



Bangladesh

Advancement in Aquaculture Food Safety System

**Moving Beyond Compliance &
Transition to Equivalence**

**Better Work & Standards Programme
Better Fisheries Quality (BEST- BFQ)**

Programme at a glance

Better Work & Standards Programme- Better Fisheries Quality
(BEST-BFQ)

&

Strengthening of Fishery and Aquaculture Food Safety and
Quality Management System in Bangladesh, Department of Fisheries

A programme funded by

European Union (EU),
Norwegian Agency for Development Cooperation (NORAD)
and
Government of Bangladesh

Implemented jointly by

United Nations Industrial Development Organization (UNIDO)
and
Department of Fisheries, Ministry of Fisheries & Livestock







Minister

Ministry of Fisheries & Livestock
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariate, Dhaka.

It is my utmost pleasure to congratulate everyone for this landmark achievement in the fisheries sector through attainment of food safety compliance meeting the global requirements to safeguard the health of the consumers. This provides access to safe food originating from Bangladesh not only for export markets but also for our domestic consumers.

This publication released on this occasion to celebrate 'Bangladesh Aquaculture Food safety Advancement' gives an enriching experience for a country like Bangladesh. The success of two programmes, Bangladesh Quality Support Programme (BQSP) and Better Work & Standards Programme (BEST), goes to show the commitment of The Government of Bangladesh towards its vision of becoming middle income country by 2021.

I take this opportunity to thank our development partners, European Union (EU) and Norwegian Agency for Development Cooperation (NORAD) for their support in our development for reaching this milestone. I would also like to thank to the Project team and experts of United Nations Industrial Development Organization (UNIDO) for their hard work and sincere efforts in Successful accomplishment of these two programmes.

Joy Bangla, Joy Bangabandhu.
May Bangladesh stay forever.

Mr. Muhammed Sayedul Hoque, MP
Minister



Ambassador
European Union to Bangladesh

The development of the fisheries sector in Bangladesh has a significant economic and social impact. It means jobs creation, export growth and improved food security for the population.

The EU-funded programmes - Bangladesh Quality Support Programme (BQSP) and Better Work and Standards Programme (BEST) - have achieved a key objective: making Bangladesh's shrimp sector compliant with the EU food safety requirements. Successive audits by EU Food and Veterinary Office (FVO) have endorsed the health certification requirements applied for export of frozen shrimps to EU. The EU is proud of having contributed to this result and we hope that similar food safety systems will be implemented in other relevant food sectors.

Finally, I would also like to thank United Nations Industrial Development Organization (UNIDO) for their professionalism in implementing these EU-funded projects and the Bangladesh Government's Department of Fisheries and the other stakeholders for their support. In this domain as in many others nothing is for granted but I am confident that the combined efforts of all local partners will make the outcomes of these two programmes sustainable.

Pierre Mayaudon
Ambassador



Ambassador

The Royal Norwegian Embassy, Dhaka

Norway is very proud to support the successful programmes that promote the use of clear standards for food safety. Such standards will strengthen the confidence in the quality of Bangladeshi product and services. The programmes have brought significant progress and change, especially to the fish and fishery sectors. I hope the outcome of the programmes will have a positive impact, to create better livelihoods for families, to help enterprises prosper and to establish safe and good employment opportunities for women and men.

The Embassy of Norway in Dhaka actively promotes better business cooperation between Norwegian and Bangladeshi companies with a view to developing the private sector in the country. These projects are central components in this work, and a part of Norway's cooperation with Bangladesh to secure a stable platform for business in important sectors in the country.

I congratulate the Government of Bangladesh and the United Nations Industrial Development Organization on the successful completion of the programmes. I look forward to seeing the results, and hope these programmes will help create more value in the important food sector in Bangladesh.

Merete Lundemo

Ambassador



Secretary

Ministry of Fisheries & Livestock
Govt. of the people's Republic of Bangladesh
Bangladesh Secretariat, Dhaka

I am very delighted to know that our fishery sector has reached a major milestone in the history of Bangladesh by becoming fully compliant with EU food safety standard. At the same time, I am happy to learn that Bangladesh has achieved the equivalent status of EU food safety standard which has been evident through the recently concluded Food and Veterinary Office audit.

Today's program as well as releasing of the publication on 'Bangladesh Aquaculture Food Safety Advancement' is a reflection of what has been achieved and in place in the country. We must appreciate and thank European Union and NORAD for their wholehearted support for these two programmes- Bangladesh Quality Support Programme (BQSP) and Better Work & Standards Programme (BEST). I express my deep sense of gratitude and appreciations to project experts of United Nations Industrial Development Organization (UNIDO) in making this possible while working jointly with Department of Fisheries.

The lessons learned through this programme implementation may be useful for other agribusiness sector of the country. I once again, congratulate the whole implementation team and the development partners.

Md. Maksudul Hasan Khan
Secretary



Director General

Department of Fisheries
Ministry of Fisheries & Livestock
Govt. of the People's Republic of Bangladesh

Fish and fishery products are generally regarded as one of the high-risk food commodities in respect to possible contaminants and adulterants. That's why there was increased pressure on Bangladesh regulatory agencies as well as food business operators across the value chain to establish reliable and effective quality assurance system to meet this objective.

The program on 'Bangladesh Food Safety System Equivalence with EU: BEST Project Intervention & Way Forward' and publication of this document showcase the achievements made in the sector in Bangladesh during last 10 years through BQSP and BEST programmes. Thanks to EU and NORAD for joining hands with the Government of Bangladesh in funding these programmes.

Today, Bangladesh aquaculture sector is considered as a model on aquaculture food safety system in the region. This progress is made possible by continued and unified efforts of my colleagues from Department of Fisheries along with UNIDO. My special thanks to BEST-BFQ Project team and its experts for working very hard in making us to achieve this. This is an excellent example of Bangladesh's interventions aimed at fostering access to the global markets with pride and confidence. This has been endorsed by FVO audits held in April 2015. I am very happy to see that with the timely intervention through these two programs, our farmers, processors and other related businesses are benefitted as also through lifting of 20% mandatory testing requirement by EU and global acceptance for Bangladesh shrimp due to improved food safety compliance.

Syed Arif Azad
Director General



We are happy to write a foreword to this publication of Better Work and Standards Programme, BEST, a programme being funded by European Union (EU) and Norwegian Agency for Development Cooperation (NORAD) and implemented by United Nations Industrial Development Organization (UNIDO) and Government of Bangladesh. This publication provides an overall review of experiences and learning during the long journey of food safety capacity building in Bangladesh. We are proud to be part of this successful programme.

Ensuring safe and healthy food is essential for improving human life in all countries, whether developed or developing. Access to safe food is in itself an element of food security. Bangladesh recognized the importance of safe food, whether domestically produced and consumed or that is imported or exported.

The BEST programme as well as Bangladesh Quality Support Programme (BQSP) has taken a long journey in building this sustainable food safety system in the country bringing Bangladesh in to an 'equivalent status'. The success of the programmes is due mainly to continued and persistent efforts of all the stakeholders in the shrimp value chain,

particularly of the Department of Fisheries and experts of UNIDO, in spite of many shortcomings. The programmes were able to provide a strong foundation for a robust national food control system in fisheries sector, as well as practical assistance in developing, implementing and/or enhancing such a system, thereby contributing to an increased ability of the stakeholders to meet sanitary and phytosanitary (SPS) requirements for domestic and international trade in fish and fishery products originating from Bangladesh. Thanks to all those who have contributed to make these programmes successful!

Dr. Saleh Ahmed
National Project Director
Strengthening of Fishery and
Aquaculture Food Safety and
Quality Management System in Bangladesh
Department of Fisheries

Karl Schebesta
Unit Chief
Chief, Food Systems Unit,
Agro Business Development
Branch, UNIDO HQ Vienna



The period between 1997 and 2005 was very critical for the fisheries sector of Bangladesh in respect to fishery products compliance to safeguard consumers' safety. The country was badly in need of a harmonized food safety system to protect the industry and the people depending on it. The partnership between Bangladesh and European Union (EU)/Norwegian Agency for Development Cooperation (NORAD) which started during 2005 contributed tremendously towards global market access for fishery products from Bangladesh.

Back in early 2000s, the industry was having serious inefficiencies in terms of quality and food safety risks. The sector needed vision and strategic direction for sustainable growth and response to emerging trends in the competitive global market place in terms of compliance. The EU and NORAD joined hands with Government of Bangladesh and came forward with program, BQSP Bangladesh Quality Support Programme (2005-10) followed by BEST- Better Work & Standards Programme (2010-15). The fisheries component of these two programs were jointly implemented by United Nations Industrial Development Organization (UNIDO) and Department of Fisheries (DoF) building fisheries quality infrastructure to meet the compliance requirements in terms of sustainable food safety systems in shrimp sector through improved testing capacity including accreditation, improved official control systems along value chain, better production, handling and processing conditions, better social compliance, harmonized legislations and better institutional capacity. The outcome of this intervention is already evident through the recently held audits by Food & Veterinary Office (FVO) which endorsed the compliance systems of Bangladesh as equivalent to those in EU.

The BEST project has many success stories while building this equivalence status of aquaculture food safety programs in Bangladesh. Here is an attempt to showcase some of the highlights of achievements and lessons learned through this publication which could guide for successful implementation of programs in future.

Shetty Seetharama Thombathu PhD

Chief Technical Advisor
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Abbreviations used in this publication

AIG	Alternative Income Generation
AMPs	Aquaculture Medicinal Products
APLAC	Asia Pacific Laboratory Accreditation Cooperation
BAB	Bangladesh Accreditation Board
BEST	Better Work and Standards Programme
BFFEA	Bangladesh Frozen Food Exporters Association
BFQ	Better Fisheries Quality
BQSP	Bangladesh Quality Support Programme
CA	Competent Authority
DGDA	Directorate General of Drug Administration
DIFE	Department of Factories & Establishments
DLS	Department of Livestock Services
DoF	Department of Fisheries
DRA	Drug Regulatory Authority
EU	European Union
FIQC	Fish Inspection and Quality Control
FVO	Food and Veterinary Office
GAP	Good Aquacultural Practices
GHP	Good Hygienic Practices
GLP	Good Laboratory Practice
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis Critical Control Point
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standardization
LCA	Local Competent Authority
LIMS	Laboratory Information Management System
MOFL	Ministry of Fisheries & Livestock
MOL&E	Ministry of Labor & Employment
MRL	Maximum Residue Limit
NORAD	Norwegian Agency for Development Cooperation
NRCP	National Residue Control Program
QAP	Quality Assurance Program
QMS	Quality Management System
QMSD	Quality Management System Development
RCA	Regional Competent Authority
RASFF	Rapid Alert System for Food and Feed
SOP	Standard Operating Procedures
SSOP	Sanitation Standards Operating Procedures
TOT	Training of Trainers
UNIDO	The United Nations Industrial Development Organization



About Better Work & Standards Programme (BEST)

A Journey from Complacency to Compliance

PROGRAM DETAILS

The Better Work & Standards Programme (BEST) is a programme funded by the European Union (EU) and Norwegian Agency for Development Cooperation (NORAD) and co-funded by Government of Bangladesh. The program is implemented by United Nations Industrial Development Organization (UNIDO) and Government of Bangladesh through their respective ministries. The project period is from 2010 to 2015. This program is a follow-up of Bangladesh Quality Support Program (BQSP) which run during the period 2005 to 2010.

Overall Objective

The overall objective of BEST is to contribute to economic growth and poverty reduction by supporting Bangladesh to take advantage of global market opportunities.

Specific Objectives

The specific objectives of each of the three Components of BEST Program are:

Component 1: Better Quality Infrastructure (BQI)

To strengthen the overall national quality conformity assessment infrastructure and integrate it with the international quality infrastructure in order to increase consumer protection through improved product safety and quality features and improve competitiveness so as to allow Bangladesh to better exploit global market opportunities.

Component 2: Better Fisheries Quality (BFQ)

To strengthen the national quality infrastructure for fish and fish products to meet safety and quality requirements in export markets, improve competitiveness and take advantage of global market opportunities, particularly in EU markets

Component 3: Better Work in Textiles and Garments (BWTG)

To strengthen overall competitiveness in the textile and readymade garment (RMG) sector and to improve the working conditions of the textile and RMG sector leading to the expansion of the sector and the creation of better employment opportunities.

Expected outcomes of BEST-BFQ Program

The BEST-BFQ program expected to improve the official controls and strengthen the integrity of production management systems to meet international norms, so as to improve food safety conditions and maintain access to export markets for fishery products.

BEST-BFQ Program beneficiaries

Direct beneficiaries were the Government of Bangladesh, designated institutions, and private sector associations through enhancement of their capacity to perform their duties. The organizations are:

- Fish Inspection and Quality Control (FIQC)
- Department of Fisheries
- Ministry of Labour and Employment
- Directorate of Drug Administration of Ministry of Health & Family Welfare
- Bangladesh Frozen Food Exporters Association (BFFEA)

The other stakeholders benefited from this program are the institutions, professional groups, private sector actors and non-governmental organizations. EU importers and consumers in Europe and Bangladesh are also targeted to be benefited from the program through improved food safety and better quality products. The ultimate beneficiary is Bangladeshi society in general through the increase in trade capacity and investment due to improved conditions for attracting foreign direct investment, leading to employment creation and poverty alleviation.

Programme schedule

Project Phase	Period
Contribution Agreement between EU and UNIDO signed	February 2010
Inception phase	July 2010 to December 2010
Implementation phase	January 2011 to June 2014
Closing phase	July 2015 to December 2015

BEST Funding

Budget	€
EU contribution (UNDO components)	12,285,000
UNDO contribution (NORAD)	1,240,000
EU contribution (GIZ component)	1,475,000
GIZ contribution (Federal Republic of Germany)	660,000
Government of Bangladesh (in kind contribution)	9,804,000
Total	25,464,000

Background information on Bangladesh Quality Support Programme (BQSP)

The United Nations Industrial Development Organization (UNIDO) with the financial support from European Union (EU) and co-financing from Norwegian Agency for Development Cooperation (NORAD) implemented a multi-component project called Bangladesh Quality Support Programme (BQSP) during 2005 to 2010 that involved several ministries and line agencies including the Department of Fisheries (DoF) as one of the major partners. DoF received the BQSP support through a government supported project named 'Strengthening of Fish Inspection and Quality Control Services' implemented simultaneously with BQSP.

With an ultimate goal to upgrade the capacity of the Department of Fisheries (DoF) and the private sector along the supply chain to implement the fish inspection and traceability system the purpose of the Fisheries component of the BQSP project was to strengthen the DoF in a sustainable manner and ensure adequate fish inspection capacity in accordance with the international food safety standards through appropriate testing of frozen fish exports (particularly shrimps) to the EU and to improve the competitiveness of the sector.

The major outputs achieved through BQSP Fisheries project include establishment of two laboratories equipped with the state-of-the-art testing facilities for microbial and chemical analyses of fish and fish products, trainings of laboratory staffs and inspectors both at home and abroad, identification of the sources for nitrofurans contamination through outsourced research, implementation of traceability across the shrimp value chain, training to value chain actors, training of trainers (ToT) on issues like Hazard Analysis and Critical Control Point (HACCP), Good Laboratory Practice (GLP), Good Aquaculture Practice (GAP), Quality Assurance Protocol (QAP), traceability and labour law.

**Achievements of BQSP Fisheries
Implemented during 2005-2010**

Two laboratories (Khulna and Chittagong) established and equipped with modern testing equipments for microbial and chemical analyses;

Laboratory staffs trained overseas on Good Laboratory Practices based on the requirements of ISO 17025;

Fisheries Inspection Officers trained at home and abroad;

HACCP and QAP improved in seafood exporting enterprises to significantly accepted levels;

Over 1,500 Inspectors and extension officials trained (TOT) on QAP, HACCP inspection, water quality, GAP and traceability;

Stakeholders trained on HACCP system and the implementation/up gradation of HACCP plans along the shrimp value chain;

Traceability system successfully introduced from factories to farms in the country (over 190,000 shrimp farms);

Sources of nitrofurans & other antibiotics identified by investigations conducted by BAU & Sterling University (UK);

Shrimp waste utilization assessed and proposals for value addition developed;

Own-check facilities of 68 EU approved processing establishments improved;

Awareness on harmful antibiotics, water quality and labor law created;

Cross cutting gender focused training on labor law 2006 (including ToT) conducted for female workers of processing factories;

Literacy program, linkage, coordination and partnership building with NGO, civil society and business associations established to create awareness;

Relevant training manuals, leaflets, brochures, posters produced.

"Food Safety through actions "
See us on web www.best-bfq.org

Transition from BQSP to BEST

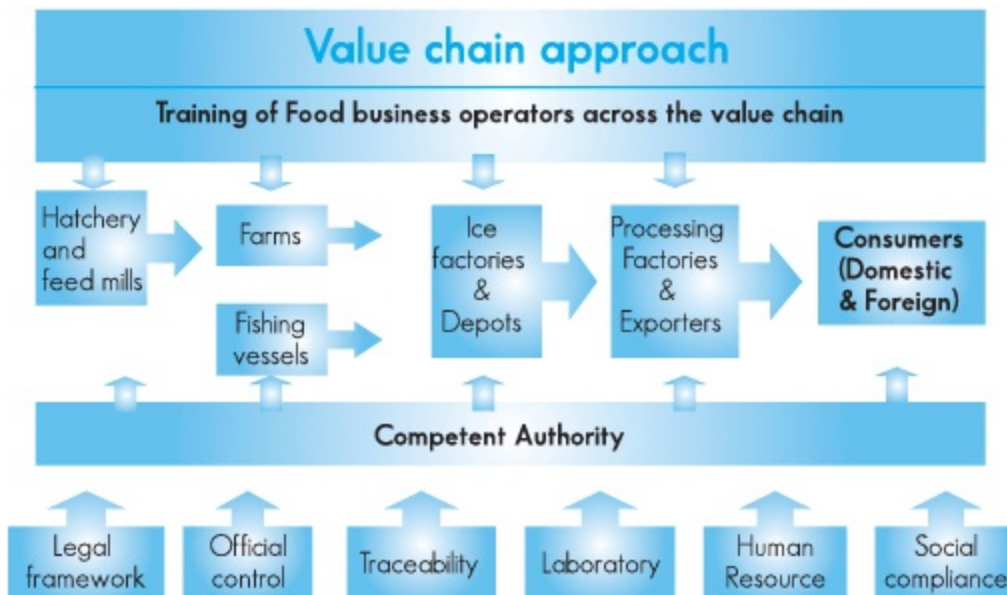
The BQSP project design for Fisheries component initially envisioned a four-year implementation period for achieving the desired outputs. However, while continuing with the planned interventions under BQSP an EU mid-term evaluation conducted in 2008 concluded that the project succeeded so far-at the time-in achieving its objectives effectively and delivered outcomes that were worthy of continuation. In response to the positive evaluation, the EU and NORAD extended the project for another phase in 2010 with the aim of building on the good outcomes of BQSP and advancing its achievements and the momentum further. The follow-up project was Better Work and Standards (BEST). The Fisheries component of BEST project was called Better Fisheries Quality (BEST-BFQ).

BEST Programme implementation

The BEST programme is implemented jointly by UNIDO and Department of Fisheries (DoF) of Ministry of Fisheries & Livestock. All the programs were planned, initiated and implemented in close partnership with the government and private sector counterparts based on the needs of the sector in line with the program objectives. This has resulted in a comprehensive and equitable partnership for the better ownership and sustainability of the programme outcomes.

BEST Implementation approach

Shrimp value chain in Bangladesh is quite unique with too many intermediaries involved between farmer and processor, including input suppliers. In addition, enabling environment (laws, regulations, policy, environment, infrastructure, governance, human and financial resource etc) governing fisheries business has great impact on the value chain. The value chain perspective provided an important direction to the team to understand the business to business relationships, mechanisms for increasing efficiency, and ways to enable business to increase productivity and add value to the product and services. Accordingly BEST used inclusive and value chain approach for implementing the program objectives of BEST- Better Fisheries Quality



Inclusive approach

The BEST-BFQ adopted value chain approach for implementing the program objectives which is inclusive of all the stakeholders, actors and activities involved in the value chain. It included food safety compliance, laboratory testing, social compliance, women empowerment, governance and environment.

Inclusivity



Program intervention areas

Intervention Logics

Harmonization of legislative and policy framework

Strengthening of Competent authority and its organization

Implementation of residue control programs

Internal control programs along value chain

Institutionalizing human resource development

Food business operation compliance

Laboratory Capacity building- Human resource & Testing capacity

Building awareness on social compliance

Digitalization of control systems

Communication and Visibility



Major activities, outputs and outcomes

PS:

The programme achievements reported here are based on the comparative analysis between baseline status and the current status, along with the activities carried out by BEST-BFQ including that of BQSP to meet the program objectives.

The baseline status data are taken from BEST baseline studies carried out (during July to Dec 2010) and Food and Veterinary Office (FVO) audit reports of 2005, 2007, 2008 and 2010, while the current status data are derived from the existing field situation as well as those recorded in FVO audit reports of 2015.

Legislative and Policy Framework in Bangladesh Shrimp Sector Harmonized

Context

Relevant, up-to-date and enforceable food safety legislation is an essential part of a modern food control system to create an enabling environment to enforce food safety measures based on risk analysis. The legislation should cover following aspects: roles and responsibilities of regulatory agencies and operators responsible for food safety control, mechanism for inspection and monitoring of harmful substances, hygiene condition, manufacturing practices, labeling, traceability and many more. Such harmonization recognizes the country's international and national obligations, particularly in relation to trade.

Baseline status (2005)

Following are the baseline status of food safety legislative framework of the country in 2005, as reported by Food and Veterinary Office (FVO, 2005)

- Legislations not harmonized with food safety requirements and not equivalent to Community legislation
- Existing legislation on contaminants and additives not considered as equivalent to European Community requirements
- Food safety related issues are not included in the usual activities of upazilla (district) officers at local level
- FIQC services are mostly focused on end product safety at the factory level
- Control is weak on the production chain at farm, harvesting, hatchery, and transportation

Program outputs

- Legislations reviewed and analyzed for gaps as against regulations for target markets
- Regulations in target markets studied
- Fish Inspection Quality Control Rules (2008) and draft FIQC Rule (2010) developed and adopted by the government
- Empowered field level officers as local competent authority (LCA) for controls along supply chain
- Inspectors at Regional and Local Competent Authority trained on official control
- Compliance manuals developed for feed and hatchery operations

Deliverables

- FIQC Rules (2010)
- Compliance manual on Hatchery Rule and Act (2010) & Feed Rule and Act (2010)
- Fish and Fishery Products Official Control Protocol (2015)
- Guidelines on Aquaculture Medicinal Products (AMPs) 2014
- Pool of trainers developed
- Human resource capacity strengthened through trainers developed in many areas who will serve the country for a long time in terms of resource persons



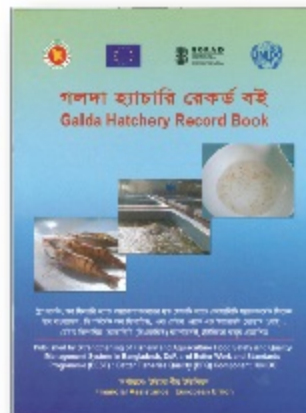
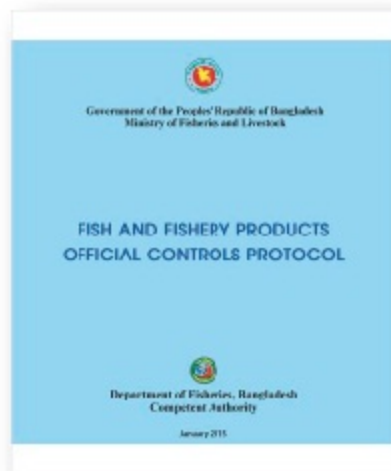
FVO audit mission (2011)



Fish Feed Rule (2011) dissemination workshop

Current status and program outcomes

A major achievement in the legislative framework governing fish and fishery products in Bangladesh is the shift from end product inspection to official control along the whole value chain and are now harmonized with international market requirements. Another major change is the legal provisions empowering fisheries extension officers for controlling the lower level of the value chain operations such as hatcheries, feed mills, farm, depots, ice factories and landing centers. They are now called as Local Competent Authority (LCA) while Regional Competent Authority (RCA) controlling at the higher level of production chain as well as overseeing the whole control operations. This is how Bangladesh legislative framework is now harmonized with the EU and global food safety requirements, this was also reported by FVO audit report (2015) as "The national legislation and standards applied to fishery products and their production chain, the rules in force can be considered as broadly in line with relevant EU requirements"



Competent Authority and its Organization Strengthened

Context

Global food safety system passes the responsibility of safety of food with the operators of the entire value chain while the official control services or Competent Authority (CA) are responsible for the enforcement. Modern food control systems have shifted from reactive approach of end product testing to preventive approach through implementation of system based on Hazard Analysis Critical Control Point (HACCP). The responsibilities of the CA involve inspection, sampling and certification of food in addition to assuring compliance in production, handling and processing, HACCP and pre-requisite programmes, traceability and testing for hazards and contaminants.

Baseline status in 2005

FVO audit report of 2005 reported following deficiencies in the CA and its organization:

- Official controls in the first part of the production chain (hatchery to factory gate) are deficient
- The knowledge and the availability of up to date Community Legislation in the different services need to be improved
- Effective official control does not seem to be feasible with the existing human and material resources in these services
- Official control capacity of the inspection is deficient due to lack of risk-based approach and inspection checklists

Program outputs

BQSP and BEST project in association with the Department of Fisheries have undertaken series of actions for bringing possible change in the structure and organization of CA, at various levels:

- Developed 'Fish and Fishery products Inspection Protocol' based on risks for inspection at every stage of shrimp sector from farm to factory

- CA officials trained on risk assessments in the shrimp value chain
- Risk-based categorization of processing factories implemented to avoid end product inspection
- CA personnel trained on the use of new inspection checklists
- Forty officers of Local Competent Authority (LCA) officers trained and equipped with necessary testing kits for monitoring at farm level
- LCA officers were trained on implementation of NRCP including planning, sampling, and corrective actions including follow-up actions
- Provided training to LCA on quality assurance and post harvest compliance
- Laboratory was separated from the inspection to avoid conflict of interest in official control
- Number of inspectors both at RCA and LCA increased by 30 numbers



Processing under Competent Authority official control

Current status and program outcomes

Currently, the Competent Authority (both regional and local) are competent enough in carrying out their respective roles in an efficient way along the whole value chain. The National Residue Control Program (NRCP) is being carried out jointly by both RCA and LCA. This has resulted in rapid reduction in export rejections (Rapid Alert System for Food and Feed- RASFF) from 50 in 2009 to mere one each in 2013 and 2014, as also the reduction in non-compliances in National Residue Control Program (NRCP).

The recently held FVO audit mission reported as following:

- The current organization of the competent authority and its documented operational procedures provide for an acceptable official control system for fishery products which is implemented in a satisfactory way
- The CA is clearly designated and has an organization at regional and local level. The CA has been given appropriate enforcement powers and adequate resources (facilities, equipment, and competent staffs) to perform official controls along the entire production chain and it can be considered as providing, in general necessary guarantees with regard to the applicable EU requirements.
- The CA's official controls on fishery products exported to the EU adequately cover most EU requirements

Trained Fish Inspectors in Action



Residue Control Programs Implemented

Context

The major concern all over the world for food and feed products of animal origin including aquaculture products is the presence of residues of veterinary medicinal products, additives and environmental contaminants. The Rapid Alert System for Food and Feed (RASFF) is a tool that the EU uses to enable the quick and effective exchange of information when risks to human health are detected in the food imported into the country. Bangladesh has had a very bad

experience with RASFF rejections of its product containers from 2004 which reached highest in 2009 with 50 containers rejected at the EU border for the presence of harmful residues. National Residue Control Program (NRCP) is another tool for continuous monitoring of detection of presence of residues and contaminants in the aquaculture products. This will ensure an overall monitoring of the aquaculture products at different stages of production.

Baseline Status

Back in 2005, FVO made serious note of the follow-up corrective action in the event of rejection by RASFF. It termed the action as deficient due to lack of conclusive investigations either by the CA or the operators due to lack of traceability system to find out the possible sources or circumstances of these contaminations. Adding to this, NRCP non-compliances were also reported to be as high as 43% in fishery products and 58% in feed and water samples for Chloramphenicol and nitrofurans metabolites in 2007. FVO (2007) reported the NRCP program as not equivalent to those provided for by Article 29 of Council Directive 96/23/EC which cannot guarantee the safety of the products, due to lack of testing facilities.

year	chemical	microbiological	others	Total
2005				4
2006				22
2007				3
2008	14	0	0	14
2009	48	0	2	50
2010	3	2	2	7
2011	3	2	1	6
2012	1	1	0	2
2013	0	0	0	0
2014	1 (withdrawn)	0	0	0
2015 (till now)	0	0	1	1

BEST Program outputs

- Assisted DOF in preparing annual NRCP plans based on risk analysis
- NRCP database developed for effective interpretation and management of NRCP results
- Prepared and published NRCP Policy Guidelines (revision 2012) which is harmonized with EU requirements
- Assisted in NRCP implementation across the country
- LCA officials of 40 upazillas trained on NRCP implementation and corrective actions
- NRCP data digitalized through database
- Strengthened the laboratory capacity to test all the residues and the contaminants forecasted in the annual NRCP.

NRCP non-compliances (2009 to 2014)			
Year	Total samples	Non-Compliances	%Non-compliances
2009	1109	92	8.34
2010	1195	39	3.26
2011	1135	61	5.37
2012	1342	34	2.53
2013	1332	49	3.68
2014	1374	23	1.67



There is a significant decrease in the number of non-compliant samples in the recent years (see table above). NRCP non-compliance is less than 2% for 2014.

The RASFF rejection was just 0 in 2013 and 2014 while it was as high as 50 in 2009 (see table above).

FVO audit mission (2015) reported that residue monitoring plan of Bangladesh is implemented effectively resulting in improving the compliance rate for exported consignments which offers guarantees equivalent to EU requirements. It appreciated the National Residue Control Plan (NRCP) Policy Guideline 2011 (revision 2012) developed by BEST project which gives advice on substances to monitor sampling strategy and planning, collection and handling of samples, result reporting and investigation procedures

Officers trained on NRCP implementation



Aquaculture Medicinal Products (AMPs) Control Initiatives

Context

There is a general perception that the Aquaculture Medicinal Products (AMPs) have not always been used in a responsible manner globally. In Bangladesh, during 2005 to 2011, detection of the Chloramphenicol and Nitrofurans in exported shrimp caused much concern. The sector was under serious scrutiny during those years from importing countries. The table in the previous chapter indicates that Rapid Alert notifications relating to the products originated from Bangladesh in 2008 and 2009 were 14 and 50 respectively which was alarming. This ultimately led to self imposed ban on export of freshwater prawns in Bangladesh during 2009.

Food and Veterinary Office (FVO) audited Bangladesh shrimp sector with special reference to situation of residue contamination during 2007/2008, 2010 and 2011. The repeated missions lead to many improvements in capacity of Department of Fisheries in testing, validation, NRCP implementation and monitoring. In spite of these developments, there are incidences of residues of certain permitted antibiotics above their Maximum Residue Limit (MRL) and detection of residues of banned antibiotics/chemicals. These reveal the abuse of permitted antibiotics and illegal use of banned or unauthorized substances. This indicates that existence and functioning of a comprehensive aquaculture drug control system supported by legislation is crucial for an overall quality assurance system to produce safe food.

Baseline status

FVO missions in 2005, 2007/2008 and 2010 raised serious concerns with respect to the controls on authorization, distribution, retail sale and use of AMPs. Another major issue of concern was absence of or wrong labeling information on withdrawal periods and MRLs for the drug residues and contaminants, along with absence of prescription system for the antibiotics. The missions also noted weak coordination between Department of Fisheries and the Drug Regulatory Authority leading to ineffectiveness of competent authority controls on the sale and distribution of aquaculture medicinal products. This resulted in their conclusion that the CA failing to provide guarantees equivalent to those detailed in Articles 66 (2) (f) and 69 of Directive 2001/82/EC.

Picture



BEST outputs

- National survey conducted on the status of AMPs in terms of authorization, manufacture, distribution, retail sale and use
- Organized coordination workshops/meetings between DoF and Department of Livestock Services (DLS) with Directorate General of Drug Administration (DGDA) on control of AMPs
- Government officials visited Vietnam and Thailand to study the control mechanisms being implemented over there
- Developed Guidelines on Control of Aquaculture Medicinal Products (AMP) and approved by the Ministry
- Guidance on the control at various levels of AMP supply chain prepared and disseminated to all stakeholders
- Pool of 22 trainers on control of AMPs developed
- Awareness on AMP guidelines created among all the stakeholders



Officers trained on AWP control

Current status and program outcomes

FVO audit mission reported that the current system of veterinary prescription or an advisory note required to purchase products from licensed pharmacies allows the competent authority to control the distribution and use of veterinary products. It also reported that the arrangements in place concerning authorization and distribution of aquacultural medicinal products and record-keeping provide confidence in the competent authorities' guarantees on compliance of exported shrimp with EU maximum residue limits. It appreciated the efforts of BEST project in developing such a legal framework after so many years of noticing the presence of residues in the aquaculture products in the country.



Training on AWP control guideline

Internal Control Programs Implemented along Shrimp Value Chain

Context

Possessing products of superior characteristics is no longer enough in today's globalized economy. Now, quality and safety of the product must be certified by an authorized body that the products come from reliable and traceable sources produced under hygienic production conditions and harvested and transported in a sanitary manner to the factory. Hence, regulatory agency has to have a documentary evidence of official controls over the whole production chain and traceability products and their raw material.

To achieve maximum consumer protection, it is essential that safety and quality be built into food products from production through to consumption. This calls for a comprehensive and integrated farm-to-fork approach in which the producer, processor, transporter, vendor, and consumer all play a vital role in ensuring food safety and quality. It is impossible to provide adequate protection to the consumer by merely sampling and analyzing the final product.

A well structured, preventive internal control approach is the preferred method for improving food safety and quality. Many potential food hazards can be controlled along the food chain through the application of good practices i.e. good aquacultural practices (GAP), good manufacturing practices (GMP), and good hygienic practices (GHP). At the processing and handling stage of the products, Hazard Analysis Critical Control Point system (HACCP) and its pre-requisite programs are applied. Bangladesh Government has recognized the application of HACCP approach by the food industry as a fundamental tool for improving the safety of food.

Baseline status

For long years, main activities of the regional FQC services were focused mostly on establishments. The initial part of the production chain from the collection of brood stock, the hatcheries, rearing and harvesting, the transport of shrimps to the establishments and the suppliers were not controlled with any systematic approach (FVO, 2005). In 2008, Local Competent Authority (LCA) was given responsibility to control landing sites and depots; however it lacked standardized and well documented approach, compromising the quality of official control all along the production chain (FVO 2008). Further in 2010, FVO recommended CA to have licensing and official monitoring of hatcheries and aquaculture farms including fin fish farms producing for the establishments needs to be carried out according to provisions at least equivalent to those mentioned in Annex I of Regulation (EC) No 852/2004.

BEST outputs

In association with Department of Fisheries (DoF), BEST programme initiated many programs on strengthening internal control systems along the whole value chain-hatcheries, feed mills, depots, ice factories and landing centers. In addition, awareness on traceability (Traceability framework was developed by BQSP in

2008) was continued along with farm registration of fin fish farms. Another area of intervention was development of e-traceability framework (this will be dealt separately later in this report).

Major outputs are listed below:

- Training of newly recruited inspectors on Quality Assurance Program (QAP)- such as inspection, documentation, SSOP and HACCP)
- Inspection protocols based on risks developed through extensive discussion
- Trained 40 SUFOs/UFOs of 10 shrimp producing districts on NRCP and post-harvest compliances
- Trained 25 Quality Managers of freezer vessels on Sanitation Standards Operating Procedures (SSOP) and HACCP and implementation of traceability
- 186 depot owners and 9 ice factory owners were trained on implementation of sanitation, hygiene and traceability requirements
- 23 packing centers and 18 wholesale landing centers trained on compliances
- Waste Management Manual developed and printed; awareness programs conducted
- Etraceability framework developed

- Registration and traceability systems introduced in 10,000 finfish farms in 50 upazilla under 12 districts
- Developed plan, curricula and training materials on GAP for extension officers of DoF
- Pool of trainers on GAP QAP and HACCP developed
- Conducted field level training program on GAP for farmers- 34 GAP training programs for shrimp farmers completed and 850 farmers trained up
- 170 lead farmers identified and trained; lead farmers were further supported through test kits and training
- Transfer of GAP knowledge to other agencies: WAB Technicians (25 technicians), BRAC branch Managers (25) and Solidaridad field officers (50)
- Conducted training for feed millers, feed and other aquaculture traders on quality and safety management
- Farm record books and Hatchery record books were developed, printed and distributed
- Compliance manual on feed act and rules, hatchery acts and rules developed through consultation, printed and distributed

Current status and program outcomes

FVO (2015) acknowledged that controls of feed mills have been carried out regularly, frequently following appropriate checklist. It also appreciated official controls at farm level by Local Competent Authority (LCA), including recording of use of aquaculture medicinal products and their withdrawal periods ensuring that aquaculture products eligible for export to the EU do not contain residues of prohibited substances or residues in excess of maximum residue limits as provided for in EU legislation. Currently, the official control system in place covers the entire production chain and it can be considered as providing, in general necessary guarantees with regard to the applicable EU requirements (FVO, 2015).



HACCP implementation in factories



Feed Act & Rule Implementation



Lead farmers are having training on GAP 2013 UNDO-BEST-BFG

Shrimp Value Chain Simplified

Shrimp sector plays a central part in the fisheries sub-sector in Bangladesh. However the recent paradigm shift of the major importing countries towards increased food safety control has become one of the major challenges for the sustainability of the sector. This particularly true in case of Bangladesh shrimp value chain due to its unique structure and dynamics with the presence of too many intermediaries with redundant roles in the supply chain. Apart from the price exploitive behaviors of market intermediaries that hinder pro poor growth in the sector, the quality of shrimp also stands to deteriorate as the number of intermediaries increases. Intermediaries may provide essential services in remote settings but in most cases their superfluous roles result in quality deterioration due to improper post-harvest handling and delayed transportation of shrimp.

Simplification of the shrimp supply chain in terms of reducing the numbers of unnecessary intermediaries or changing the way they are operating is imperative for the sustainable development of the sector. The challenge is to identify innovative solutions, possibly based on contract farming models, that are efficient and competitive and also 'inclusive' in terms of working with small holders on sustainable basis.

BEST initiatives

In 2012, BEST carried out an extensive study on the value chain of shrimp to understand the dynamics of the existing marketing channel of shrimp with particular emphasis on the roles played by the actors/intermediaries, the economic as well as socio-cultural basis of their presence in the system with an ultimate aim to develop a framework with entry points for interventions to simplify the supply chain.

- Simplification Framework developed:** Based on the field studies and stakeholders consensus, a framework was developed, the core of which is to break down the supply chain complexity into its essential component parts that can be modified to increase supply chain performance
- Value chain Identified:** Value chains were identified for implementation of simplification with direct involvement of Department of Fisheries (DoF) and BFFEA. Paranpur in Satkhira and Jhonjonia in Bageraht were selected for piloting
- Consultations held:** Many consultations held in selected value chain of Satkhira and Bageraht and agreement reached between the farmer and processor for cash payment and digital balance for weighing.
- Farmers trained:** BEST experts trained all the farmers (100 in each group) on pre-stocking pond management, nursery management, feeding management, grow-out, harvest, traceability and post-harvest management, as essential part of Good Aquaculture Practice (GAP).



Farmers of simplified supply chain



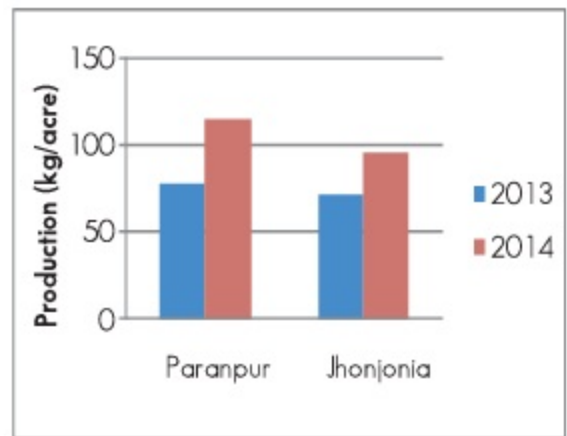
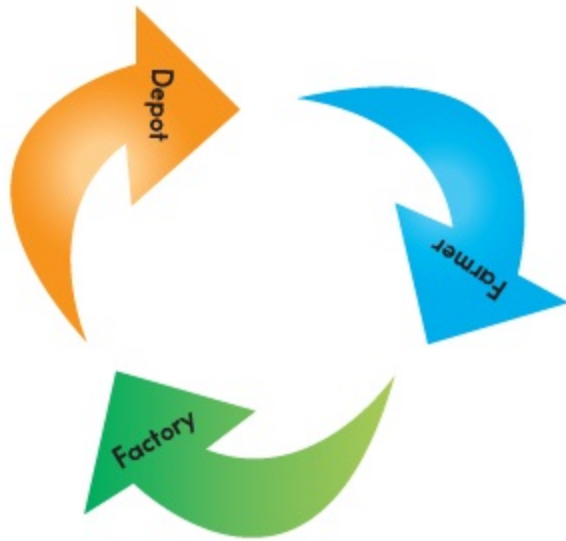
Farmers with ID card for traceability

- Traceability implemented:** Registration of farmers ponds and issue of ID cards were done as part of traceability
- Associations created:** Simplified farmers are grouped into working associations with selected office bearers.

Outcomes

The post-intervention study indicated that per acre average productions has increased at Paranpur from 78 kg to 115 kg (+47%) and at Jhonjonia from 72 kg to 96 kg (+33%) and farmers are now happier with higher production. This outcome is the result of receiving training on GAP. This increase in production encouraged the farmers to culture shrimp in more scientific way to gain more profit from this sector.

It's very essential that such practical demonstration of successful simplification of supply chain model be taken up by the processors for developing their own supply chains, through which they can ensure full control on the operations with respect to food safety.



Training of farmers on GAP



Food business operation Compliance

Consumers all over the world want safe and wholesome food whether it is imported or produced domestically. During recent years, after many food scares or food safety scandals in the world, consumers are demanding for more information of the food they consume such as its growing conditions, feed and seed used, harvesting and post-harvest management practices, transportation and processing. So food business operators, small farmer to big enterprises, need to adopt a comprehensive food safety strategy from farm to fork.

To reach the real goal of food safety, a farm-to-fork food safety approach is required. Bangladesh has in fact introduced this in shrimp sector through its recent legislation amended in 2008 (FIGC Rule, 1997 amended in 2008). Accordingly, efforts are in place to enforce control systems across the whole value chain.

Baseline status

At the processing establishment level the HACCP plans of most of the factories had necessary elements but did not always reflect the evolving situation in the establishment as found in FVO report in 2005. It also recorded that RASFF notifications were followed up by the establishments without further investigation or corrective measures. As also referred earlier, the food business operators along the value chain such as farmers, depots, ice factories, landing centers were having limited knowledge on food safety, hygiene, sanitation and traceability.

Baseline study conducted by BEST in 2010 revealed the following:

- The export oriented EU approved plants are having excellent physical structures and maintenance programs
- Documentation of hygiene and sanitation and GMP and SSOP manual preparation need further strengthening through training
- Traceability related documents needed to reflect the reality
- Depot operators still demand training to increase their knowledge about the requirements of hygiene, sanitation and traceability
- Ice factory operators need training on hygiene and sanitation including ice production management system to avoid risk of contamination in ice
- Occurrence of disease, poor feed quality, poor water quality management and lack of knowledge on GAP are major causes for low production in farming

BQSP and BEST intervention

During BQSP extensive awareness campaigns were taken up to create basic knowledge on food safety among the food business operators.

- Quality managers at processing factories were trained on GAP and HACCP
- Almost 80% of the HACCP manuals of the factories were reviewed and suggestions made
- Depots and ice factory personnel were trained under BQSP project on hygiene, sanitation and traceability. Documentation and record keeping on hygiene and sanitation activities need further strengthening
- Traceability training programs were conducted to stakeholders along the value chain and DoF officials
- Training programs were also provided to DoF officials on food safety, GAP and water quality management



Traceability training for farmers

During BEST, efforts continued with the food business operators through institutionalizing the training programs and piloting:

- Training manual on Good Aquaculture Practices (GAP) developed through extensive discussions used for training of farmers and trainers
- Handbook on GAP in Bangla and GAP pocket diary was developed for the use by farmers
- Trainers (20) on GAP developed through extensive training
- Good Aquaculture Practice (GAP) implemented in pilot upazillas
- Field assistants (24) developed in pilot upazilla through extensive in-house training on GAP for serving 12,000 farmers
- Extensive awareness programs held at union levels of pilot upazilla for popularizing GAP
- Trained quality managers of 72 processing factories
- Pool of 20 HACCP Trainers (12 from FIQC and 8 from processing factories) were developed
- Trained trainers reviewed the HACCP and SSOP manuals of 72 fish processing factories and trained quality managers on QAP hygiene and sanitation (GMP and SSOP), HACCP and risk analysis



Training of factory managers on Traceability



GAP demonstration on farm

Current status and program outcomes

The official control operation procedures on processing establishments are fit for purpose and ensure that products are eligible for export and provide sufficient guarantees on traceability from production to export to the EU (FVO 2015). Currently, the official control system covers the entire fishery products production chain including aquaculture farms, landing centers, auction depots, processing establishments and transport. Specific checklists are being used at each step of the production chain.

FVO (2015) concluded that the control system in place covering the entire production chain can be considered as providing, in general necessary guarantees with regard to the applicable EU requirements with regard to general structure, maintenance and the flow of products, own-check programme covering prerequisites such as staff training, cleanliness, cleaning and sanitation, pest control and water quality.



Processing under HACCP requirement

Human Resource Development Institutionalized

Food safety is ever changing science. To cope up with the advanced knowledge and market requirements, increasing awareness and knowledge about food safety and quality issues among consumers and their organizations, food producers, processors, traders, food enterprises, industry associations and others, are very important aspects of food safety system. For effective implementation of compliance requirements along the value chain, human resource development must take place at various levels: regulatory level, food business operators' level and food handlers' level. The competent authorities who perform official controls should have a sufficient number of suitably qualified and experienced staff to carry out their duties properly. Food businesses must make sure that all food handlers, and people who supervise food handlers, have the right skills and knowledge in food safety and food hygiene for the work they do. It is a legal requirement and part of any food safety program.

Baseline status

FVO mission held in 2005 made a recommendation to improve the competent authority's knowledge and the availability of up to date the European Community Legislation in the different services. It also reported that existing laboratory staffing levels were insufficient to carry out the volume of testing required (FVO 2007). FVO mission (2008) also recommended to ensure that all officials involved in controls along the food chain receive appropriate training enabling them to undertake their duties competently and to take into account the EU standards



GAP Trainers monitoring farm water quality

Baseline studies of BEST program held in 2010 indicated that the existing skill and education levels among those working at the shrimp value chain (except managers and quality managers at processing factories) are very limited. There was also a strong demand for training for those involved in fisheries value chain on Good Aquaculture Practice, hygiene requirement, traceability, record keeping, feed management, etc. It also reported that availability of training materials and resources/trainers was scarce.

Actions delivered under the BEST

- Pool 20 HACCP trainers (12 from FIQC and 8 from processing factories) were developed
- Trained trainers reviewed the HACCP and SSOP manuals of 72 fish processing factories
- Trainers trained factory quality managers of 72 factories on QAP hygiene and sanitation (GMP and SSOP), HACCP and risk analysis; the factory managers trained their internal staff and workers on hygiene and sanitation
- New DoF officers (28) recruited under the project were trained on food safety
- Training manual on Good Aquaculture Practices (GAP) developed through extensive discussions
- Trainers on GAP developed through extensive training; these trainers trained farmers in 18 upazillas in pilot scale
- Handbook on GAP in Bangla and GAP pocket diary were developed for the use by farmers
- Field assistants (24) developed through extensive in-house training on GAP and equipped with test kits in pilot upazilla for serving 12,000 farmers
- Laboratory analysts trained on ELISA, LCMSMS, AAS analysis, ISO 17025, quality management, and test



BEST-BFQ Lead farmer

FVO (2015) comments on BEST-BFQ

FVO mission of 2015 made following notes: The CA has UNIDO since 2010 in a project called BEST-BFQ funded by the EU and the NORAD which is a follow-up programme of BQSP (2005-2010). Under the combined 10 year initiative legislation has been revised, a large scale education effort for both CA staff and stakeholders has been undertaken as well as guidelines developed and disseminated. Quality assurance and traceability related training have been performed for CA staff at all levels in which food business operators participated. Good Aquaculture Practices training has been given to a large number of CA and hatchery staff farmers and feed mill personnel. There has also been participation in international training, workshops and studies by official staff.

A comprehensive information package has been distributed to CA staff and stakeholders covering guidelines for feed production, shrimp hatcheries, waste management in fish and fishery industry, Good Aquaculture Practice guide for farmers, farm record books and Compliance Guidelines for Shrimp Hatchery as well as Compliance Guidelines for Fish Feed Production, Import and Marketing.

Impacts

Bangladesh fishery sector and the competent authority reached a status of equivalency after meeting all the EU requirements at all stages of the production chain. Food business operators are aware of the EU market requirements in terms of safety of the products they handle or produce. At the same time they are rewarded by lift off of 20% testing requirements at EU border inspection posts and access to emerging markets such as Russian Federation. Through human resource capacity building, the laboratories are able to provide test results at regional centers within a week as against at Dhaka or abroad with turnaround time of about 30 days



72 Lead farmers of Khulna region

Laboratory Human Resource Capacity Enhancement

Any laboratory supporting the Competent Authority or regulatory body shall have adequate facilities for physical, microbiological and chemical analyses. Most importantly it is not only the type of equipment that determines the accuracy and reliability of analytical results but also the qualification and skill of the analysts. It is therefore necessary that utmost care be taken to ensure that the analysts are well trained and skilled to undertake efficient and effective performance of the laboratory.

Laboratories are an essential component of a food control system. The establishment of laboratories requires considerable capital investment on human resource development. Therefore careful planning is necessary in selection of the analysts and further training programs.

Baseline status

In 2007 there were only two personnel involved in operation of the LC-MS-MS equipment which was not sufficient. The audit missions in 2005 and 2008 concluded that analytical methods employed to control against the presence of chemical contaminants are not fit for the purpose. One of the major causes of failure to meet the analytical and quality control requirements was lack of trained staff and poor knowledge on Good Laboratory Practices (GLP). Due to this situation, the competent authority failed to offer guarantees equivalent to that provided for by Article 4(2)(c) and 4(2)(d) of Regulation (EC) No 882/2004.

Further baseline studies carried out by BEST in 2010 indicated that there is a strong need for human resource development policy or planned human resource development programme in Fish Inspection and Quality Control department to avoid transfer of skilled and trained manpower on attaining promotion. There was also a need to assign technical managers in the laboratory. The number of staff was basically insufficient for the amount of work load.

Major inputs

BQSP

Laboratory analysts were provided training on basic concept of quality and quality management system (QMS) based on ISO 17025, ISO 9000, documentation and GLP both overseas and locally. This enhanced technical capability of laboratory analysts. A proposal for restructuring of laboratory organogram with technical recommendation for two regional centers of Fish Inspection and Quality Control (FIQC) was prepared and submitted.

BEST

- New laboratory analysts recruited and trained
- Organogram of the laboratories at three centers reformed and quality managers and technical managers appointed
- Laboratory managements separated from FIQC to avoid conflict of interests
- Analysts trained through LC and MS schools on use of LCMS/MS equipments for testing residues, conducted by international experts
- 20 key analysts were trained on use of LCMS/MS
- Benchmarking study tour organized for key laboratory personnel and senior management with accredited laboratories in Thailand



Training of laboratory analysts at work



Training of analysts on LIMS

- Analysts trained on internal audit, GLP/QMS, measurement uncertainty, calibration, validation, internal quality control external quality control & participation in proficiency tests, use of certified reference materials, and use of Laboratory Information Management System (LIMS)
- Created necessary awareness with in top government officials and follow up for its approval.
- Organized a benchmarking study program on QMS establishment, implementation and accreditation with accredited laboratories in Thailand
- Provided technical laboratory testing and management related trainings to the analysts both locally and abroad.

Current status and program outcomes

Laboratory analysts are now well informed and trained on use of various state-of-the-art equipments for testing different test parameters both in chemical and microbiological laboratories, at three centers.

FVO audit mission (2015) acknowledged that staffs have received extensive training on the quality management system, method validation as well as on the LIMS/MS technique under an EU co-funded project, BEST. It also appreciated that all laboratories had proved their competence through participation in proficiency tests which is in line with the requirements of Decision 98/179/EC. The audit report concludes that given the laboratories' accreditation to ISO 17025, their overall satisfactory results in regular proficiency testing and their internal quality controls, the laboratories designated by the CA for official analyses of fishery products can ensure the reliability of the results of the analyses.

Situation Improved from 2010 to 2014

2010	2014
1. No Test Method Validation	Completed 32 Methods validation & Laboratory started routine test
2. Lack of Documentation (Quality Manual, SOPs, Forms etc.)	Documents ready to meet Laboratory accreditation (QM & 167 SOPs, 67 forms etc.)
3. No Participation in PT	Passed in 10 Proficiency Testing
4. No Equipment Calibration	Calibration completed
5. Lack of knowledge	31 local & foreign trainings conducted
6. No accreditation	Laboratories are accredited for ISO/IEC 17025:2005

Laboratory Analytical Capacity Advancement

Food contamination, economical fraud, adulteration and other related food safety issues have lead to an increased awareness among the consumers. Hence, food testing laboratories play in ensuring the safety and quality of our food supply. Laboratory services are an important component of effective food safety control systems with an essential role within the overall food control system of finally proving that practices followed by food producers, suppliers and processors result in safe products for the consumers.

Sophisticated instruments and well-trained, experienced analysts are essential factors in food safety laboratories for any regulatory agency to depend upon. By combining highly skilled, professional staff with state-of-the-art laboratory facilities, qualified and validated methodologies, the laboratories are able to provide food industry with highly accurate and reliable, testing services. Regulatory agency needs to base its approval of laboratories based on the its compliance with the general criteria for testing laboratories laid down in the ISO/IEC 17025 accreditation requirements.

Baseline status

The laboratories performing official analyses were neither accredited to ISO 17025 nor participated in external proficiency studies and the routine use of certified reference material. The method employed for nitrofuran analysis did not monitor the metabolites and therefore found ineffective with no value as a tool for certification (FVO mission 2005). Lack of good laboratory practice (GLP) in laboratories, insufficient machines, trained staff and validated methods could not offer guarantees equivalent to those provided for under Article 4 (2) (c) and 4 (2) (d) of Regulation (EC) No 882/2004, thereby undermined confidence in the reliability of results of aquaculture products and ultimately the performance of the entire residue control system (VFO, 2007/2008).

Actions delivered

Lot of activities had to be accomplished in case of laboratory capacity development due to the existing status in the beginning of the **BQSP**. Following are some of the BQSP outputs:

- Two laboratories of Fish Inspection & Quality Control- FIQC (at Khulna and Chittagong) established and equipped with chemical and microbiological testing equipment
- The two laboratories plus the FIQC laboratory in Dhaka, other national laboratories (BAEC, BARI and BCSIR) assisted towards preparing for accreditation
- Staffs were trained on the use of equipments and on basic concept of quality and Quality Management System (QMS) based on ISO 17025, ISO 9000 and as well on GLP
- Gap analysis of two FIQC laboratories, against the requirement of 17025 conducted through international experts
- Quality manuals and related procedures drafted
- A Quality Management System Development (QMSD) teams developed to work on the establishment of the QMS

During the **BEST**, many activities still needed to be accomplished. To list few:

- Developed the QMS such as quality manual, Standard



FVO Audit of laboratories



Analysts in action



LCMS/MS operation by trained analysts

Operating Procedures (SOPs), instructions and forms in as per ISO 17025

- Assisted in implementation of the QMS; coordinated the internal audit and management review; Assisted in planning and performing of the corrective actions based on the findings of the audit and preventive action
- Assisted in preparing suitable organizational structure that complies with organization and impartiality requirements of accreditation.
- Assisted in implementing Laboratory Information Management System (LIMS), and provided internet access
- Established linkage with reputed laboratories or institutes of same nature
- Procured two LCMS equipments for residue testing and installed at Dhaka- methods validated and successfully used; later shifted to Khulna and now in use there
- ELISA screening tests installed at both the laboratories, methods validated and put into use
- Provided technical assistance in the area of validation of test methods, participate in proficiency testing program, interpretation of the proficiency test results, and accreditation process
- All laboratories had proved their competence through participation in proficiency tests
- Accreditation of both the laboratories (at Khulna and Chittagong) based on the requirements of ISO 17025

Current status and program outcomes

After great efforts by the BEST team as well as analysts, both the laboratories are now accredited to ISO 17025 by the national accreditation body, the Bangladesh Accreditation Board (BAB), which has the Mutual Recognition Agreement signatory status with the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and International Laboratory Accreditation Cooperation (ILAC) since January 2015.

The regional laboratories were also able to use ELISA test methods reducing the testing turnaround time from 30 days to less than 7 days, helping the exporters to a great extent. Now all the test parameters are available in the region as against in the past. The use of ELISA test methods has resulted reduced the cost to great extent as well as reduced the load of samples going for LCMSMS equipment.

FVO mission (2015) concluded as "given the laboratories' accreditation to ISO 17025, their overall satisfactory results in regular proficiency testing and their internal quality controls, the laboratories designated by the CA for official analyses of fishery products can ensure the reliability of the results of the analyses"

Impact

Reduction of testing turnaround times from 30 days to less than 7 days and availability of lab services at regional centers helped the industry to a great extent. Even if the cost of 20 ton of shrimp in container is around 200,000 USD, to stay for 25 extra days for test results, and would cost the exporter at least 2,500 USD towards bank charges in the form of interest.

Until 2010, the exporters were sending samples to Thailand or Singapore for testing which used to take 20 to 30 days for test results; now the testing facility is available at their door steps. The cost of each sample was about 350 USD at Singapore or Thailand. Now it costs about 100 USD per sample within the country.

The laboratory capacity advancement has benefited the exporters along with all the other business operators in production chain financially.



New laboratory built by DoF at Savar, Dhaka

Social Compliance Capacity Building

Well-educated people who know their rights and act according to their duties are the key to the economic development of a country.

Shrimp and seafood industry has been very promising economic sector from where Bangladesh receives her second largest foreign exchange earnings after readymade garments. The post-harvest shrimp processing industry has been quite responsive in the last few of years in terms of better social compliance and improving labor standards due to demand from the market.

The overall objective of intervention of BEST programme on social compliance was to support implementation of Labor Laws 2006 across the shrimp processing industries to improve the socio-economic situation of workers enabling better competitiveness and advantages of global market opportunities, particularly in EU markets.

Baseline status

The labor laws training activities was very new to the shrimp sector until 2005 when Bangladesh Quality Support Programme (BQSP) started. There was no training manual or any materials in 2005.

Activities to improve social compliance started during the BQSP have had a significant positive impact in terms of awareness. As access to education and knowledge of duties and rights is lagging far behind international standards, especially in remote rural areas, this activity continued during BEST from what was started under BQSP and increase the coverage.

Baseline study conducted by BEST in 2010 observed the following:

- Labour laws 2006 is not fully implemented for all classes of labor engaged in the shrimp industry.
- Official inspection and control only covered permanent labors/workers
- There has been strong demand both from FIGC Inspectors and MOL&E Inspectors to have practical training on new labour laws
- Bangladesh Frozen Food Exporters Association (BFFEA) initiated Alternative Income Generation (AIG) training centre with an NGO at Khulna and trained about 400 female labor on different AIG which phased out from 2010
- No gender focused training program on Good Aquaculture Practice (GAP), traceability and record keeping.

Actions delivered

BQSP

- Developed a training manual on labor compliance through extensive discussions with stakeholders (in Bangla)
- A training manual on ‘Women in Small-scale Golda Farming developed and published
- Piloted training programs for female farmers and farmer couples on small-scale golda farming,
- Promoted literacy training for youth and women
- Raised awareness on the rights and duties of workers and employers provided by the labour law through training on the labour law for all the stakeholders along the employment chain of the shrimps sector



Trainers on labor Law



Training Manual on Labor Law

BEST

- A pool of 78 trainers trained on labor law (29 from Ministry of Labor & Employment- MOL&E, 24 from Fish Inspection & Quality Control- FIQC, 20 from BFFEA factories & 5 from NGOs)
- 217 Human Resource/Labor officers from 51 factories were trained
- Training programs held at both Khulna and Chittagong regions
- Factory based training programs conducted for 2590 workers, mostly women in 25 factories on their rights as per Labor Law
- Trade Union leaders and members (100) and Labor Contractor/Labor Supervisors (51) were trained on labor law
- Motivational and awareness programs held for Labor Compliance Officer/HR Manager (2 programs held at FIQC, Khulna and Chittagong) covering 37 participants
- 125 factory owners/ Managers (125) were provided awareness on the social compliance requirements



A section of women workers being trained on labor law

Outcomes of BQSPBEST programs

- New labor laws implemented in the shrimp/fisheries sector with great amount of awareness created within the sector. Capacity of MOL&E field officials and FIQC inspectors strengthened for training, inspection and monitoring of implementation and enforcement of Labor Laws 2006 across the shrimp processing industry. Other outcomes are:
- Appointment of Compliance Officers in 30 factories to look after labor compliance
- Record keeping on labor compliance and reporting to MOL&E departments
- Better informed industry, 'knowledge gap' on labor compliance reduced
- FIQC has allocated 20 marks for social compliance (out of 100 marks) in their factory evaluation score sheet, which is a new initiative



A child care center established at factory as part of social responsibility

Impact

- Institutional capacity of Department of Labor, Department of Inspection for Factories & Establishments strengthened to enable better service to the shrimp sector.
- Increased awareness on the rights and duties among the workers and employees under the Labor Laws
- The project has been successful in creating mass awareness among the shrimp and frozen food processing sector regarding the need of social compliance.
- Most of the participant industries have adopted better labor compliance and necessary record keeping reporting to the inspecting authority and buyers. There are visible documents like participant register, list of resource persons attended, good photographs, posters and festoons displayed for audience.
- Better reputation of Bangladesh products in terms of social compliance in international markets

E-traceability framework

Traceability is a risk-management tool which allows food business operators or authorities to withdraw or recall products which have been identified as unsafe. It is a way of responding to potential risks that can arise in food, to ensure that all food products are safe for consumption. It is vital tool for authorities or food businesses to identify a risk by tracing back to its source in order to swiftly isolate the problem and prevent contaminated products from reaching consumers. The traceability tool should be able to identify at any specified stage of the food chain (from production to distribution) from where the food came (one step back) and to where the food went (one step forward), as appropriate to the objectives of the food inspection and certification system.

Bangladesh was in great need of a reliable traceability framework to safeguard its export and its consumers. BQSP programme developed a traceability framework which is paper-based through extensive discussions and consultations with stakeholders. This framework is based on European milk traceability. One of the disadvantages of this framework was too much of writings and papers, which may not be suitable for low-educated or uneducated farmers. To complement the paper-based traceability, BEST programme decided to develop a digital framework called e-traceability. The framework was approved by the Ministry of Fisheries & Livestock for field testing. Due to unforeseen reasons and time constraints, this field testing could not be taken up yet. However the framework is ready for anyone to implement or use it.

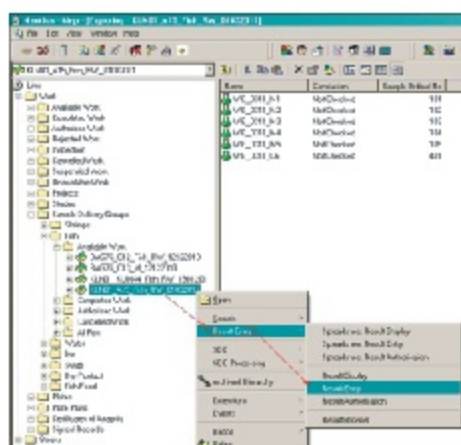
Laboratory Information Management System (LIMS)

A Laboratory Information Management System (LIMS) is a software based laboratory and information management system with features that support a modern laboratory's operations. Key features include, but are not limited to, workflow and data tracking support, flexible architecture, and data exchange interfaces, which fully support its use in regulated environments

By using a LIMS, a laboratory can automate workflows, integrate instruments, electronic data exchange, chain of custody, document management, inventory and equipment management, method management, personnel and workload management and quality assurance and control.

BEST programme installed LIMS in two IQC laboratories in Khulna and Chittagong and interfaced with most of the modern testing equipments for automatic test results recording and then ultimately test report generation. The users have been extensively trained and the software was customized for the local preferences.

In future, this LIMS may be linked to farmer database, traceability data and inspection and certification services. This would be a real dream coming true before 2021.



Screen shot of Laboratory Information Management System-LIMS

Communication and Visibility

An increasingly important role for food control systems is the dissemination of information, education and advice to stakeholders across the farm-to-table continuum. These activities include the provision of information, guidelines and training resources for key officials and workers in the aquaculture industry; development of visibility materials, brochures, posters; and distribution.

Interventions

The objectives of the BEST's communication and visibility strategy are to build awareness of the Bangladesh shrimp sector compliance among target audiences and user groups inside and outside the country. This also improves knowledge on food safety among target groups within the country. This will contribute to improved coordination and information exchange within in the country on food safety and social compliance issues and improved positive image of the country globally.

BEST programme addressed specific training needs of their food inspectors and laboratory analysts as a high priority. These activities provided many resources such as manuals, handouts and guidelines.

BEST programme produced wide range of publications for the public and the industry on aquaculture food safety issues.

BEST played important role in spreading the information and resources for increasing awareness and knowledge about food safety and quality issues among farmers, processors, traders, enterprises, industry associations and others, and empowering them to enhance food safety and quality for themselves.

BEST educated various food business operators about food safety and quality, and encouraged them to adopt good aquacultural manufacturing, hygiene and handling practices (including HACCP) in their respective operations

BEST resource materials covered wide area of shrimp sector as: GAP HACCP QAP Feed compliance, Hatchery compliance, AMP Post-harvest compliance, traceability and NRCP

BEST- BFG published newsletters on a frequent basis covering progress of the sector for dissemination among the stakeholders across the nation. The Newsletters and its formats developed by BFG can also be used by DoF to continue spreading the information to wide range of user groups



BEST-BFQ website home page



BEST-BFQ blog screenshot



BEST-BFQ face book homepage

The website developed by the BEST-BFQ has useful resources for stakeholders. The content of the website will be transferred to DoF and BFFEA website for continuous and effective dissemination of information

BEST-BFQ also disseminated information on social media such as

blogs (<https://bfqbangladesh.wordpress.com/>) and face book (<https://www.facebook.com/BESTBetterFisheriesQuality>)

Today, we are releasing BEST Resources and BEST Video DVDs containing all the resource materials produced during the BEST programme. This has training resources for farmers, depots, hatcheries, feed mills, ice factories, landing centers, processing factories, Officers, Managers, etc (for everyone!).



BEST-BFQ resources and Videos

Outcome

Tools and publications are effectively being used by food safety and quality professionals directly involved in building national food safety systems, scientists, academics and trainers, and food chain operators, as well as other stakeholders contributing to in developing and implementing food safety and quality programmes.





Program Sustainability

Sustainability refers to the continuation of or building on the benefits from an intervention after the assistance has been completed. Issues to be considered include the probability of long-term benefits from the project investments and the resilience of the net benefit stream to risk over time. At the phasing out of such a big program, the issue of sustainability is of great importance. This is even more so because of the big investments made in capacity building and the need to use this capacity by the stakeholders efficiently and effectively. Huge investment was also made in developing laboratory infrastructure.

The program is proved to be sustainable, thanks to the realization of all the officials of the DoF and major stakeholders that compliance with food safety and quality is a prerequisite to increase or even maintain the current level of exports to international markets. The confidence level of DoF officials shows clear evidence that they were able to absorb technical assistance, and also to act on recommendations.

Another reason for better ownership of the programme outcomes is due to the involvement and complete participation of major stakeholders and particularly the Department of Fisheries in all the activities. None of the programs or activities of the BEST-BFQ was organized independently or in isolation. It was all through joint participation. This is the key reason for the ownership of the programme outcomes.

In case of laboratory, the BEST programme phased out its supports for equipment maintenance, technical assistance

and training, except for some communications, since last 1 one year. The laboratories were still able to demonstrate their competence in the recently held FVO audit, in keeping routine operations, and in general management of the laboratories in a sustainable and effective manner.

The project support to the FIGC laboratories has imparted the necessary equipment (through previous BQSP and current BEST projects) and skills for the laboratory to get accredited as per ISO 17025 and hence to ensure the validity and reliability of the tests according to the international standards. Technically, the laboratory support is sustainable even though there is a little risk of trained staff turnover. However the main output of this sub-component i.e., laboratory accreditation is achieved and being sustainably managed.

Laboratories have now become independent of FIGC and having their own organogram reporting directly to Director General. This gives the laboratory a kind of independent or neutral status and they may make their own decisions with respect to financial and technical policies.

The DFOs, SUFOs and FIGC Inspectors who have been trained on various issues such as GAP QAP AMP SSOP HACCP etc are now training the beneficiaries at their localities on their own. These officers participated in different trainings and workshops facilitated by the BEST project enabled them to contribute effectively in the harmonization of regulatory frameworks and also created the impetus to do so.

Training resources developed by NEST programme are very useful for the stakeholders as training material or resource material for their own development. These resources have been extensively distributed throughout the country among DoF offices, private sector fisheries organizations, beneficiaries, implementing agencies, etc.

Implementing agencies such as BRAC and Solidaridad have already owned these resources and using them for training purposes.

The act and rules, policies and guidelines developed by BEST, if enforced in a continued manner will have a big impact on the sustainable development of the sector; the outcome in this regard is clearly sustainable. The same can be said for the country wide implementation of the NRCP given the fact that the NRCP Policy Guideline 2011 (revised in 2012) has already been approved and that quite a large number of trainings had been provided to the respective officials for immediate implementation.

BEST programme established pool of resource persons or trainers created through ToT to provide further trainings on a sustainable basis.

The programme also supported for the development of NRCP data management and it is expected that the database will be integrated with the main domain of DoF.

It is too early to comment on the sustainability of the pilot simplification system in the shrimp supply chain. However since BFFEA and Department of Fisheries were part of the process of simplification of the value chain, the farmers associations created are likely to be sustainable, with the continuous guidance from DoF

The BEST-BFQ project invested heavily on capacity building trainings and workshops to strengthen internal control systems regarding Good Aquaculture Practices (GAP), hygiene, environmental management, traceability and record keeping. The expertise built within the industry seems to be sustainable due to the fact that pool of trainers developed are in place and the training resources developed are well distributed.

The outputs achieved through training and awareness activities carried out for accelerating labour law implementation in the shrimp processing industries is sustainable due to institutionalization of the activities. Apart from creating a pool of trainers, the project activities also created necessary environment and impetus to bring in other parties to continue the activities on a sustainable basis. The Office of the Department of Factories & Establishments (DIFE) has become more involved in monitoring the compliance issues while a Legal Adviser has been appointed by BFFEA to render counselling supports to member factories on different issues related to social compliance. By the same token, the FIGC annual inspection for license renewal has also become more stringent on issues related to child labour and other labour rules.

Program Impact

Impact refers to the long term effect produced by an intervention, BEST programme has been successful in creating long term effect through its development intervention across the sector. As many of the project activities have just recently been completed with some key outcomes yet to be realized, it is rather too early to assess the impact level at this stage. The comments on actual or potential impacts described in this section should therefore be considered as subjective.

Policy impact

On the policy and legislation side, the project has made a significant impact. The most notable impact that is already apparent is the empowerment of Local Competent Authority (LCAs) for implementing legislation on official control at filed level (empowerment of SUFOs). This empowerment has already given results which is evident through the recent audit reports.

The project has successfully advocated for distribution of responsibility to different ministries so that coordination among Department of Fisheries (DoF), Department of Livestock (DoL) and DGDA can result in effective control of Aquaculture Medicinal Products (AMP). The degree to which these rules and regulations will be enforced will be decisive for the project impact.

Separation of certification body from laboratories avoiding conflict of interest is another outstanding contribution in terms of governance. This will have far reaching benefits on laboratories for the development of independent profit making organization which could subsequently step into research & development in post-harvest fisheries.

Development impact

Laboratory accreditation has been the most significant core intervention aspect of the BEST-BFQ project which will have long lasting benefits for the whole sector. While the FIGC laboratories are now accredited, substantial development of human resource capacity in terms of training on methods validation, instruments calibration, documentation, laboratory management and technical capacity. These activities have already resulted in improved laboratory performance in terms of reduced turnaround time on tests as mentioned by the factory personnel interviewed, increased proficiency as recognized by external PT providers, reduced non-compliance rate as evidenced by a consistently low number of alerts posted in the RASFF database of EU since 2010 and, most importantly, high self-esteem of laboratory staffs.

The programme has shifted the past trend of end-product testing to preventive approach model based on risks. This is a very important impact in term of global food safety requirement.

Social impact

The sub-component dealing with labour rights and work environment issues was also found to have important positive impacts on its target group, particularly the female workers, including: enhancing their awareness, improving their self-esteem, and developing their communication and dialogue skills. Training on labour laws has been well accepted by the industry. A large number of shrimp processing plants have already appointed Compliance Officer or Human Resource Manger including a few female employees. The Compliance Officers are supposed to implement labour laws, plan and arrange internal training programs and report compliance situation to the



Department of Inspection for Factories and Establishments (DIFE). The industries are now maintaining records of trainings with lesson plans, name and address of the resource persons and yearly training plans. The project also catalysed the process of regular inspection of the factories by officials from the Department of Labour and Employment, which had been carried out on a casual basis during the pre-project period.

The timely intervention of the BEST programme led to attain greater compliance in the sector, regain the reputation of Bangladesh in export markets. This resulted into continued export business leading to retention of employment for both men and women at different levels of production chain. There are almost over 4 million people are involved in the fisheries business either directly or indirectly. Hence, the impact of regaining compliance through BEST is felt by everyone involved.

Financial impact

The BEST programme has clearly created great financial benefit to the processors due to improved testing capacity. These processors are paying about 100 USD per sample and getting the results within 7 days at local laboratories, otherwise would have spent about 350 USD for testing each sample abroad waiting for about a month for exporting their shipments. This has saved lot of time and foreign currency.

The BEST programme has also benefited processors and all the actors involved in the value chain financially because of lifting of 20% mandatory testing at Border Inspection Posts of EU countries. This relaxation takes the Bangladesh products directly to EU retail markets without waiting for the test results at EU border which usually takes 4 weeks. This advantage for Bangladesh products fetches better price in international market, whose benefits trickle down to everyone of the value chain.

Based on the compliance of fishery sector, Bangladesh has already gained entry to new and emerging markets. One such big market is Russian Federation to which significant quantities of the products are being exported since last 3 years.

Sectoral impact

The success of the BEST programme is worth replicating in other sectors of the country such as agriculture, fruits, vegetables, betel leaves (Paan-patha), etc in terms of developing food safety systems based on the implementation strategies or modalities used in this programme.



A Way Forward

A Way Forward

The BQSP and BEST-BFQ programmes have undoubtedly made significant contribution in building the food safety capacity of shrimp sector of Bangladesh in our joint journey of last 10 years. In line with its overall goal, these programmes built sustainable systems in shrimp sector through improved testing capacity, improved food control systems along supply chain, better production, handling and processing conditions, better social compliance, harmonized legislations, better institutional capacity for training, simplification of supply chain, etc. The outcomes and impacts of the program results are already evident. Recent FVO audit reports are the proofs of what is achieved.

Now it's time to ensure that the program success will continue beyond the exit of this program to maintain the compliance of Bangladesh shrimp sector. In this direction, the program experts developed an exit plan along with a sustainability plan and submitted to the Ministry of Fisheries & Livestock which is already under approval process. The Exit Plan has also set out the list of deliverables available for implementation once the BEST-BFQ exits.

It is important that the stakeholders take up their respective responsibilities in an orderly manner. This would definitely ensure efficient and effective continuation of project success to maintain the compliance of Bangladesh shrimp sector. This will also improve the aquaculture productivity of the country leading to poverty reduction and ensuring food and nutritional security, which can significantly contribute to Vision 2021 of Government of Bangladesh.

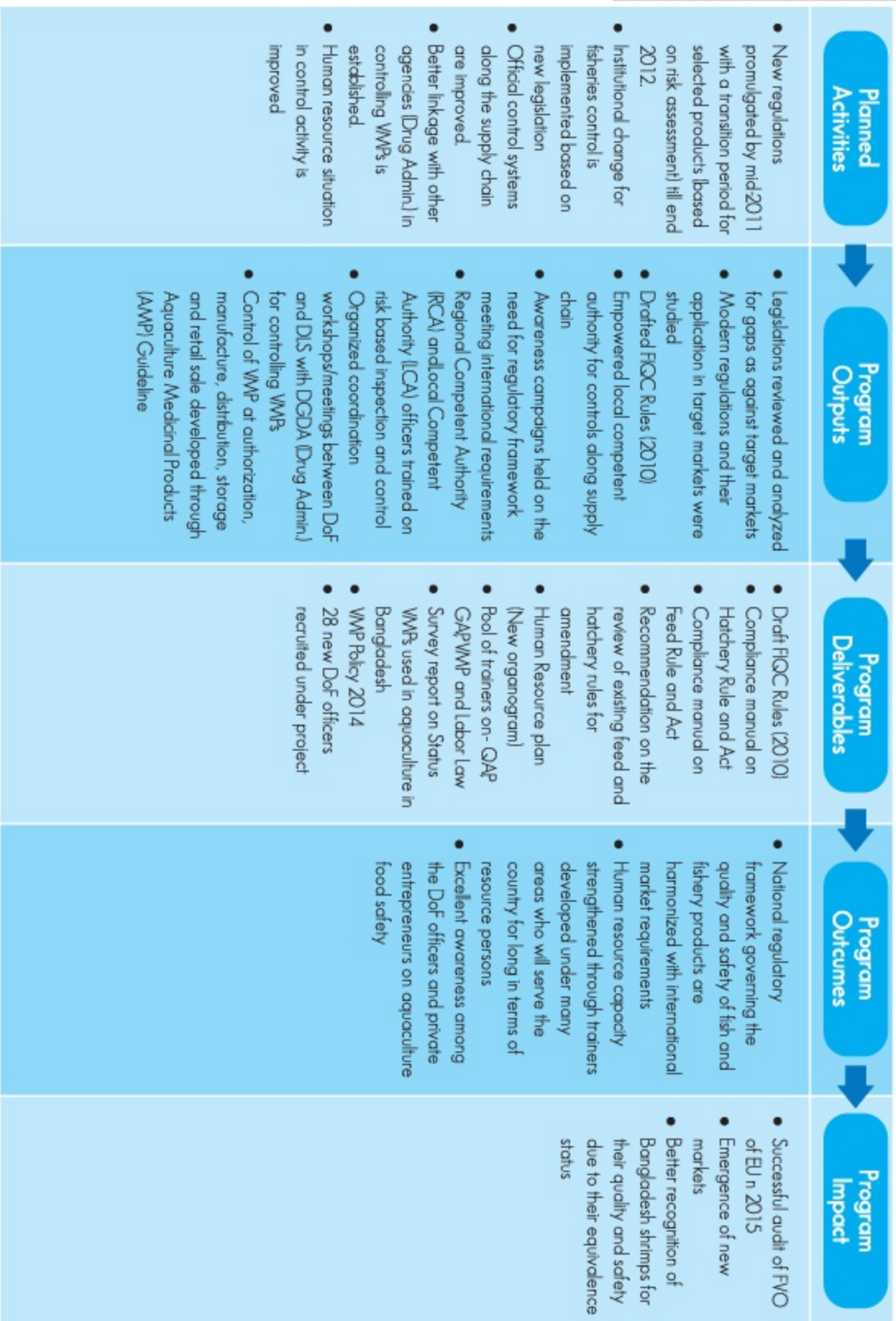


Village GAP doctors (field assistants) trained and equipped to serve farmers

Planned Actions Vs Outputs



Intervention logic #01: Regulatory Framework for controls in the supply chain harmonized, including control on Veterinary Medicinal Products (VMP)



Intervention logic #02: Official controls by CAs strengthened throughout the entire supply chain and principles of risk analysis applied

Planned Activities	Program Outputs	Program Deliverables	Program Outcomes	Program Impact
<ul style="list-style-type: none"> National Residue Control Plan (NRCP) is based on risk analysis by program end NRCP protocols are written and implemented Official inspection checklists are updated and approved; Inspection systems along supply chain are risk based; Risk analysis is fully understood Inspectors at field level are fully equipped with necessary kits and trained Field level officials involved in control of shrimp supply chain are well trained An up-to-date seafood safety website is launched (Visibility plan) 	<ul style="list-style-type: none"> Assisted DOF in preparing annual NRCP plans based on risk analysis NRCP database developed for effective interpretation and management of NRCP results Prepared and published NRCP Policy Guidelines and implemented LCA officials of 40 upazillas trained on NRCP implementation and corrective actions Prepared Fish and Fishery products Inspection Protocol based on risks for every stage of shrimp sector from farm to factory Risk-based categorization of processing factories proposed to avoid end product inspection CA personnel trained on the use of new inspection checklists CA officials trained on risk assessments in the shrimp value chain 40 Upazilla officers equipped with necessary testing kits for farm monitoring Provided training on Quality Assurance and post harvest compliance Developed a website on BEST-BFQ to disseminate information to stakeholders Newsletters, project brochure, highlights of achievements prepared, printed and distributed 	<ul style="list-style-type: none"> NRCP policy guideline (2012) NRCP Database Risk-based NRCP Plans Trained field level officers (DFOSJFO/FO/FAFO) of 40 upazillas The final draft inspection manual Fish and Fishery Products Inspection Protocol Compliance manual on Quality Assurance Program (QAP) Trainers on Inspection manual Pool of trainers on- QAP GAPWP and Labor Law Website www.best-bfq.org and BFQ Blog & BFQ Face book Newsletter project brochure, highlights of achievements 	<ul style="list-style-type: none"> NRCP non-compliances reduced RASSF non-compliances drastically reduced NRCP plans are risk based and compliant to EU requirements NRCP data are now digitalized NRCP effectively implemented through implementation of NRCP policy guideline Pool of trainers created Risk assessments well understood Website gave wide publicity on the development of the sector 	<ul style="list-style-type: none"> The NRCP programs, NRCP protocols, inspection system along the supply chain have been accepted by Food and Veterinary Office audit as harmonized with global food safety requirements. FVO lifted 20% mandatory testing requirements. Russia has approved the food safety system of Bangladesh fish and fishery products

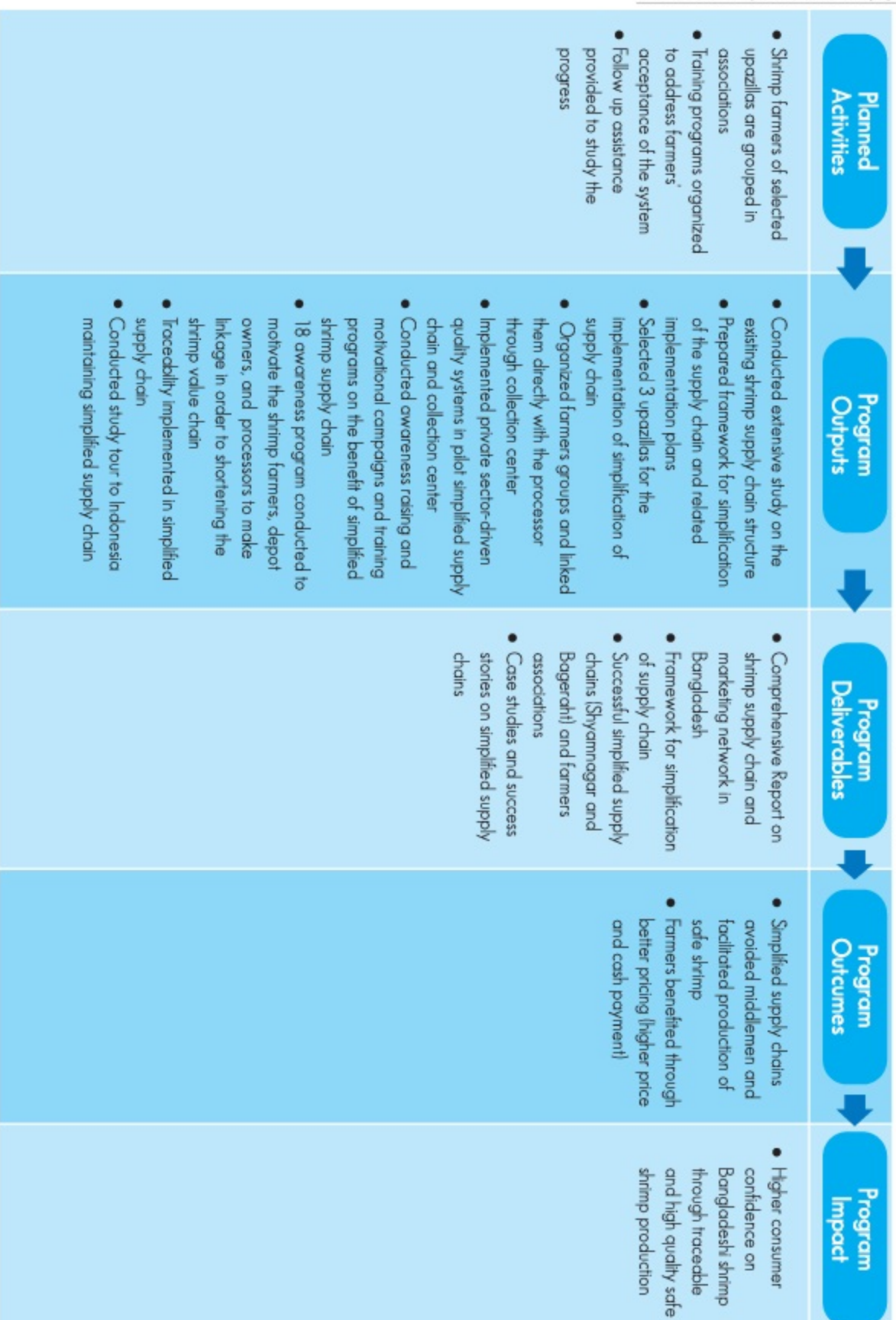
Intervention Logics #03: Improving the validity and reliability of analysis through support for the strengthening of good laboratory practices and accreditation of laboratories



Intervention Logics #04 & 05: Private sector assistance: Assisting private sector in establishing reliable self-control system and Skills development

Planned Activities	Program Outputs	Program Deliverables	Program Outcomes	Program Impact
<ul style="list-style-type: none"> Business operators are trained BFEFA assisted with infrastructure and lab designs A business plan is prepared for sustainability of the lab cum training centre Program intervention logics were later directed towards institutionalizing the training and skill development leading to aquaculture food safety and productivity improvements along supply chain and Development of training manuals and trainers Piloting of GAP in pilot upazilla through field assistants to assist >12,000 farmers 	<ul style="list-style-type: none"> Developed a business plan for the training cum laboratory centre Lay out design prepared for BEFFA lab and training centre Successful piloting of Good Aquaculture Practice (GAP) implemented Training manual on Good Aquaculture Practices (GAP) developed through extensive discussions, for trainers Handbook on GAP in Bangla and GAP pocket diary was developed for the use by farmers Trainers on GAP developed through extensive training Field assistants (24) developed in pilot upazilla through extensive in-house training on GAP for serving 12,000 farmers Equipped the field assistants through test kits for monitoring and extension services Awareness programs held at union levels for popularizing field assistants Trained quality managers of processing factories on GAP hygiene and sanitation (GMP and SSOP), HACCP and risk analysis Pool 20 HACCP TOT 20 Trainers, 12 from FIGC and 8 from processing factories were developed Trained trainers reviewed the HACCP and SSOP manuals of 72 fish processing factories and trained other officers Evaluated HACCP manuals of processing industries by FIGC officials using prescribed checklist 	<ul style="list-style-type: none"> Business plan Layout for training cum laboratory centre Training manual on GAP GAP handbooks and diaries Fish and Fishery products control protocol 	<ul style="list-style-type: none"> Private entrepreneurs- the processing factories are enjoying compliance now 20% testing requirements dropped Rapid screening tests have been introduced Reduction in turn-around time for tests helping exporters Social compliance of the factories FVO audit appreciation 	<ul style="list-style-type: none"> Improved food safety and productivity of shrimps through Good Aquaculture Practice Reverty reduction through sustainable and profitable shrimp farming

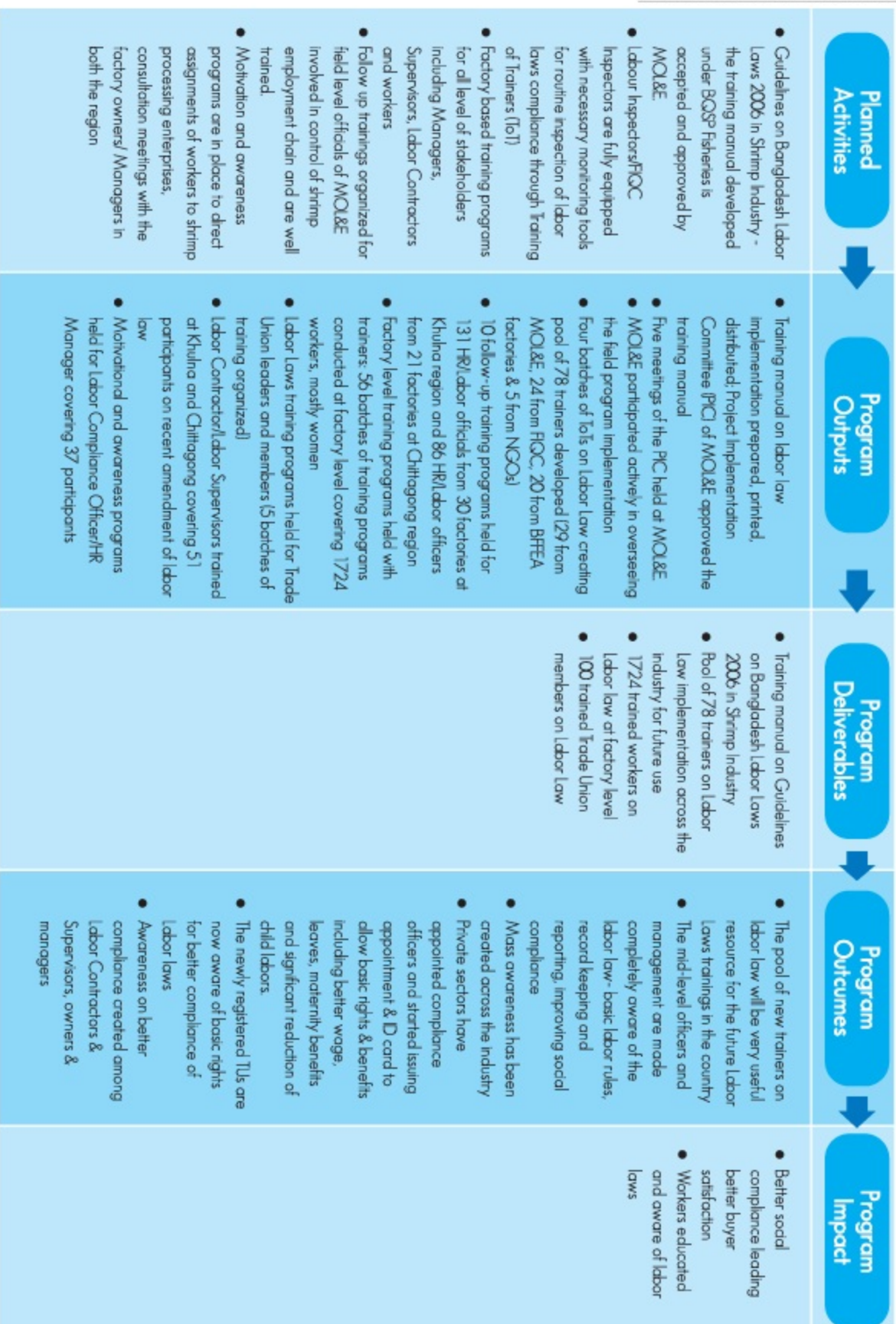
Intervention Logics #06: Initiatives supported to simplify the supply chain in order to enhance the potential for the successful uptake of internal control systems by private sector



Intervention Logics #07: Fishery business operators supported throughout the supply chain to strengthen internal control systems regarding GAP, hygiene, environmental management and traceability

Planned Activities	Program Outputs	Program Deliverables	Program Outcomes	Program Impact
<ul style="list-style-type: none"> Internal control and documentation system all along supply chain are improved; Own check systems of all the factories are improved GAP and traceability established in fishing vessels Control system for aquaculture drugs and chemicals Officials on control operations are well trained on SSOP and HACCP Waste water management systems improved Piloting of computer based traceability Traceability systems introduced for fin fish farms Training on GAP is given to DoF officials, farmers and other stakeholders Feed quality and safety management improved Selected Upazillas are provided with water quality test kits Workshop, seminar coordination and consultation meetings held on GAP/QAP water quality management 	<ul style="list-style-type: none"> Training of newly recruited inspectors on QAP (inspection, documentation, SSOP and HACCP) Inspection protocols based on risks developed through international expert; Trained 40 SFOs/UFOs of 10 shrimp producing districts on NRCP and post-harvest compliances Trained 25 Quality Managers of freezer vessels on SSOP and HACCP and implementation of traceability Prepared a manual for depot owners and ice factory on traceability and hygiene and sanitation 186 depot owners and 9 ice factory owners were trained on implementation of sanitation, hygiene and traceability requirements 23 packing centers and 18 wholesale landing centers trained on compliances Waste Management Manual has been printed- Awareness program on waste management conducted E-traceability framework developed Registration and introduction of Traceability systems for finfish in selected districts; officers of 52 upazilla were trained on traceability and farm registration 10000 farms registered under 12 districts covering 50 Upazillas Developed plan, curricula and training materials for TOT on GAP for extension officers of DoF Pool of trainers on GAP/QAP/HACCP developed Conducted field level training program on GAP for farmers; 34 GAP training programs for shrimp farmers completed and 850 farmers trained up 170 lead farmers identified and trained; lead farmers were further supported through test kits and training Transfer of GAP knowledge to other agencies: WAB Technicians (25 technicians), BRAC branch Managers (25) and Solidaridad field officers (50) Conducted training for feed millers, feed and other aquaculture traders on quality and safety management Compliance manual on feed act and rules and hatchery acts and rules developed through consultation meeting with experts 	<ul style="list-style-type: none"> User Manual for depot owners and ice factory on traceability and hygiene and sanitation Trainers (40) on NRCP and post harvest compliances Inspection protocols based on risks Training Manual on quality assurance programs (SSOP and HACCP) in freezer vessels Trainers (25) on control operations (inspection, documentation, SSOP and HACCP) Waste Management Manual for fish and fishery industry E-traceability framework Training manual on GAP 170 trained lead farmers 10000 registered fish farmers Database of 190,000 shrimp farmers Trained technicians: 25 WAB technicians, 25 Agriculture Extension Field Officers and 25 BRAC branch Managers Compliance manual on Feed Act and Rule Compliance manual on Hatchery Act and Rule 	<ul style="list-style-type: none"> Better food safety compliance against global market requirements Food business operators are aware of food safety requirements Improved internal control systems along supply chain Trainers available for future training as resource persons Better environmental awareness among processors Bangladesh shrimp products are traceable GAP introduced in pilot scale to produce safer shrimps Better awareness among feed millers and hatcheries created Improved feed safety systems among feed millers Improved awareness and visibility 	<ul style="list-style-type: none"> Food safety compliance of aquaculture products leading to higher consumer and buyer confidence Farmers' benefits leading to poverty reduction Improved farming systems (GAP) leading to sustainable shrimp farming and increased productivity

Intervention Logics #08: Target groups of women, youth and children supported for socio-economic improvement through implementation and enforcement of labour law



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Photo Gallery



A Project with
Farm to Fork Approach





Farmer couple trained on GAP



Frozen shrimp from Bangladesh



Shrimp processing operation under HACCP



Laboratory analysts trained on microbiological testing



Stakeholder consultation while developing e-traceability framework



Monitoring of field operations by the Ministry officials



Piloting of GAP in Shyamnagar 21 Jan 2014



Product from the GAP lead farmers pond



Women farmers involved in producing safe shrimp



GAP awareness through Pot-gaan, traditional dance



BEST expert on to the field for training

Programme on EU-Bangladesh partnership through BEST-BFQ



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