided some direction to develop forward market of shrimp business in the context of Bangladesh.

Photographs of workshop held at Hotel Castle Salam, Khulna on 18 June, 2023.

2.4.06 Workshop to facilitate market linkages with buyers and exporters for shrimp and sea bass at Dhaka

Workshop on facilitation of market linkages with buyers and exporters was organized on 19 June, 2023 at Hotel Golden Tulip, Banani, Dhaka with the participation of farmers representatives, shrimp and seabass buyers and exporters along with the different super shop outlet representatives where the information on shrimp and shrimp products, prices, quality, food safety was shared so that market linkages with shrimp and seabass buyers and exporters are established. Mr. Bala Chandra Mohan, international expert spoke and made a valuable presentation in the workshop based on Bangladesh context and experience from India. Global market, export, export trend, buyers' requirement, transportation chain, etc. have been discussed in the workshop with the following recommendations.

Photograph of market linkages workshop at Hotel Golden Tulip Hotel, Banani, Dhaka.

Recommendations:

(i) Timely mitigation of BT shrimp aquaculture saline water crisis during culture period (February-September) in consultation with local administration, WDB, MoFL and MoA.

(ii) Declaration of specific shrimp culture zone/area by the government through the identification of proper shrimp culture area.

(iii) The price of electricity for shrimp/aquaculture sector should be same as is applicable for agriculture sector.

(iv) Introduction of third-party certification in shrimp in Bangladesh to compete internationally with other exporters. For the introduction of third-party certification in shrimp to enhance export needs to be implemented development project to build farmers capacity, cluster farms approach and aquaculture improver program as a priority project.

(v) A bulk amount of shrimp and its steady production is of prime importance for sourcing and sustaining international buyers which is now a great barrier because of lower productivity. In this regard, advance training of shrimp farmers, supply of SPF seed, infrastructure development and input support to the farmers should be provided.

(vi) Access to finance and risk management are important parameters for increasing shrimp and fish production. In this regard coordination among farmers, Bank, insurance, NGO as well as other financial institutions and government policy support is essentially required.

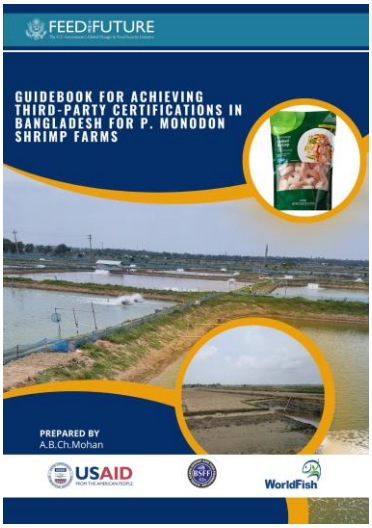
(vii) For export promotion safe premium brand shrimp, contract farming, adherence to standard international compliance, partnership with the stakeholders, market analysis, cost minimization through efficiency, increasing productivity with advance technology, value addition and continuous access to new markets can play vital role.

(viii) Campaign and different system of marketing e.g., inbound marketing, content marketing, social media marketing, search engine optimization, paper click, account-based marketing, email marketing, etc can enhance export.

(ix) Effective linkages to be established among farmers, processing plants, retail and whole sale markets, super shops, buying houses and competent authorities to develop fish and shrimp market and marketing system of Bangladesh.

2.4.07 Develop technical guidance on third party certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand

An international consultant, Mr. Bala Chandra Mohan was deployed to work closely on the formulation of a technical guidance on third party certification in shrimp. Initially he prepared a draft report, visited hatcheries, feed mills, farms, wholesale and retail markets, consulted with a significant number of the value chains actors, shared draft report and received feedback in a workshop and finalized the report which certainly will increase the value chain actor's ability to meet export market demand effectively. The report is shown in Appendix III.



2.4.08 Workshop for guidance for third party certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand at Khulna

Followed by the assigned work the hired consultant shared the draft guidance on third party certification for the enhancement of shrimp certification in the context of Bangladesh at Hotel Castle Salam, Khulna on 17 June, 2023 with the participation of farmers, buyers, exporters, DoF and other concerned agency representatives where the formulated guideline inclusive of GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) rectified incorporating agreed feedback from the stakeholders so that shrimp certification and farmers' ability to meet export market demand increase significantly.

Photograph of workshop at Khulna on 17 June, 2023.

2.4.09 Introductory workshop on pilot digital traceability in the shrimp value chain

Piloting of digital traceability in the shrimp value chain was done through a series of tasks. At the beginning during cluster and farm selection GPS Mapping of farm with a unified code were chalked out. For the active enrollment of value chain actors concerned with the traceability an introductory workshop was arranged at Ava center, Khulna on 28 March, 2023 with the participation of farmers, processors, DoF representatives and other concerned stakeholders. In the workshop the shrimp cluster farmers and project personnel were briefed about pilot digital traceability activities. The main focused area of the workshop was traceability and its importance in Bangladesh aquaculture sector as well as the modes and modality of pilot digital traceability

Photograph of workshop at Khulna on 28 March, 2023.

2.4.10 Development of tool and programs for collection and storing on input source and output source data

After introductory workshop with the stakeholders the tools and programs for collection and storing of input and output source data, protocol on linking cluster farmers with processing plants for the collection of input data from pilot farms were developed along with 'Kobo Tool' and a dedicated web platform with support from WorldFish. All the culture process i.e., input-output data entry, data storing, information flow as well as reporting work was done accordingly. The data-base development work along with 'Kobo Tool' and dedicated web platform was done during March, 2023 while input-output data entry, data storing, information flow as well as reporting work covered the whole culture period. In this regard the farmers were supplied farm record books, TAB for data flow work and project field staff directly assisted farmers for the storing of data in the digital platform.

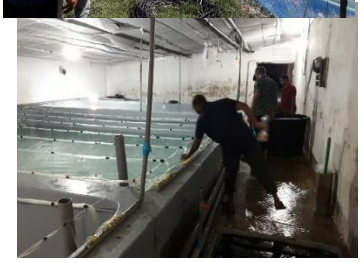
A project field staff recording as well as posting traceability data to online platform jointly with the concerned farmers at Sholgathia, Dumuria, Khulna.

2.4.11 Consultancy services to Capture the production and economic performance of seabass farming

A. Seabass fry nursing for 45 days

- Consultant name: Mr. Vijayan Cinnathumbi
- Joining date: 14 July, 2023
- Activities performed:
  - Nursery and culture site visit at Bandha, Dumuria 15 July; MKA farm, Hoikong, Teknaf 17 July; MKA hatchery-1&2 and Yunchiprang, teknaf, Cox'sBazar 18 July, 2023.
  - Seabass fry receiving at MKA farm-2, Cox'sBazar, 19 July.
  - Preparation of cemented tanks for conditioning/acclimatization, short nursing arrangement along with other facilities, 17-19 July.
  - Seabass fry acclimatization and stocking, 19 July.
  - Short cemented tank nursing, shipment and hapa nursing (Total nursing: 45 days):

a) Cemented tank nursing by the supplier: 19 July-14 August, 2023-27 days.



Seabass consultant Mr. Vijayan Cinnathumbi working for cemented tank nursing at the hatchery site, Cox'sBazar and hapa nursing at pond site at Bandha, Khulna..

Seabass fry nursing at pond side hapa (18 days):

- Activities performed:
  - 10 hapa making with different mesh size, hapa setting at Bandha, Dumuria, Khulna; MKA farm-1, Hoikong,Teknaf, Cox'sBazar and and Yunchprang, Teknaf, Cox'sBazar.
  - 2 aerators setting at each 3 above-mentioned rearing sites.
  - Shipment, grading and stocking to each of the three rearing sites.
  - Feeding of seabass fingerlings.
  - Water quality monitorin

b) Hapa nursing at pond site: 15 August-1 September, 2023-18 days.

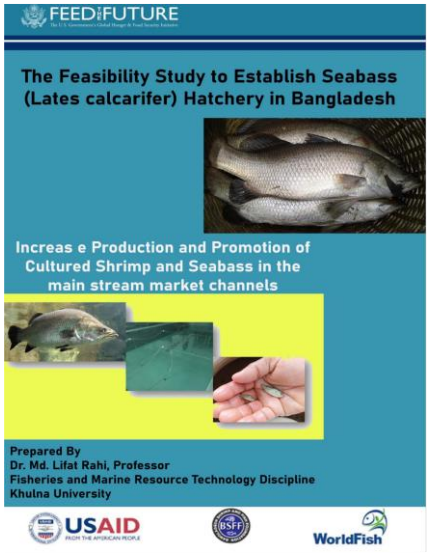
*Detailed cemented tank nursing, hapa nursing and 'Capture the production and economic performance of seabass farming' reports are attached in Appendix IV

Grading at Bandha, khulna

Hapa nursing at Hoikong, Cox'sBazar

2.4.12 Carry out feasibility study to establish seabass hatchery in Bangladesh

The project carried out a feasibility study to establish seabass hatchery in Bangladesh which is prime pre-requisite for the expansion of seabass culture in Bangladesh. In this connection the hired national consultant Prof. Dr. Lifat Rahi conducted a short survey, Focus Group Discussion (FGD), Key Informant Interview (KII), visited BT shrimp hatchery, feed mill, potential culture sites, markets and other concerned establishments as well as consulted with the stakeholders for preparing his assigned report. Moreover, he addressed the feedbacks on his draft report by the WorldFish and BSFF. Finally, he shared his findings in a dedicated workshop on the same event and finalized his report. The report is attached in Appendix V.



Photographs of workshop and feasibility report

2.4.13 Pond preparation and culture management Sea bass (Pond preparation, seabass fry and feed procurement, sampling and harvesting.)

For the culture management of seabass 6 selected ponds were well prepared by drained out water, drying, dyke repairing, black soil removing, liming, fencing, water filling etc. Accordingly, 14400 seabass fries were procured locally which was imported from Asia Tropic Zone Co., Thailand by the project vendor. The fries were well packed with polybag and oxygen during transportation. For the transportation from Thailand to Cox'sBazar and Cox'sBazar to Jessore air cargo were used. While for local transportation same procedure followed using motor vehicle for road transport. A total of 11500 kg feed including nursery feed was also procured from Thai Union, Thailand by the same importer with the finance and arrangement of BSFF and selected 3 farmers. At the beginning 1st 20 days the seabass fingerlings grow-out rearing at pond side hapa were done to minimize cannibalism and increasing survival, minimize wastage of feed and water quality management as per suggestion of the consultant. Sampling works was also done as per project provision. However, culture period has not yet finished and harvesting could not be done as fingerling stocking was late because of various limitations in timely procurement of fry, seed and consultant.

a) Hapa grow-out rearing at pond site: 2, September-21 Sept., 2023-20 days.

b) Grow-out rearing at the three pond sites: 22, September-14 March, 2024-175 days.

Reports on seabass culture management is attached in Annexure-

Grow-out hapa rearing site at Bandha, khulna

Sampling at Hoikong, Teknaf, Cox'sBazar.

Seabass fry grow-out rearing at pond side hapa:

- Activities performed:
  - 10 hapas making with different mesh size, hapa setting at Bandha, Dumuria, Khulna; MKA farm-1, Hoikong,Teknaf, Cox'sBazar and and Yunchprang, Teknaf, Cox'sBazar.
  - 2 aerators setting at each 3 above-mentioned rearing sites.
  - Shipment, grading and stocking to each of the three rearing sites.
  - Feeding of seabass fingerlings.
  - Water quality monitoring
  - Finally releasing the seabass juveniles in the grow-out pond on 22 September, 2023.
  - The grow-out culture management work beyond project period will be done by the selected entrepreneurs/farmers with their own cost and management. However, the farmers will provide the production and culture management data/information to BSFF for record and dissemination.

*Detailed cemented tank nursing, hapa rearing and 'Capture the production and economic performance of seabass farming' reports are attached in Appendix IV

The production cost of seabass fry nursing (Indoor and outdoor hapa) for 45 days, projected grow-out production cost of seabass for 195 days, projected production cost and benefit of seabass and average sampling record (Average of three sites) of seabass are presented in Table: 1.5.10, 1.5.11, 1.5.12 and 1.5.13 respectively.

Sampling and grading at Bandha, Dumuria, Khulna.

Sampling of seabass pilot culture was done on 14.09.2023 at Bandha, Dumuria, Khulna. The Aqauculture Specialist, Khulna along with other project personnel and the entrepreneur actively participated in sampling work.

2.4.14 Nursery management of seabass fry 45 days (Pond preparation, feeds, water quality management, fry collection and transportation, nursing technology dissemination for technicians)

For the nursery management of seabass for a period of 45 days the 4 selected ponds were well prepared by drained out water, drying, dyke repairing, black soil removing, liming, fencing, water filling and finally setting nursing hapas in the ponds. Thailand imported seabass seeds and feed were procured and transported as discussed in section 2.04.11 and 2.04.13. Water quality e.g., pH, DO, Ammonia, Transparency was monitored regularly and found suitable for nursing. However, a modification was done in nursing as per suggestion of the consultant. In that two-stage nursing e.g., short cemented tank nursing at hatchery premises and hapa nursing at pond sites were done as discussed in section 2.04.11:

a) Cemented tank nursing: 19 July-14 August, 2023-27 days.

b) Hapa nursing at pond site: 15 August-1 September, 2023-18 days.

*Detailed cemented tank nursing, hapa rearing reports are included in the report on ‘Capture the production and economic performance of seabass farming’ in Appendix IV.

Seabass fry transportation, acclimatization and stocking

Nursing technology dissemination for technicians

BSFF project team arranged three days training for local technician to train them about the nursing of seabass fries in indoor cemented tank at MKA-2 hatchery premises, Inani, Cox'sBazar during 15-17 August, 2023. Two technicians from Bandha, Dumuria, Khulna and two technicians from MKA-1 farm, Hoikong, Teknaf, Cox'sBazar and two technicians from Yunchprang, Teknaf, Cox'sBazar with a total of six participants attained in the training.

Aquaculture Specialist of Cox's bazar region conducted the training along with international seabass consultant Vijayan C. There were two parts of training e.g., theoretical and practical session at the nursey site. Three WorldFish representatives were attended the training while Team Leader and Executive director attended at the closing of training. Two local DoF representatives were also participated in the training.

Training of technicians for seabass nursing technology dissemination at MKA-2 hatchery, Cox'sBazar.

2.4.15 Skill Development Training for the Nursery and Grow out Farmers for sea bass farmers

As per project provision BSFF technical team provided Skill Development Training for the Nursery and Grow out Farmers for sea bass farmers at Khulna and Cox's Bazar regions. The main focused area of the training was the enhancement of skill of farmers about the seabass culture, seabass feeding practice, diseases control, nursery management and marketing. There were 5 batches of trainings each with 20 participants. DoF officer attended the trainings as resource person. The WorldFish and BSFF representatives were also attended the trainings as guests.

The detail of skill development training of seabass farmer is presented in Table 1.5.11

Training at Rongikhali, Cox'sBazar

Training at Sholgathia, Dumuria

2.4.16 Workshop on sea bass culture management technology dissemination

BSFF project team arranged two-day long workshops entitled 'Seabass culture management technology dissemination' on 18 August, 2023 and 27 August 2023 at Hotel NeedsBayWatch, Cox'sBazar and Hotel Castle Salam, Khulna respectively with the participation of DoF, BFRI, BFFEA representatives and other stakeholders. International Consultant Mr. Vijayan C displayed the main power point presentation focused on nursery and culture management technology of seabass. The workshop was aimed for the expansion of seabass farming through sharing information and knowledge among the concerned government agencies, private sector stakeholders, exporters and other related actors of fisheries and aquaculture sector of Bangladesh. WorldFish, BSFF and project Team also participated in the event and provided valuable contribution. The detail activities have been included in workshop report.

Workshop on sea bass culture management technology dissemination at the Hotel NeedsBayWatch at Cox'sBazar on 27 August, 2023.

2.4.18 Workshop on feasibility study findings and recommendation for sea bass hatchery establishment in BD

The project carried out a dedicated workshop on 10 June, 2023 at Hotel Castle Salam, Khulna linked with feasibility study to establish seabass hatchery in Bangladesh which is prime pre-requisite for the expansion of seabass culture in Bangladesh. In the dedicated workshop the hired national consultant Prof. Dr. Lifat Rahi elaborated about site selection criteria for a seabass hatchery, requirements for the production of seabass seeds in hatcheries, technical issues for seabass seed production in hatcheries, challenges associated with seabass hatchery operation, spawning and induced breeding of seabass in hatchery, hatching and larval rearing of seabass in the hatchery with the following key recommendations.

Photograph of workshop held at Khulna on 10 June, 2023

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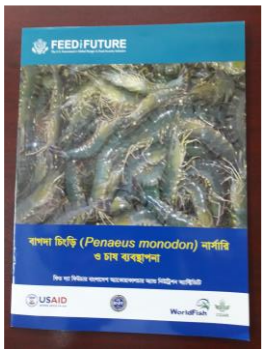
Workshop key recommendations:

- Seabass farmers must be supported with seed, feed and technical support throughout the grow-out phase.
- Hatchery owners must be supported with:
  a) Skilled and expert technicians for the entire production cycles initially.
  b) Must be given financial support, broods, nutritional supplements for the broods and expert technical support for the entire cycle.
- Breeding trials can be conducted by modifying (or creating facility) black tiger shrimp hatcheries to successfully introduce seed production in Bangladesh.
- Cox's Bazar region provides the best environmental conditions for seabass breeding trials initially and then can be transferred to the other locations (particularly Bagerhat, Khulna and Satkhira) for establishing hatchery facilities.
- Feed industry must be developed in parallel to the hatchery phase for brood, nursery and grow-out phases/stages

*Detailed consultancy reports on 'Carry out feasibility study to establish seabass hatchery in Bangladesh' is attached in Appendix V.

2.4.19 Promotional activities

Agreed number of promotional materials for the uses of concerned stakeholders were prepared and distributed to the beneficiaries. The materials were prepared from the review of literature from Thailand, India, Australia, Singapore and other overseas and domestic resources. The suggestions and feedbacks from WorldFish and BSFF authority was also incorporated in the literature. These included (i) Seabass booklet-1500, (ii) Shrimp booklet-1500, (iii) Seabass leaflet-3000, (iv) Shrimp leaflet-3000, (v) Seabass training manual-250 and (vi) BT Shrimp training manual-250 Nos. There is no suitable publications on seabass nursery and culture management technology appropriate for the practical users. The promotional materials prepared by the project will serve as the reference and base literature for the concerned stakeholders.



Promotional materials preparation and distribution

2.4.20 Project Orientation and Progress Review Meeting

For the effective implementation of project activities project inception and progress of works was shared and reviewed through one orientation program and two meetings held on 5 February, 2023; 17 May, 2023 and 30 July, 2023 with the participation of WorldFish and BSFF concerned officials at WorldFish, Khulna Office, BSFF Dhaka Office and BSFF Dhaka Office respectively. WorldFish team provided presentations focusing program implementation, finance, communication, Mel system during the orientation meeting while in the review meetings they provided valuable feedback and suggestions which ultimately resulted effective implementation of the project assigned activities.

BSFF Team leader Dr. Md. Zillur Rahman presents an overview of the project and implementation plan in the meeting.

Mr. Shamsul kabir, DCoP of the Project share his thought and experience of shrimp and aquaculture in the meeting and provide guidelines to achieve the goals of the project in timely manner.

Project orientation meeting at WorldFish Office, Khulna

2.4.21 National Fish Week and Day Observe (International Women's Day and Youth Day)

International Women's Day was observed at Kadomtola, Dumuria on 9th March 2023 with the participation of community women and cluster female farmers. This was the day to celebrate the social, economic, cultural, and political achievements of women from all around the world. The day also focuses on a call to action for accelerating gender parity and setting agendas and goals in achieving these targets. The WorldFish-BSFF project arranged an open discussion, game, cultural program and quiz competition on the event.

International woman's day at Kadamtola, Dumuria, Khulna

National fish week, 2023 was celebrated through farmers rally, discussion meeting and quiz competion focusing the national theme of the week **"Nirapod Mache Bhorbo Desh, Gorbo Smart Bangladsh"** on 26th July, 2023 at Dumuria khulna. DoF representative was present in the event and provided information about government support for shrimp farmers.

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National Fish Week, 2023 at Baroikathi, Dumuria, Khulna

2.4.22 Attending training on environment and climate organized by WorldFish

Attended at the Training on environmental compliance & CRM " held on 19 March, 2023 at Hotel Six Seasons, Gulshan, Dhaka organized by WorldFish, Bangladesh and South Asia Office, Dhaka. Sixteen implementing partners of WorldFish attended the program. Issues relating to environmental conservation, climate change, climate change adaptation especially probable hazards due to project intervention and mitigative measures have been discussed in the training. BSFF tried best so that the project interventions cause no or minimal negative impacts on the environment at the intervene areas.

2.4.23 Closeout Workshop

A closeout workshop was held at Hotel Golden Tulip, Banani, Dhaka on 24 September, 2023 with the participation of representatives from DoF, BFRI, Academia, BFFEA, WorldFish, BSFF and other concerned representatives. Project Team Leader presented the implemented activities along with the findings during the project period. The guests and participants of the workshop discussed on the presentation and provided their valuable suggestions. Finally, the workshop ended with some

Project closeout workshop at Banani, Dhaka

2.4.24 Monthly Progress Report

As per project proposal a monthly progress report has been submitted at the beginning of next month along with work plan for upcoming month. A total of 8 (Eight) monthly report and work plan have been submitted to the WorldFish which have been reviewed by the WorldFish program POC and other concerned project personnel.

2.4.25 Project Completion report

Initially a draft project completion report has been submitted at the end of the project completion. The draft report then finalized as per review and feedback by WorldFish project authority. The final report included project background, all the implemented activities, findings, constraints, recommendations and other necessary areas.

2.4.26 MEL data collection, processing and submission (as applicable)

During project implementation information collection and recording for reporting of MEL data was also collected from grass root level which was processed and submitted to WorldFish project authority as deliverables along with regular reports and other documents.

2.4.27 Success story collection and dissemination

As per project proposal 8 (Eight) success stories have been prepared and submitted to WorldFish within the project period based on the success and achievements of implemented project interventions. The successes are also disseminated among the other project beneficiaries and concerned stakeholders. The Case Studies/Success Stories are as follows which have been submitted to WorldFish duly:

1) A case study on SPF shrimp PL used in “Sholgathia shrimp cluster” at Dumuria, Khulna
2) A case study on Feeding of BT Shrimp in “Kadamtola male shrimp cluster farm” at Dumuria, Khulna.
3) A case study on Shrimp Nursery in “Sholgathia Shrimp Cluster farm” at Dumuria, Khulna.
4) Biosecurity measures in “Kadamtola shrimp cluster farm” at Dumuria, Khulna resulted good production with better post larvae (PL) survival.
5) Black Tiger Shrimp Cluster Farming approach at Kadamtola, Dumuria, Khulna yielded more production along with traceability
6) A case study on Vetky Nursery at Banda, Dumuria, Khulna.
7) A case study on “Mridula Mondol, an example of female empowerment through successful shrimp farming at Baroikati shrimp cluster, Dumuria, Khulna.”
8) A case study on the success of Mr.Tawhid Mollah on shrimp farming at Sholgathia, Dumuria, Khulna.

3.0 Project performance and milestones

Table: 3.0.01 Project performance and milestones

Sl. No.	Activity	Planned with quantity	Achieved with quantity	Remarks
5.01	Preparatory work for cluster formation, site selection, farmer introduction on activities sharing and agreement signing and GPS Mapping	5 Clusters	5 clusters	100%
5.02	Pond preparation and culture management BT shrimp			
5.02.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	6 Nos.	6 Nos.	100%
5.02.02	Shrimp PL (SPF)	1,440,000 Nos.	1,440,000 Nos.	100%
5.02.03	Feeds	36000 kg	26970 kg	75%
5.02.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	100 Nos.	100 Nos.	100%
5.03	Capacity development training for shrimp farmers on good aquaculture practices (GAP), improved post-harvest management for grow-out farmers (100 selected 100 technology dissemination)	200 Nos.	200 Nos.	10 batches 100%
5.04	Capacity development training for value chain stakeholder (Depo, arrad, cool chain mgt, exporter, etc.)	40 Nos.	40 Nos.	2 batches 100%
5.05	Workshop for forward market development for shrimp, farmers access to aqua inputs and domestic consumption to explore the business at Khulna	1 No.	1 No.	100%
5.06	Workshop to facilitate market linkages with buyers and exporters for shrimp and sea bass at Dhaka	1 No.	1 No.	100%
5.07	Develop technical guidelines on certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand	1 No.	1 No.	100%
5.08	Workshop for guidance for third party certification i.e., GAP (Good Agricultural Practices), HACCP (Hazard Analysis Critical Control Point) to increase farmers' ability to meet export market demand at Khulna	1 No.	1 No.	100%
5.09	Introductory workshop on pilot digital traceability in the shrimp value chain	1 No.	1 No.	100%
5.10	Development of tool and programs for collection and storing on input source and output source data	1 No.	1 No.	100%
5.11	Consultancy services to Capture the production and economic performance of seabass farming	1 No.	1 No.	100%
5.12	Carry out feasibility study to establish seabass hatchery in Bangladesh	1 No.	1 No.	100%
5.13	Pond preparation and culture management Sea bass			
5.13.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	6 Nos.	6 Nos.	100%
5.13.02	Sea bass fry (around 1 gm)	14400 Nos.	14400 Nos.	100%
5.13.03	Feeds	9000 kg	9000 kg	100%

Project performance and milestones (Contd.)

Sl. No.	Activity	Planned with quantity	Achieved with quantity	Remarks
5.13.04	Sampling and Harvesting (Labor, water/sample testing, aqua medicine, etc.)	6 Nos.	6 Nos.	100%
5.14	Nursery management of sea bass fry 45 days	45 days	45 days	100%
5.14.01	Pond Preparation (Dyke repairing, black soil removing, fencing, etc.)	4 Nos.	4 Nos.	100%
5.14.02	Feeds	-	-	Included in 5.13.03
5.14.03	Water quality management (sampling, Labor, water/sample testing, aqua medicine, etc.)	4 Nos.	4 Nos.	100%
5.14.04	Fry collection and transportation (Local and Cox's Bazar)	2 Nos.	2 Nos.	100%
5.14.05	Nursing technology dissemination for technician (Accommodation, food, transportation, etc.)	6 Nos.	6 Nos.	100%
5.15	Skill Development Training for the Nursery and Grow out Farmers for sea bass farmers	100 Nos.	100 Nos.	5 batches 100%
5.16	Workshop on sea bass culture management technology dissemination	2 Nos.	2 Nos.	100%
5.17	Workshop on domesticated sea bass culture technology dissemination to explore business	1 no.	-	Ignored as per suggestion of WF
5.18	Workshop on feasibility study findings and recommendation for sea bass hatchery establishment in Bangladesh.	1 No.	1 No.	100%
5.19	Promotional activities			
5.19.01	Booklet- Shrimp & Sea Bass (Design and printing)	3000 Nos.	3000 Nos.	100%
5.19.02	Leaflet- Shrimp & Sea Bass (Design and printing)	6000 Nos.	6000 Nos.	100%
5.19.03	Training manual- Shrimp & Sea Bass (Design and printing)	500 Nos.	500 Nos.	100%
5.20	Project Orientation and Progress Review Meeting	3 Nos.	3 Nos.	100%
5.21	National Fish Week and Day Observe (International Women's Day and Youth Day)	3 Nos.	2 Nos.	67% Youth Day beyond project period
5.22	Attending training on environment and climate organized by WorldFish	1 No.	1 No.	100%
5.23	Closeout Workshop	1 No.	1 No.	100%
5.24	Monthly Progress Report	8 Nos.	8 Nos.	100%
5.25	Project Completion report	1 No.	1 No.	100%
5.26	MEL data collection, processing and submission	-	-	Done
5.27	Success story collection and dissemination (as applicable)	8 Nos.	8 Nos.	100%
5.28	Management Cost (Personnel, Supplies, Travel)	---- BDT	?	

4.0 Key Innovation of the project

1. Mobilization of small-scale farmers in the cluster
2. Establishment of linkage of a farmer with a reliable input supplier
3. Through the Improvers training program disseminated awareness about good aquaculture practices adopting a holistic approach covering all aspects of production, biosecurity maintained, and requirements for third-party certification.
4. Introduce the farmer to the modern approach to fingerling nursing, feed management, and water management
5. Another key innovation was the introduction of commercial feed base modern seabass production.
6. A key innovation has also been to form strong partnerships among BSFF, Development partner WorldFish, and Private sector stakeholders including hatchery operators and effectively utilizing regional expert and their services for training on third-party certification and experts on seabass production.
7. Academia has been involved and professional services have been made available under the project intervention on a study on the feasibility of establishing a seabass hatchery in Bangladesh
8. User friendly and innovative approach has also been introduced for the production of a production manual on specific subjects i.e., a booklet on seabass and shrimp, training, a manual on seabass and shrimp culture management, and leaflet on seabass and shrimp culture management.

5.0 Sustainability of the business/ intervention model

The intervention model i.e. cluster approach of BT Shrimp cultivation following Good Aquaculture Practices with traceability implementation and third-party certification awareness is of prime importance to explore the business. The cluster approach can pave the way of government registered sustainable farmers group that can run the business as is guided by the project. Moreover, the implementing partner i.e., BSFF and other concerned NGO's can adhere with the group under their core general activities. The Department of Fisheries under its mandate of extension activities will certainly be able to play vital role for the sustainability of the business as the project activities was implemented through the cooperation and in some cases participation of DoF officials. It is to be mentioned here that DoF officials participated in most of the training programs and workshops as resource person and even their suggestion and statistical information have been used for selecting clusters and the farmers which will keep them together to run the business. BFFEA, processors and exporters are most important actors in shrimp industry. Collaborative and contract farming system with those actors may be a milestone to sustain the business. The feed mill and hatchery owners, value chain actors can also active role in this regard. The financial institutions are equally important for the development and sustainability of the shrimp sector because without access to finance the business will not sustain. The government policy support regarding cluster farming can also play important role in this regard.

On the other hand, commercial feed-based seabass as a new species is very important for the development of coastal aquaculture. The euryhaline species with high range of salinity tolerance has immense role for the expansion of coastal aquaculture along with adverse climate change adaptation specially the intrusion of saline water. As till now the country could not produce seabass seed in the hatchery as well as its feed, the government must take initiative to introduce the species in Bangladesh as well as expansion of its culture. The government along with concerned NGO's, research institutions

and other stakeholders should work together for piloting the seabass culture, its expansion as well as sustainability. At present a significant cost is involved in importing seabass seed, feed along with proven culture technology which are major constraints to run the business. Until and unless seabass seed and feed could be produced locally in Bangladesh the business would not be sustainable and cost effective. However, for the introduction and sustainability of seabass culture in Bangladesh the implemented project activities on seabass i.e., piloting of seabass nursery and culture management with trial and error must be continued with support from government and concerned stakeholders. The feasibility study finding of seabass hatchery establishment in Bangladesh should be given due attention and pilot seabass breeding trail is to be operated in selected hatcheries. The feed industry should be developed in parallel to produce seabass feed to make the seabass culture cost effective. However, the key areas of sustainability of intervention model are stated below:

Environmental Sustainability:

Water Management: Efficient water use and proper wastewater treatment are essential to minimize the environmental impact of shrimp farming. Effective water management will help prevent salinization and pollution of surrounding water bodies.

Biodiversity: Cluster farming should aim to protect local ecosystems and biodiversity. Preserving mangroves and other natural habitats is critical.

Social Sustainability:

Community Involvement: Active participation and cooperation among farmers within the cluster are vital. Knowledge sharing and support networks can enhance social sustainability.

[Livelihoods: Cluster farming should contribute to improved livelihoods for small-scale farmers by providing access to markets, fair pricing, and income stability.

Economic Sustainability:

Cost Management: Efficient resource utilization, including feed and energy, is necessary to ensure economic viability.

Market Access: Access to domestic and international markets at competitive prices is crucial for the economic sustainability of cluster farming.

Adaptation to Climate Change:

Bangladesh is susceptible to climate change impacts. Cluster farms should implement strategies to adapt to changing environmental conditions, such as rising sea levels and increased temperatures.

Government Policies and Regulation:

Supportive policies and regulations that promote sustainable shrimp farming practices are essential. Regulatory oversight can help enforce environmental and social standards.

6.0 Impact of the business/intervention model on the overall business in the intervention period (if any)

The implementation of project interventions required procurement of a number of inputs as well sale of their products which created opportunities for small holder's business promotion with significant money flow. Besides employment generation the farmers purchased lime, bleaching powder, rice bran, molasses, yeast, SPF shrimp PL, shrimp feed and other aqua-medicine for culture activities which had immense effect on their economy. The following table 6.0.01 and 6.0.02 summarizes the major input-output flow in the project intervene areas of Dumuria and Botiaghata Upazila of Khulna district, Kaliganj Upazila of Satkhira district and Sadar and Fakirhat Upazila of Bagerhat district and other areas as required for running project activities. Similarly, for seabass pilot culture the input-output flow in the project seabass intervenes areas of Khulna and Cox'sBazar played a significant role in the business community.

Table: 6.0.01 The major input procurement and shrimp sale in project intervene areas of shrimp clusters.

Sl. No	Procured input	Quantity	Price (Tk)	Produce Shrimp (Kg)	Sale Price (Tk)
1	Lime	5000 kg	125000	20341	13221650
2	Bleaching powder	727 kg	36350		
3	Others (fencing net, bamboo, transportation & others)		483710		
4	SPF PL	1200000	1440000		
5	Dolomite	2600 kg	64940		
6	Probiotic	5100 gm	34300		
7	Prebiotic	2515 kg	110660		
8	Shrimp Feed	29920 kg	2125750		
9	Aqua-medicine & others		136360		
	Total		4557070	20341	13221650

Table: 6.0.02 The major input-output flow in the project intervenes areas of shrimp clusters.

Sl. No.	Procurement/Sale	Quality	Procurement and sale areas
1	Lime	5000 kg	Farmers expended BDT 1.25 lakh for lime from nearby local markets of Sholgatia, Baroikati, Dumuria & Bagerhat.
2	Bleaching powder	727 kg	Farmers expended BDT 36.35 thousand for bleaching powder from nearby markets of Sholgatia, Baroikati, Dumuria & Bagerhat.
3	Others (fencing net, bamboo, transportation & others)		Farmers expended BDT 4.83 lakh for fencing net from nearby markets of Sholgatia, Baroikati, Dumuria & Bagerhat. Bamboo procured from their villages.
4	SPF PL	1200000	Project procurement from Desh Bangla SPF Hatchery, Khulna.
5	Dolomite	2600 kg	Farmers expended BDT 64.94 thousand for dolomite, BDT 34.3 thousand for probiotic and BDT 1.10 lakh for prebiotic from nearby markets of Sholgatia, Baroikati, Dumuria & Bagerhat.
6	Probiotic	5100 gm	
7	Prebiotic	2515 kg	
8	Shrimp Feed	29920 kg	Farmers expended BDT 21.25 lakh for shrimp feed from nearby markets mainly Golder Enterprise, Chohera; Animesh Enterprise, Baroikati; Apon store, Kalibarighat & Krishi vander, Dumuria.
9	Aqua-medicine & others		Farmers expended BDT 13.63 lakh for timsen, DO increasing medicine, vitamin-minerals, saline and other aqua-medicine from nearby markets of Sholgatia mainly Momi Apu Store, Baroikati; Momi store, Kodomtala; Krishi vander, Dumuria & Bagerhat.
10	Produced Shrimp	20.34 tones	Farmers sold their shrimp at nearby fish wholesale markets of Baroikati, khornia, sholgatia, Dumuria & Foltita. Lager grade shrimp sold to local processing factories through dipo holder/agent. The shrimps were also supplied to various fish markets all over the country through arods. They have earned about BDT 1.32 crore by selling the produced Shrimp.

7.0 Business Risk and Intervention Strategy

1. The main risk encounter was related to the timely procurement of fingerlings and feed negotiating authority empowered to issue the authorization, occasional weather-related adverse circumstances, and non-availability of trained manpower who had to be trained by the project intervention team.
2. In specific cases production outcomes were affected by the financial and different constraints of farmers, the risk was always there about the potential incident of diseases.
3. Particularly shrimp farmers also faced piece uncertainties in their products, particularly in the case of shrimp.
4. During the project period due to its short duration, a full production cycle could not be attempted and so the marketing of products didn't materialize

8.0 Project budget and financial management

1. **Summary Budget:** The summary of the budget has been presented in Table: 1.8.01.
2. **Understand the Budget:** The budget was completely understandable and divided into different section according to the project proposal.
3. **Budget Reallocation:** Budget was not reorganized due to the nature of the signed contract. BSFF expenditure was according to the budget line.
4. **Constraints of the Budget:** Due to the increase of dollar rate sometimes it became very difficult to manage the events within the allocated budget. In some cases, i.e., Seabass fingerling procurement and transportation cost was higher than the allocated budget where BSFF contributed more to manage the deliverable in due time. Alongside of these the price of venue and menu of different workshop were higher than the allocated budget and BSFF managed the events by its own capacity to generate the deliverable.
5. **Budget Reporting:** In every month the financial statement was sent to WorldFish with the monthly report.

6. **Expenditure Details:**

Table: 8.0.01 Brief monthly expenditure statement

February-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	592,197
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	31,700
4	Travel	145,068
5	Activitiy Cost	96,780
Total		**865,745**

March-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	572,197
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	16,300
4	Travel	-
5	Activitiy Cost	-
Total		**588,497**
April-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	592,197
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	47,100
4	Travel	167,833
5	Activitiy Cost	270,684
Total		**1,077,814**

May-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	592,197
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	31,700
4	Travel	108,729
5	Activitiy Cost	1,278,198
Total		**2,010,824**

June-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	592,197
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	31,700
4	Travel	127,685
5	Activitiy Cost	1,047,988

Total	**1,799,570**

July-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	-
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	31,700
4	Travel	103,951
5	Activitiy Cost	845,564
Total		**981,215**

August-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	1,184,394
2	Staff Benefits	-
3	Equipment Supplies and Operation Cost	31,700
4	Travel	215,328
5	Activitiy Cost	1,274,612
Total		**2,706,034**

September-2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	
2	Staff Benefits	
3	Equipment Supplies and Operation Cost	
4	Travel	
5	Activitiy Cost	
Total		

Summary: February-September 2023		
SL	**Particulars**	**Expenditure in BDT.**
1	Staff Salary	
2	Staff Benefits	
3	Equipment Supplies and Operation Cost	
4	Travel	
5	Activitiy Cost	
Total		

9.0 Monitoring and reporting

Monitoring

The project recruited 3 (Three) cluster supervisors and 2 (two) technical officers directly supervised the project activities at the field level. The project also recruited 2 (Two) Aquaculture Specialists. One of the Aquaculture Specialist was posted at Khulna for supervising and monitoring the of works of the project field staff of khulna i.e., 3 (Three) cluster supervisors and 2 (two) technical officers along with direct supervision and monitoring of the project implemented activities of the in Khulna region. The project recruited other Aquaculture Specialist was assigned for head quarter activities as well as supervising and monitoring of works of the project field staff of Cox'sBazr i.e., 1 (One) Technical officer along with direct supervision and monitoring of the project implemented activities of the Cox'sBazar region. The field staff i.e., Cluster Supervisors during their day-to-day visit to 5 (Five) shrimp clusters provided necessary advice on pond preparation, SPF PL collection and stocking water quality monitoring, feeding, sampling, harvesting, post harvesting, record book writing, traceability data posting and other works. Before that, they were also involved in organizing farmers and cluster selection. The Technical Officer of Khulna region was mainly engaged in day-to-day visit of two ponds of pilot seabass nursery and culture management location at Bandha, Dumuria, Khulna and provided necessary advice on pond preparation, nursery management, imported seabass seed transportation and stocking, water quality monitoring, feeding, sampling, record book writing and other works. On the other hand, the Technical Officer of Cox'sBazar region was performed the similar job. Both the Technical Officers and Cluster Supervisors delivered their duties under direct guidance and advise of concerned Aquaculture Specialists. Similarly, the Aquaculture Specialists delivered their duties under direct guidance and advise of project Team Leader. The project Communication and Documentation Officer, Accounts Officer, IT Officer performed their assigned work duly. The project personnel assisted the Team Leader of the project in implementing, reporting, monitoring and evaluation of project activities. For the monitoring and supervision travel the assigned personnel duly submitted their advance tentative program followed by actual report those have been subsequently submitted to the authorities. The BSFF core management and Executive Director, BSFF provided necessary guidance to Team Leader as and where necessary. In regards of effective project implementation and monitoring a project orientation meeting and two progress review meetings were jointly organized with the participation of WorldFish and BSFF project authorities. The BSFF core management also monitored and supervised the works of the project personnel and activities as and where necessary.

Table: 9.0.01 The major monitoring work by the project head quarter team

Sl. No.	Monitoring/Supervision visit/Participation by	Date	Place	Major activities performed
01.	ED, Team Leader, AS	05.02.23	WorldFish Office, Khulna	Participated in the Orientation meeting
02.	ED, Team Leader, AS	21.03.23	Dumuria, Khulna	Shrimp cluster and seabass pilot culture site visit
03.	Team Leader, AS	28.03.23	Khulna	Digital traceability workshop
04.	Team Leader, AS	17.04.23	Teknaf, Cox'sBazar	Training
05.	Team Leader	24.05.23	Khulna	Meeting, Field visit
06.	Team Leader, As	27.05.23	Cox'sBazar	Training
07.	ED, Team Leader, AS	10.06.23	khulna	Workshop
08.	ED, Team Leader, AS	11.06.23	Khulna, Bagerhat	Shrimp cluster and seabass pilot culture site visit
09.	Team Leader	17.06.23	Khulna	Shrimp cluster and seabass pilot culture site visit
10.	Team Leader	14.07.23	khulna	Seabass pilot culture site visit
11.	AS	16.07.23	Cox'sBazar	Seabass pilot culture and nursery site visit
12.	ED, Team Leader, AS	18.08.23	Cox'sBazar	Workshop
13.	Team Leader	27.08.23	Khulna	Workshop

Reporting

Reports have been prepared for every activity just after its implementation as per template of the project and subsequently shared at the share point of WorldFish. Moreover, monthly progress as well as financial reports were prepared at the end of each month and shared at the beginning of next month. A total of 8 (Eight) monthly progress reports were generated and submitted to WorldFish. The financial reports were generated by the assistance of project Accounts Officer which are also checked by WorlFish project team time to time for the release of fund. The work plan for each month was prepared and a total of 8 (Eight) monthly work plans have been submitted to WorldFish at the beginning of each month. For the implementation of project activities Program POC was informed well ahead for every event so that WorldFish project authority can participate and monitor the activities. The regular event wise program implementation updates were communicated with Program POC, WorldFish either weekly or just after completion of the program. The consultants hired for the services of the project submitted their reports duly which have also been shared at the share point of WorldFish. The major reports submitted to WorldFish are as follows:

(i) Monthly progress and financial reports
(ii) Monthly Work plan
(iii) Seabass nursery and grow-out pond preparation reports
(iv) Pond preparation reports on BT shrimp
(v) Consultancy report on shrimp third party certification
(vi) Consultancy report on feasibility study to establish seabass hatchery in Bangladesh
(vii) Report on seabass nursing technology dissemination for technicians
(viii) Water quality sampling reports on BT shrimp and seabass
(ix) Sampling reports on shrimp and seabass
(xi) Consultancy report on capture the production and economics of seabass to explore business.

10.0 Challenges

The project entitled "Increase production and promotion of cultured shrimp and seabass in the mainstream market channels" implemented by Bangladesh Shrimp and Fish Foundation and WorldFish financial assistance from USAID Feed the Future Bangladesh Aquaculture and Nutrition Activity was unique in many ways as it had multiple focuses involving both pilot scale formation of shrimp clusters and introduction of commercial feed-based production of seabass. For the project implementation team to carry out work on two parallel streams of activities involving shrimp and seabass consumed much time and delicate management related issues for the project management team. The field level mobilization of clusters involving multiple stakeholders spread over large project area proved to be particularly challenging. Convincing the farmers to join the clusters also proved to be challenging requiring much persuasion. The negotiation with suppliers to timely supply seed also required special negotiation and efforts with the supplier of seed. Selecting international consultants and availing his service also proved to be challenging given the present foreign exchange release by Bangladesh Bank for the payment of the services of international consultant. The farmers also often highlighted that no financial assistance extended to them for pond preparation from the project was also greatly problematic for them. The farmers participating clusters also suffered from timely availability of feed, probiotics and other inputs at affordable cost. Notwithstanding these challenges the farmers with great efforts and support from project management team achieved good production result.

The pilot intervention relating to commercial production of seabass also faced many challenges. Foremost among them were finding suitable vendors for fingerlings and feed who were in a position to timely supply these critical inputs. This was a new initiative. Careful project site selection for a new venture like this and enlist the participation of interested private sector participants was specially challenging. There was no local knowledgeable technical hand to provide the specialized services needed for the intervention. The project team had to select an international consultant with many efforts to overcome these important constraints and produced user-friendly production manuals which were of a very specialized nature. In preparing the manual care had to be taken that its content could be readily understood by the target stakeholders. The implementation of the pilot also involves extensive intensive field level monitoring which was time consuming and needed very close coordination.

For the sustainability of similar efforts in future three key challenges will have to be overcome. Ensuring adequate predictable resources to be disbursed timely would be of crucial importance. For the success of clusters intense motivational work will be needed. At the same time the farmers will have to be convinced that their participation in the clusters would enable them to have advantage in terms of procuring seeds and feeds and obtaining resources from financial institutions. Continuous activities to help the farmers and entrepreneurs on modern production technologies and other relevant inputs will be important. In case of introduction of commercial feed-based seabass production will largely depends on creation of awareness on the market potential for such species both domestic and international, ensuing timely availability of seed, feed and other inputs including implements like aerators, graders for fingerlings sorting, pond preparation materials and aqua inputs. Training for skilled manpower needs to be a continuing and compelling necessity. Support from the interested development partners and Department of Fisheries to interested farmers and entrepreneurs following a well work out plan of action will be of great help. The government may also be persuaded to extend assistance for production of such species to stakeholders engaged in production of such specific value-added species in specially designated special aquaculture economic zone.

11.0 Areas of Improvement/Recommendation

For the improvement of Black Tiger shrimp culture with community involvement the work on farm selection, farmers selection, capacity development of farmers should be finished within the month of February. The farm biosecurity should be emphasized along with supply of SPF PL. After pond preparation the PL stocking work should be done within 1st week of April. The other necessary works also to be done with proper work plan with need-based modification as and where necessary.

On the other hand, seabass seed, feed and technical/consultant support to be arranged well ahead not later than the month of March. The work on farm selection, farmers selection, capacity development of seabass farmers should be finished within the month of February. The farm biosecurity work along with water quality maintenance should be done properly. After pond preparation the PL stocking work should be done within 1st week of April. The other necessary works also to be done with proper work plan with need-based modification as and where necessary.

However, the following recommendations would be main steps for the improvement of Black Tiger shrimp and seabass aquaculture in Bangladesh:

- Implementation of digital traceability in the shrimp value chain to meet the requirements of buyers for export promotion. Government policy, technical and other support required. The stakeholder's participation, cooperation mechanism should also be developed.
- Introduction of third-party certification system in the shrimp value chain to meet the demands of buyers and exporters to enhance export. Government, the competent authority policy, technical and other support required in this regard. The stakeholder's participation, cooperation mechanism should also be developed. To expedite certification cost minimization through efficiency is required. The other recommendation of third-party certification consultancy service should be implemented.
- Forward market development activities including promotion for increased domestic consumption, export of shrimp and farmers' access to better quality inputs including SPF shrimp PL, seabass fry/fingerlings, aqua-feeds and aqua medicinal products through promotion and marketing should be continued.
- Sharing of information on shrimp, shrimp products and seabass, prices, quality, food safety should have as a regular business so that market linkages with shrimp and seabass buyers and exporters are established.
- Recommendations of consultancy services for seabass hatchery establishment in Bangladesh should be implemented for the production of seabass seed feed locally in Bangladesh to mitigate the main constraints of introduction of commercial feed-based seabass aquaculture.
- Appropriate policy and other support are required by the government for the access to finance of the farmers/entrepreneurs to run and explore the business because aquaculture is more investment oriented.
- Feed industry must be developed in parallel to the hatchery phase for brood, nursery and grow-out phases/stages for cost effective seabass and shrimp feed.
- Piloting, research and development of different culture system of BT Shrimp and seabass with trial and error would be effective
- For the supply of quality premium product value chain actors i. e. depo, arad and farmers representatives, transporters, exporters are too brought under common umbrella for improved post-harvest management, transportation, handling, maintenance of cool chain, etc.
- Compliance of international standards on food safety should be maintained through GAP's, GMP, BMP, etc.

12.0 Conclusion

The planned activities under the project entitled 'Increase production and promotion of cultured shrimp and seabass in the mainstream market channels' supported by USAID Feed the Future Bangladesh Aquaculture and Nutrition Activity were carefully designed to cover some of the most important priorities closely related to the government's comprehensive plan to explore the coastal aquaculture potentiality of Bangladesh with special focus on increased shrimp and seabass production, implementation of good aquaculture practices to enhance traceability and product certification, fishery product diversification for domestic consumption and export promotion. The beginning of the works under the project had to initially face great challenges due to necessity of changing of attitude of shrimp farmers to follow cluster approach, setting and organizing of 5 (five) BT shrimp clusters, issue of minimum project support i. e. only seed and training support from project side to motivate the farmers compared to DoF support in similar activities, sourcing of overseas feed-based seabass seed and specially prepared imported seabass feed. Special efforts had to be made to overcome the many other serious challenges linked with sourcing of international consultant and synchronizing seabass seed, feed and consultant arrival. The constant support and advice of the WorldFish and BSFF core management helped the BSFF project Team to overcome these challenges and complete the works under USAID Feed the Future Bangladesh Aquaculture and Nutrition Activity. The project team is grateful to WorldFish and BSFF core management for the help extended to it and the guidance as well as advice which enabled it to stick to the timeline and the logical sequence of works planned and ensure the highest quality of all the works undertaken. The works mapped under the project were varied and yet closely interrelated. The outcomes of these works will hopefully help achieve some of the key objectives related to the development of the fisheries and aquaculture sector of Bangladesh in general and coastal aquaculture in particular. These outcomes have been on the whole very positive and will certainly be able to form the useful basis for future development initiatives planned for the sector.

13. Appendix

Appendix-I	Shrimp cluster baseline data
Appendix-II	Post intervention shrimp production data
Appendix-III	Report on shrimp third-party certification
Appendix-IV	Report on capture the production and economic performance of seabass
Appendix-V	Report on feasibility study to establish seabass hatchery in Bangladesh