



**Impact Evaluation Study
on
The Strengthening of Fish Inspection and Quality
Control Service in Bangladesh (2nd Revised)**



Carried out by
Evaluation Sector
Implementation Monitoring and Evaluation Division (IMED)
Ministry of Planning
Government of the People's Republic of Bangladesh

Conducted by
Development Technical Consultants Pvt. Limited (DTC)

June 2013

Impact Evaluation Study on the Strengthening of Fish Inspection and Quality Control Service in Bangladesh (2nd Revised)

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ACRONYMS

BAEC	:	Bangladesh Atomic Energy Commission
BARI	:	Bangladesh Agricultural Research Institute
BCSIR	:	Bangladesh Council of Scientific and Industrial Research
BFEEA	:	Bangladesh Frozen Fisheries Exporter Association
BFRI	:	Bangladesh Fisheries Research Institute
BQSP	:	Bangladesh Quality Support Programme
CEPD	:	Centre for Export and Product Development
DG	:	Director General
DOF	:	Department of Fisheries
DPP	:	Development Project Proforma
DTC	:	Development Technical Consultants Pvt. Limited
EC	:	European Commission
EEZ	:	Exclusive Economic Zone
ELISA	:	Enzyme-Linked Immune Sorbent Assay
ES	:	Evaluation Section
EU	:	European Union
FAO	:	Food and Agriculture Organization
FGD	:	Focus Group Discussion
FIQC	:	Fish Inspection and Quality Control
GDP	:	Gross Domestic Product
GOB	:	Government of Bangladesh
HACCP	:	Hazard Analysis Critical Control Points
HPLC	:	High Performance Liquid Chromatography
ICT	:	Information and Communication Technology
IGA	:	Income Generating Activities
IMED	:	Implementation Monitoring and Evaluation Division
ITLOS	:	International Tribunal for the Law of the Sea
KII	:	Key Informant Interview
MDGs	:	Millennium Development Goals
MOFL	:	Ministry of Fisheries and Livestock
NORAD	:	Norwegian Agency for International Development
NPD	:	National Project Director
PCR	:	Polymerase Chain Reaction
PL	:	Post Larvae
QAP	:	Quality Assurance Programme
QAQC	:	Quality Assurance and Quality Control
SFIQC	:	Strengthening of Fish Inspection and Quality Control
TAPP	:	Technical Assistant Project Proforma
UFO	:	Upazila Fisheries Officer
UNIDO	:	United Nations Industrial Development Organization
USAID	:	United States Agency for International Development
USFDA	:	United States Food and Drug Administration

Executive Summary

Background:

Fisheries sector has been playing a vital role in poverty reduction, employment generation, export earning and overall socio-economic development of Bangladesh. Fisheries sector contributes 4.43% to the national GDP and 22.21% to the total agricultural GDP (Bangladesh Economic Review 2011). The sector contributed 2.73% of the country's total export earnings during 2010-2011. About 10.5% of the total population directly or indirectly depends on fisheries for their livelihood. Out of the total animal protein requirement of Bangladesh fisheries alone provides 60% of total requirement. Among the exporting commodities, fisheries ranks third position. As export is subject to assurance of quality of the fish product, adequate measures have been taken to improve the status of exportation. To support the quality exportation, two fish Inspection and quality control laboratories have been established during 1975-1976 by the DOF and since then the quality control and inspection system is being implemented in the country. In spite of these initiatives the frozen fishery products from Bangladesh were blacklisted during 1979 by the USFDA due to sub-standard quality of the products. To overcome the problem, a GOB funded project entitled "Establishment of National Fish Inspection and Quality Control" was implemented during 1983 for the facilitation of better inspection and quality control services. During 1995, USFDA and EU insisted for the introduction of HACCP system in the sea food sector. In the meantime, the FAO came forward to assist for the implementation of HACCP system in Bangladesh. Accordingly, a TAPP entitled "HACCP Based Fish Quality Assurance Programme" was implemented by GOB and FAO during 1996-1997. But EC imposed a ban on the importation of fisheries products from Bangladesh in July, 1997 due to non-compliance of HACCP system by the processing industries and inadequate monitoring mechanism by the competent authority. In order to meet the international standard, the concept of HACCP system and its strict implementation, the strengthening of fish inspection and quality control services (SFIQC) project was implemented from July 2005 to June 2010 for assurance of better testing facilities and product quality.

Project objectives:

(i) To strengthen institutional capacity of DOF to upgrade the FIQC services in Bangladesh and to assure the quality and safety of fish/shrimp products in compliance with the ongoing and forthcoming International Food Safety and Trade Regulations; (ii) To comply and implementation of HACCP and traceability system in all steps from pre-harvesting management to post-harvest product processing chain up to export level through up gradation of on-farm and in-plant own check system; (iii) To improve the quality and food safety of shrimp and fish products through value addition, preventing contamination and assuring hygienic measures in all stages of productions, harvesting and preservation, handling, transportation, processing, storage and export; (iv) To modernize two fish inspection and quality control laboratories with a standard of international accreditation level and to renovate and modernize the existing laboratory facilities with required modern equipment for micro-level identification of contamination concerning food safety issues; (v) To create general awareness regarding food safety and quality of fish/shrimp products and efficiently train all relevant stakeholders in order to implement food safety measure through various training, workshop, seminars and other mass communication; (vi) To improve the socio-economic conditions of poor destitute especially involving the women by generating employment opportunity at various steps in the chain of production and export of fish/shrimp products; and (vii) To sustain in the international food business market through increasing export of good quality and safe fish/shrimp product as per consumer's demand and increase export earning to achieve the MDGs.

Objectives of the assignment:

(i) To review the implementation status of the project in respect of: (a) financial aspect; b) existing functional status of fish inspection and quality control laboratories; c) institutional capacity development of DOF; d) improvement and general awareness of food safety and quality of fish/shrimps products; (ii) To review compliance and implementation status of HACCP

and Traceability system in all stages; (iii) To assess impact of the project activities in relation to employment of destitute especially women; (iii) To identify the strengths, weaknesses and threats towards project activities; (iv) To recommend measures for continued sustainable international demand for fish/shrimps products and improved management of project activities in future and similar other project in the country.

Methodology

Project Group Survey Design: A total of 1689 representative samples of beneficiary was determined using 95% confidence level with maximum 4% margin of error.

Non-Project Group Survey: A total of 844 (around 50% of the project group) respondents were selected on the basis of similar nature of works in terms of fish production and processing by using simple random sampling methods based on activities of fisheries.

Instruments used for data collection and Respondents: (a) **Project Group:** The questionnaire covering project beneficiary (fisherman, depot, ice plant, processors includes destitute women) had been filled in by a set of pre-designed questions in project upazila. (b) **Control Group:** The formats covering non-project respondents have been filled in through a set of pre-designed questionnaire other than project upazila; (c) **Focus Group Discussion:** Total 6 Focus Group Discussions (FGDs) each with 20 participants were conducted; (d) **Key Informant Interview (KII):** A total of 12 Key Informant Interviews were organized generally regarding project strengths, weakness and threats etc; (e) **Capacity and Skills Assessment:** A total of 1200 respondents who received training from the project was interviewed; and (f) **Physical Observation and Inspection of Functional Status of Fish Inspection and Quality Control of 3 Laboratories:** Physical verification of the laboratories has been undertaken and inspection was carried out regarding functional status of 3 laboratories using pre-designed checklist.

Implementation and Data Management Plan:

Necessary data were collected by using the above-mentioned instruments from different locations of Dhaka, Chittagong and Khulna division during March 19 to April 07, 2013. A total of 16 enumerators and 3 supervisors were involved in data collection. The consultant and supervisors were responsible for FGD, KII and Physical observation of FIQC laboratories and monitoring and supervision of data collection activities. After collection of raw data, it was screened, cleaned and coded for data entry, processing and analysis.

Major of Findings of the Study

Status of Project: The project was initially planned to implement for a period of five years starting from January 2004 to December 2008 with a total cost of BDT: 4338.83 lakh but the duration was reduced later from 5 years to 3 years (from July 2005 to June 2008) with a reduced budget of BDT: 3851.52 lakh. But actually the project was completed in June 2010 with further 1.5 years extension.

Status of Financial Management of the Project: Almost 96.73% (BDT 36.50 crore out of BDT 37.73 crore) budget of the project was utilized efficiently and effectively.

Functional Status of FIQC Laboratories: The major findings of physical observation regarding the current status of construction and up-gradation works of the laboratories have been presented below:

- DOF completed construction of two new FIQC laboratory buildings during the year 2008. Fitting, fixing, installation and training on the new equipment was completed during early 2010. All works and facilities under Chittagong and Khulna FIQC laboratories were observed similar in nature and good conditions excepting few equipments which were out of order.
- The existing facilities of the laboratories were limited to: (i) Microbiological Test, (ii) Organo Leptic Test, (iii) Dryness Test, and (iv) Chemical Test that includes only TVN, TVBN, Hypoxanthen and Tri-methylamine. Laboratories have been updated with additional facilities to handle diverse nature of test such as: (i) Heavy Metal Test (ii)

Antibiotic Test; (iii) Pesticide Test; (iv) Hormone; and (v) Bacteria & Mesophiles Test. As such, FIQC laboratories now can provide testing services of international reputation.

- The laboratories of Chittagong and Khulna were yet to start chemical testing. The construction works was delayed 7 months from the actual completion time.
- All laboratories were found to meet the present demand of 75-80 microbiological tests and 10-15 chemical tests per day. Dhaka laboratory has been rendering services of chemical and microbiological tests as per requirement of the processing industries
- All laboratories have adequate skilled manpower to meet the present demand of customers. The current capacity of the laboratory was found almost 4 times (1500/month) to that of the previous capacity
- Overall revenue earning of the DOF has increased from BDT: 50 lakh to 410 lakh.
- Because of quality test of FIQC laboratories shipment rejection rate has been decreased from 54 to 1. In addition, EU has also withdrawn mandatory 20% sample re-testing.

Impact Analysis of Quality Assurance, Export and Poverty Reduction

Level of Knowledge of Respondents on FIQC Laboratories: Around 81.8% (1228) and 68.6% of both beneficiary-1 & 2 under project group replied in affirmative regarding their knowledge of FIQC laboratories as compared to 13.1% (99) and 9% in control group. Similar trends of results have also been found on quality control measures. Around 89.4% of the respondent of beneficiary-2 under project group replied in affirmative regarding their understanding of the project and subsequent modernization of the respective laboratories as compared to only 9.1% in control group. Similar trends have also been observed in the increment of export earnings (58%) and acceptance of laboratory testing at international markets (79.3%) but the same was found only 10% in control group. It is revealed that project intervention has increased the level of knowledge regarding food safety and quality, income and export earnings but rarely any impact on production.

Changing Capacity and Management: A total of 69.7%-75% beneficiary responded positively regarding the training and capacity enhancement while none responded from the control group. From the above it can be concluded that project intervention has impacted positively on enhancing the level of technical knowledge and skill of the FIQC officer.

Food Safety and Quality of Fish/Shrimp Products: A total of 78% (1171) and 79.3% of both beneficiary-1 & 2 from the project group indicated positive response regarding the attainment of proper postharvest management and knowledge whereas the same was noticed as 49.2% (372) and 33% in case of the control group. Similar results have also been shown in case of the importance of FIQC laboratories, acceptance of certificate at the international level and decrease of consignment rejection and withdrawn of mandatory test wherein 66% respondents replied affirmatively compared to 9.1% in control group. It has also been found that 79.3% respondents of project group realized the necessity of the compliance of HACCP system to ensure export of shrimp products as compared to only 20% in control group. Regarding the status of training provided on HACCP system, 54.3% respondents replied in negative under project group whereas the same was noticed as 90.9% in control group.

Changing Scenario of HACCP and Traceability Implementation: About 56.4% respondent has the required skills of FIQC laboratory and received training on HACCP compliance. In terms of knowledge and training on HACCP compliance, project group showed a significant improvement comparing to that of control group. Similar trend of result has also been found in case of traceability which is 74.6% (1120) as compared to none in control group. In view of the above, the changing scenario of the improvement of human resources development particularly for the HACCP compliance is apparently visible.

Change of In-Plant "Own Check" System: Around 76.1% respondents have adequate knowledge on quality control of their own organization after the project intervention as compared to only 10% in control group. Similar results (73.9%) have also been seen in case of the importance and method as compared to 9.1% in control group.

Change of Idea about Product Development and Foreign Currency Earning: Only 48.4-59.3% (890) respondents of both categories of Beneficiary-2 replied regarding the impact of project on value added product development positively whereas none responded positively in control group. Only 40.8%-74.5% of both beneficiaries have received support (training and awareness campaign) from the project as compared to none in control group. Around 58% of project respondents reported to have increased foreign exchange earnings. Similarly 65% incidence of increased income was noticed. But there has been insignificant (18%) increase of product development idea of beneficiary-1 after the program compared to only 16.4% (124) in control group.

Status of Beneficiary-2 Organization: Around 51% respondents have given positive reply on staff training from the project as compared to 100% of normative in control group. While asked whether their skills have increased due to training, 76.1% beneficiary replied positively compared to 100% of normative in control group. While it was asked whether their organization has been approved from any authority almost 87% has confirmed that they have been approved from DOF as compared to none in control group. None of the project group and control group organization has any child labor in their organization.

Present Status of Fish/Shrimp Production of Beneficiary-1

Only 10% family owned more than 2 acre pond/gher before the project as compared to 29% after the project. No major variations were observed in control group either before or after the project period (15% only). This change of pond/gher size indicated positive impact of the project. No significant variations were observed either during before and after project even in control group with regards to production. But most of them (77.4%) opined that project has no impact on production increment but few, 34.3% (515) has still been facing problem to sell their products.

Impact on Employment and Poverty Reduction:

Employment Generation: Most of the respondents (84%) have told that there has been considerable increase of employment opportunities after the intervention of project. Manifestation of the increases in processing plants was around 61.5%, fish/shrimp farm around 22.2% and Income Generating Activities (IGAs) around 16.2%. Similar trends of result have also been found in socio-economic status improvement and women employment. Almost similar types of results have also been found in case of beneficiary-2;

Impact on Income and Poverty Reduction:

(a) Changes in Level of Income Flow: The data indicated that the average gross annual income of beneficiary-1 household has been found to increase up to 55% under the income range of BDT 75,001- lakh and 34% under the income range of BDT above lakh after project intervention. Among the respondents of beneficiary-2 the depot owners represented the highest income gain after project intervention than any other groups. In case of the processors, the income increased up to 100% under the income range of BDT: 51 lakh and above after project interventions; The World Bank defines extreme poverty as living on less than US\$1.25 per day, and moderate poverty as less than \$2 a day.

(b) Changes in Average Annual Expenditure Flow: Around 51% (766) to 89% (1335) of respondents of beneficiary-1 family consumption related expenditure has increased from 10,000-25,000 taka to 75,001 to 1 lakh taka after project intervention. Similar results have also been found in beneficiary-2 where all cases exhibiting 10%, 7%, 1%, 10% and 6% under the expenditure range of BDT 16 to 30 lakh. Besides, an increment of expenditure has been recorded as 15%, 10%, 27, 10%, 2% and 2% in all cases under the expenditure range of BDT 31lakh and above group excepting family maintenance. This apparently indicated an increase of annual income flow leading to increased expenditure for further betterment;

(c) Project Impact on Daily Food Intake: According to WFP, poverty used to determine based on the percentage of the population eating less food than is required to sustain the human body (approximately 2000–2500 **calories** per day). Around 79% of households family of project group cooked food twice in a day while rest 21% family members has found thrice in a day as compared to 70.3% of households family cooked food twice in a day while rest 29.7% family members has found once in a day before the project. The highest 99.8% respondents of project

group have stated that they eat food three times as compared to 70.3% before the project and 72% in control group. Around 99.8% of the project group has opined that they don't have any experience of food shortage/deficit in a year as compared to 26.1% in control group. Around 46.8% of the project group respondents have opined that they eat fish everyday followed by three days 34.2% while 34.3% of the control has opined same view followed by three days 9.7%. All respondents (1501) are above absolute poverty as their food intake range is above 2000-2500 calories.

Impact on Women Empowerment: The results indicated a level of women consciousness as high as 98.8% for project as compared to 58% for control group. The level of women consciousness in all respects except property rights (17%) has increased by 40% for project households as compared to 2% for control.

Impact on Environment: All respondents (100%) confirmed that project has no negative impact on environment and 68% of respondents confirmed that the project ensured environmental friendly working condition for the staff. Regarding by-product utilization, only 11% respondents have opined positive reply while majority indicated no knowledge. The most important issue of food quality and safety such as traceability, respondents have some knowledge (74.6% -1120) as they received training on that almost similar types of results have also been noticed in case of beneficiary-2.

Assessment of Skills and Capacity: Necessary data were collected from 1200 trained beneficiaries including laboratories personnel (30), processors (40), depot owners (200), ice plant owners (30), middleman (100) and shrimp farmers (800) and analyzed so as to assess their improvement in skill and capacity buildings. It appeared that a total of 21,992 participants were trained during the project period. Of these 37 were from abroad and 21,885 were from in-country. Besides, 471 and 111 participants attended awareness meeting/seminars and conferences in different topics.

Major Areas of Training: It appeared that very important subjects relating to processing, quality control, improved production and management of HACCP and traceability systems were included among the training programs. All of these have enhanced the capacity building of the stakeholders regarding quality product development and diversifications. Survey data indicated that 62.53% of the members were found to be aware about the available training facilities. .

Impact of Training: It appeared that 100% FIQC laboratory officials improved their efficiency relating to the service delivery and similar trends of results have also been found in other stakeholders.

Role on Fish/Shrimp Exportation: It is evident that the role of FIQC laboratory has been increased up to 100% after receiving the training whereas in other sectors remarkable improvements have also been noticed.

Status of Skill Development: Skill achievement through production technology and postharvest technology was found higher in case of fish farmer (96% and 86.5%) and depot/supplier level (80.5%). The skill development of the processors, middleman and ice plant owners was also found increasing.

Status of the Training Knowledge on HACCP: The highest numbers of processors received training on the HACCP system (96.8%). All of these represented a positive indication towards the benefit gained from the project.

Impact of the Traceability and HACCP skills on Export Earnings: The results relating to the status of knowledge on the implementation framework of traceability indicated the positive trends in all cases (100%-33%). Above all, the project played a very significant role regarding the development of technological knowledge for quality assurance and increased export earnings.

Findings of the Focus Group Discussion (FGD): Six (6) FGDs were conducted and the major findings of the results of the FGD are given below:

- i. Among the respondents participated in the FGD under all six project areas, opined that quality and food safety has ensured from the production to processing and shipment. This

- finding revealed that the HACCP in the project areas were being efficiently used for exporting fish/shrimp products to the overseas country.
- ii. All the respondents said that the construction and up-gradation works of the FIQC laboratories in Dhaka, Chittagong and Khulna were of international standard.
 - iii. Currently Dhaka laboratory has been performing microbiological and chemical tests whereas Khulna and Chittagong laboratories have been conducting only microbiological test.
 - iv. Most of the participants expressed their happiness regarding the quality of training received on HACCP and traceability system but desired more intensive training.
 - v. Fish farmers stressed on more support from DOF and BFRI regarding production technology.
 - vi. Regular repair and maintenance of the laboratories equipments is difficult without any provision of yearly services contract from the respective venders and more financial delegation to laboratory authority.
 - vii. All laboratory equipments except few were very good quality for sample testing and all lab personnel were also well trained to ensure international standard of testing.
 - viii. All the participants agreed that laboratories were of international standard and will get approval of international accreditation soon. Because of quality enhancement shipment rejection rate has been decreased from 54 (2009) to 1 (2011 & 2012).
 - ix. All laboratories are earning economical benefit in the form of service charges.
 - x. Exportation of fish and shrimp products suffered very badly in the past and sometimes received imposition several times from the importing countries until modernization of the laboratories. But now such obligations have been withdrawn and EU has also withdrawn mandatory 20% sample re-testing.
 - xi. Fish and shrimp production has been increased but at the same times also facing some problems like low productivity and environmentalist threats
 - xii. Modernization and up-gradation of the laboratory facilitated sustained and increased export rate and foreign exchange earnings but still there is a need to have a good business plan for the development of value added product
 - xiii. Production enhancement is needed through the introduction of low cost fish and shrimp production technology, so as to ensure easy and steady flow of raw materials to the processing plants.
 - xiv. The project intervention has lead to an increment of fish and shrimp production and export earnings in the tune of 10-20%. Revenue earning of the laboratories has increased up to 200%. Besides, daily income of fish farmers has also been increased from 100-200 BDT.
 - xv. Modernization and up gradation of laboratories and introduction of HACCP and traceability system in the culture system have extended the field of employment generation
 - xvi. The socio-economic condition of the people has been improved to a greater extend after project intervention.

Findings of the Assessment of Strengths, Weaknesses and Threats of the Project

Assessment of the Strengths and Weaknesses of the Project: The major strengths and weaknesses identified by the KII are discussed below:

Strengths of the project

- **Renovation and Modernization of Existing FIQC laboratory Facilities:** Reconstruction of Dhaka laboratory and two new FIQC laboratories have been built with all facilities in Khulna and Chittagong to the international accreditation standards. Along with the strengthening of FIQC (Dhaka, Chittagong and Khulna) three new sub-stations for FIQC (Benepole-Jessore, Cox's Bazar and Satkhira) have been built through this project. All the laboratory personnel have received in-country and overseas training on different aspects of quality assurance.
- **Compliance and Implementation of HACCP and Traceability system in all stages from production to export:** The frame-work for HACCP and traceability has been developed and implemented.

- **Strengthen human resources development to carry out proper testing and inspection of Fishery products especially shrimps:** A total of 37 senior officials of DOF/MOFL including laboratory personnel have been trained abroad for a period of 2 weeks. In addition, a total of 21,885 target groups have also received 1-3 days training on different topics including HACCP and traceability.
- **Up-gradation of In-plant “Own Check” system to ensure product quality and safety:** About 74 processing plants have established/upgraded its in-plant “own check” system to ensure product quality and safety.
- **Increased Export Earning through Quality Assurance and Product Development:** Trained manpower of the DOF can ensure product quality and safety which is necessary for export earnings. Rejection has decreased from 54 to 1 shipment and export has increased around 10-20%.
- **Raise Awareness on Environmental aspects and by-product utilization:** A good number of awareness workshops on environmental aspects have been conducted and training program was organized which has increased awareness on environment friendly by-product utilization.
- **Improved socio-economic conditions of target group’s especially women through awareness creation and lobbying:** Now women are fully aware about their rights, can deal their right with senior. As production and export has increased thus family income of the target group has also been increased thereby improving the socio-economic condition of the target group.

Weaknesses of the project implementation process

- **Approval of International Accreditation Standard:** International accreditation standard approval is yet to receive.
- **Chemical Test:** Only Dhaka FIQC laboratory can deliver both tests whereas Khulna and Chittagong can undertake only microbiological tests in-spite of passing 2.5 years of project implementation.
- **Regular repair and maintenance:** Around 8-9 equipments are out of order and are unable to repair due to lower financial authority. As such, authority needs more financial delegation.
- **Insufficient Training:** The training duration and focus was not enough to educate the shrimp/fish farmers.
- **Delay completion of construction works:** The construction works was delayed about 7 months.
- **Benchmark Survey:** There was no baseline data of the project.

Threats of the Project

- **Low Productivity of Shrimp/Non-availability of Raw Material for the Processing Plants:** Present production need to increase from 300 kg to 1500 kg/hectare.
- **Shrimp Zone:** Demarcation of the exclusive shrimp production zone is needed for better exporting system.
- **Common Landing Station:** At present there is no common landing station in the shrimp production areas. Thus authority needs to take necessary action for common landing station for shrimp.
- **Inadequate planning and intervention at costal area:** Detailed costal area intervention plan need to be prepared upon conducting feasibility study with the representative of the relevant departments.
- **Environmental intervention:** Joint cost-benefit and environmental study is needed to stop unplanned intervention in the sector.
- **New test requirement:** Provision should be made to tackle new threats of test and equipments.

- **Availability of Disease Free PL of Shrimp:** The government needs to ensure healthy, quality and disease free Post Larvae (PL) supplies of shrimp through registered hatchery for better production.

Assessment of the Sustainability of the Works

The major findings of the assessment are discussed below:

- **Quality of the works:** All the project management personnel including consultants of UNIDO have ensured the quality control and management of the materials, quantity and timeliness of the works.
- **Durability of the works:** Maximum 100 years durability period for newly constructed laboratory buildings and maximum 10 years durability for laboratory equipment is considered subject to regular repair and maintenance.
- **Sustainability of the Project:** All three laboratories have been earning revenue for government and to facilitate more exportation. As such, it is very much needed to run these laboratories by any cost.
- **Management:** This is a very successful project which is giving desired benefit to the target group as well as country regarding foreign exchange earnings.
- **Cost-effectiveness of the works:** As FIQC laboratory has been earning 1.5 cores to 4.5 crore taka per annum so the establishment cost of FIQC seems to be minimum compared to the benefit earned. More scopes are existed for higher income provided all the laboratories can run to their highest level.

Recommendations: The major recommendations regarding the project are given below:

- **Approval of International Accreditation Standard:** Immediate actions need to be taken to get International accreditation standard.
- **Chemical Test:** Chemical test at Khulna and Chittagong laboratories need to be started immediately.
- **Regular Repair and Maintenance:** All repairing and maintenance works needs to be done under the service contract. Flexibility and more financial delegation are needed for this purpose.
- **Training:** Training program having longer duration i.e. 3-5 days duration along with elaborated subject matter need to be organized for the target group.
- **Project Design:** Too much revision and changes may cause delay in implementation. This trend should be avoided in future planning. Besides, feasibility study of the project may be carried out before final formulation.
- **Avoidance of Additional Time of Implementation:** Delay of the project implementation should be avoided.
- **Stuffing Facilities at the Renowned Processing Plant Premises:** More attention is needed for arranging stuffing of shrimp at the processing plant based on the previous record of the industry.
- **Raw Materials Availability and Product Diversification:** More research on production and product diversification technology is needed for steady flow of raw materials to the shrimp processing plants.
- **Shrimp area Zonation:** Shrimp area should be demarcated and a separate zone be declared immediately for production intensification and increased export earnings.
- **Landing Station Strengthening:** Landing stations need to be up graded to ensure fair price and better quality.
- **Biodiversity conservation:** Problem regarding bio-diversity need to be resolved through joint investigation involving the concerned Departments and shrimp farmers.

- **Branding of Unique Quality of Shrimp:** The government needs to take immediate step for branding unique item of shrimp origin.
- **Autonomous Body:** As per international accreditation standard, FIQC should be autonomous body of DOF.
- **Updating of Fish Farmer Registration:** The database of the 190,000 registered fish farmers need to be maintained, monitored and updated regularly.
- **New Project on Shrimp Productivity:** Immediate actions are very much warranted for undertaking more new project on shrimp for production intensification and diversification.
- **Availability of quality water:** The authority needs to take immediate step to ensure the availability of quality water with required depth for shrimp production.
- **Baseline Information:** Project should have baseline data for impact assessment.

Conclusion: BQSP-SFIQC is an ideal example of EU aided project of the Government of Bangladesh that can be replicated in other departments so as to ensure quality of food for local consumer.

- The project has succeeded in achieving its target to sustain export of shrimp/fish in the international market and such beneficial effects on the target/ target groups are still visible.
- Modernization of three FIQC laboratories up to the international accreditation standard is well established.
- Training programs for laboratory activities, HACCP and traceability facilitated the DOF personnel and beneficiary for the development of skills to ensure quality of shrimp products from production to export.
- The project has significantly positive impact on increasing export, income, capacity of DOF, women's empowerment and raising awareness on food safety and quality leading to increased export of the country and improved livelihood of the beneficiary.

CHAPTER 1 BACKGROUND AND OBJECTIVES

1.1 Background

Bangladesh is endowed with vast inland water resources inhabiting varieties of fish and shrimp species. While the pressure on arable and grazing lands has been increasing parallel with the geometric progression of human population, the scope for increased crop and livestock production from such scared land is not so bright. To the contrary, the scope for increased fisheries production from wide spread water resources is quite bright. As a result, fish and fisheries are being considered as an indispensable part of livelihood security from time immemorial. It is an element of our cultural heritage.

Fisheries sector has been playing a vital role in poverty alleviation, employment generation, foreign exchange earnings and nutrient supply leading to socio-economic development of Bangladesh. It contributes 4.43% to the national GDP and 22.21% to the total agricultural GDP (Bangladesh Economic Review 2011). Among the exporting commodities, fisheries rank third position. During 2010-2011, fisheries contributed 2.73% of total export earnings. Fish alone has been providing about 60% of animal protein in our daily dietary requirement. The average growth rate of this sector during the last three years was 6.11%. About 10.5% of the total population is directly or indirectly involved in fisheries sector¹. Considering the resources availability, fisheries have the highest prospect for future development. Because of the enormous importance of the sector, Department of Fisheries has been implementing different development projects for maximum sustainable utilization of fisheries resources to ensure food security.

Due to high demand of fish and shrimp in the international market, the country has been exporting shrimp and fisheries products since independence.

After independence 15 fish processing plants were operated in private sector. During the last 30 years, fish processing plants in the country have shown an impressive growth, which currently accounts to 96 in number. In the meantime the export earnings have also been increased from BDT 23.80 million in 1971-1972 to BDT 46,038 million during 2010-2011 (DOF 2012). During the year 1999-2000, a total of about 39.5 thousand MT of shrimp and fisheries products were exported wherein the share of shrimp alone was about 89% (DOF 2012). The export growth of fisheries products showed an increasing trend in the recent past and the same as we believe would be maintained during the coming days through the intervention of comprehensive efforts for greater benefit of the sector.

The demand of Bangladeshi fisheries product has been increasing with the advent of time and technological advancement. Different technologies have been evolved to develop the quality product so as to satisfy the long pending demand of the international market. For this reason, two Fish Inspection and quality Control Laboratories one each at Chittagong and Khulna have been established during 1975-1976 through a GOB financial assisted project at a total cost of BDT: 15.0 lakh and since then the quality control and inspection system is being implemented. In 1979, the frozen fishery products from Bangladesh were blacklisted by the United States Food and Drug Administration (USFDA) due to sub-standard quality of the products. It incurred a heavy loss in the form of shipment rejection. To overcome the problem, a GOB funded project entitled "Establishment of National Fish Inspection and Quality Control" with a total cost of BDT: 61.09 lakh was implemented during 1983 for better facilitation of inspection and quality control services. The project facilitated the procurement of standard equipment and machineries for the laboratories of Chittagong and Khulna for strengthening

¹ Fisheries Statistical Year Book 2010-11

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their quality control measures. Under this project fish inspection and quality control station at Dhaka was established. Due to lack of infrastructure facilities the Chittagong laboratory could not be operated until 1986-1987. Following this, the fish inspection and quality control laboratory of Chittagong brought into functional (DPP SFIQC, 2007) through the implementation of Technical Assistance Project with a cost of BDT: 24 lakh under the support of Food and Agriculture Organization (FAO) of the United Nations.

During 1995, USFDA and EU insisted for the introduction of HACCP system in the sea food sector. In the meantime the FAO came forward to assist for the implementation of HACCP system in Bangladesh. Accordingly a TAPP entitled "HACCP Based Fish Quality Assurance Programme" was implemented by GOB and FAO during 1996-1997. The project provided technical assistance for human resource development in the sector (DPP SFIQC 2007).

But EC imposed a ban on the importation of fisheries products from Bangladesh during July, 1997 due to non-compliance of HACCP system by the processing industries and inadequate monitoring mechanism by the competent authority. The government tackled the situation through a special measures and extended supports for infrastructure improvement so as to meet importer's requirement (DPP SFIQC 2007). In order to meet international standard, the concept of HACCP system and its strict implementation the SFIQC project was implemented to fulfill the food safety and quality of the fish products.

In the meantime, selected processing plants and Fish Inspection and quality Control Laboratories of the Department of Fisheries were upgraded to some extent. Based on these the EC inspection team visited some of the renovated plants and FIQC Laboratories and eventually the ban was lifted by EC from 1st January, 1998. Since then, the declined export earning has been increasing gradually and steadily. Due to the introduction of HACCP and "in plant own check" system until now 74 processing plants out of 96 running plants have received approval from EC to export their product to EU countries (DPP SFIQC, 2009).

At present the processing plants and the competent authorities have been trying their best to comply with most of the EU requirements but still further assistance for the development of whole chain of operation from culture to processing to implement HACCP system is very much needed. Steps have so far been taken in the form of the modification of Fish Inspection and Quality Control Rules, considering the EU directives and other international requirements in 1997. Accordingly, compliance of HACCP system and its implementation by the processing plants in all stages of the food processing chain from harvesting to final product would be maintained to ensure and stabilize the export market.

During the second half of 2009, GOB, in consultation with the exporters, imposed a six month voluntary ban on the export of fresh water shrimp to the EU, because of the increased frequency of rapid alerts. SFIQC supported the MOFL, and cooperated with other donors and technical agencies to form a national committee to prepare and implement a plan to overcome the problem of banned in exportable shrimp so that exports could be resumed in the shortest possible time. Though the lifting of the ban, planned for November 2009 was postponed, but with the concurrence of the EU inspectors, exportation was resumed in January 2010.

1.2 Project Summary

1	Name of the Project	Strengthening of Fish Inspection and Quality Control Service in Bangladesh(2 nd Revised)"
2	Sponsoring Ministry	Ministry of Fisheries & Livestock
3	Executing Agency	Department of Fisheries (DOF)
4	Donor Agency	European Union
5	Location of the	All over Bangladesh

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Project							
6	Estimated Cost	Original Cost		1 st Revised Cost		2 nd Revised Cost	
		4338.83 lakh Tk.		3851.52 lakh Tk.		3773.31 lakh Tk.	
		Taka	Foreign Currency	Aid (TK)	Taka	Foreign Currency	Taka
		931.87	3406.96 Tk	2657.02	1194.50	2657.02 Tk	1116.29
7	Implementation Period			Date of Commencement		Date of Completion	
		Original		January 2004		December 2008	
		1 st Revised		July 2005		June 2008	
		2 nd Revised		July 2005		December 2009	
		Actual		July 2005		June 2010	

1.3 Project Objectives

Objectives of the project are to:

- (i) strengthen institutional capacity of Department of Fisheries (DOF) to upgrade the fish inspection, and quality control services in Bangladesh and to assure the quality and safety of fish/shrimp products in compliance with the ongoing and forthcoming International Food Safety and Trade Regulations;
- (ii) comply and implementation of HACCP and traceability system in all steps from pre-harvesting management to post-harvest product processing chain up to export level through up gradation of on-farm and in plant own check system;
- (iii) improve the quality and food safety of shrimp and fish products through value addition, preventing contamination and assuring hygienic measures in all stages of productions, harvesting and preservation, handling, transportation, processing, storage and export.
- (iv) modernize two fish inspection and quality control laboratories with a standard of international accreditation level and to renovate and modernize the existing laboratory facilities with required modern equipment for micro-level identification of contamination concerning food safety issues;
- (v) create general awareness regarding food safety and quality of fish/shrimp products and efficiently trained all relevant stakeholders in order to implement food safety measure through various training, workshop, seminars and other mass communication;
- (vi) improve the socio-economic conditions of poor destitute people especially involving the women by generating employment opportunity at various steps in the chain of production and export of fish/shrimp products; and
- (vii) sustain in the international food business market through increasing export of good quality and safe fish/shrimp product as per consumer demand and increase export earning to achieve the MDGs.

1.4 Components of the Project

Following activities were undertaken to achieve the objective:

- (i) **Modernization of Existing Laboratories:** Under the component, existing system of FIQC lab was upgraded with modern equipment, machinery, chemicals, glassware and other ancillary facilities and FIQC personnel and lab personnel was trained. In addition,

establishment of procedures or methods to find out various parameters of aquaculture residues in water, fish, and shrimp etc.

- (ii) **Quality Assurance:** This was established strategies and modalities for upgrading the quality of products through ensuring the proper post harvest handling at site and depot. Measures were taken to ensure freshness for raw materials through improving the transportation system. The infrastructure facilities of depot regarding water supply system, drainage facilities, primary grading and packing system was developed to save raw materials for post harvest contamination.
- (iii) **Product Development:** Due to decreasing of block frozen product, strategies and modalities were set for developing and producing new types of various value added products to enhance the foreign exchange earnings.
- (iv) **Development of in-plant quality control system:** The component provided training and study, meeting and seminar to enable the people to perform better 'own check' system to ensure quality products.
- (v) **Human Resources Development:** The component activities consisted of the following:
 - (a) **Compliance to HACCP:** The component activities involved training, workshop and seminar for human resources development both of the public and private sector so as to comply the HACCP system.
 - (b) **Training:** provided support to adopt HACCP system and ensure products quality both short and long-term.
 - (c) **Women Empowerment:** The women and destitute poor people engaged in fish production to exporting stages were empowered
 - (d) **Study Tour:** Study visit organized in buyers country and within the country
 - (e) **Consultative Meeting:** Organized to facilitate exchange of view and adoption of latest technology for policy level GOB personnel and top management personnel of processing industries
 - (f) **Monitoring and Evaluation:** Both internal and external monitoring observed to follow up activities to achieve project objectives.
- (vi) **Capacity Development:** Strengthened institutional capacity in increasing the appropriate manpower position for effective and efficient monitoring
- (vii) **Management Development:** Formulated a plan for designing and renovation of existing fish processing plants based on international standard
- (viii) **Support Services:** Provided support services in kind and technical assistance to the private sector specially in critical areas of quality assurance
- (ix) **Results and Investigation:** A task force independently conducted research and investigation of probable risk in different stages of HACCP implementation for quality assurance

1.5 Overview the Functional Status of FIQC Activities of DOF

The main problem facing governments and the fish industry of the country is to comply with foreign consumer expectations, particularly on quality assurance. A lack of adequate infrastructure and technical expertise often translates such defects of quality assurance. . These, in turn, result in the loss of millions of dollars of foreign exchange earnings every year because of rejection and low prices for exports into the international markets. In view of these, DOF has set up FIQC wing to strengthen the quality assurance in the form of internal and external monitoring of the product so as to enhance foreign currency earnings.

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The FIQC of the DOF is headed by the Principal Scientific Officer supported by three Deputy Directors at three divisional laboratories. The DD is supported by the required numbers of office, field and lab level skills officers and staffs for quality assurance of exportable fish and shrimp products. The FIQC organogram of the DOF has been furnished below in Figure 1:

Figure 1: Organogram of FIQC under DOF

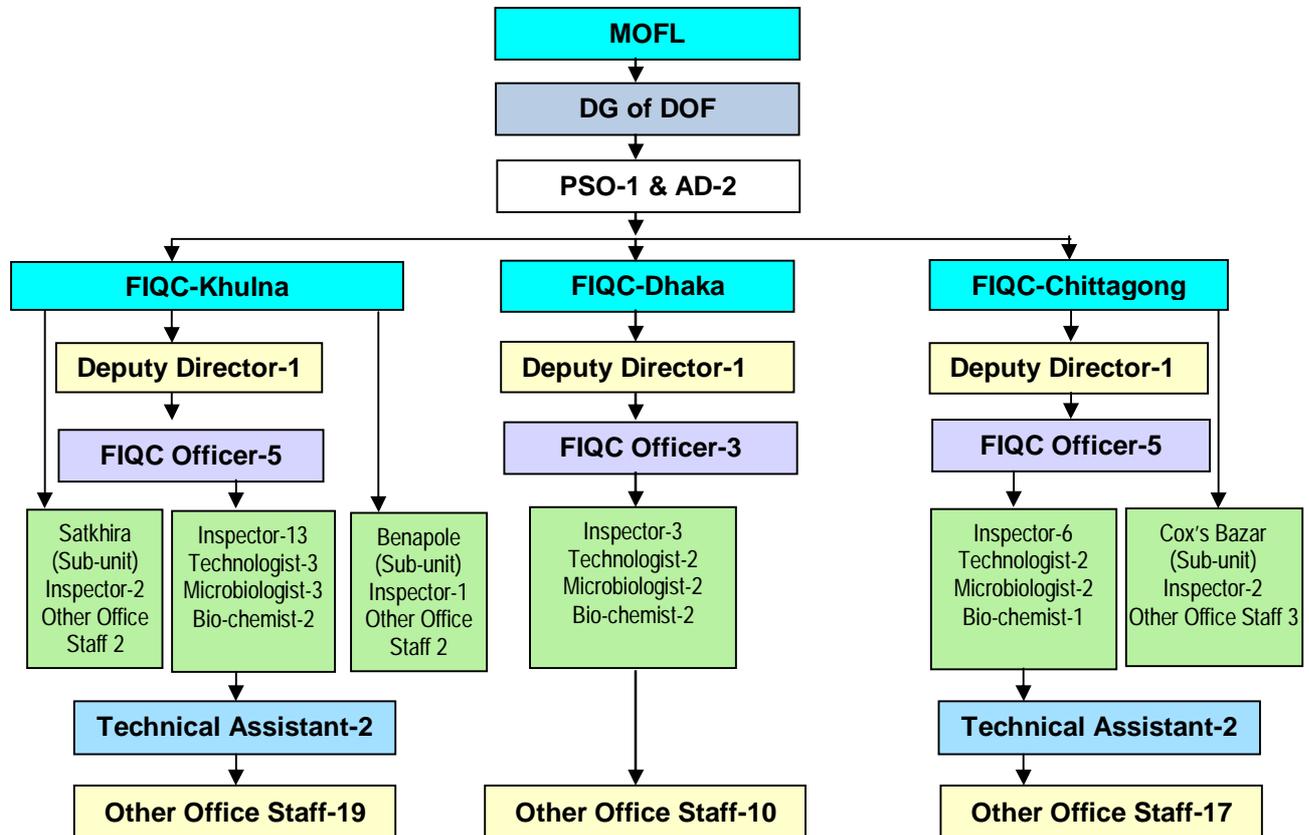
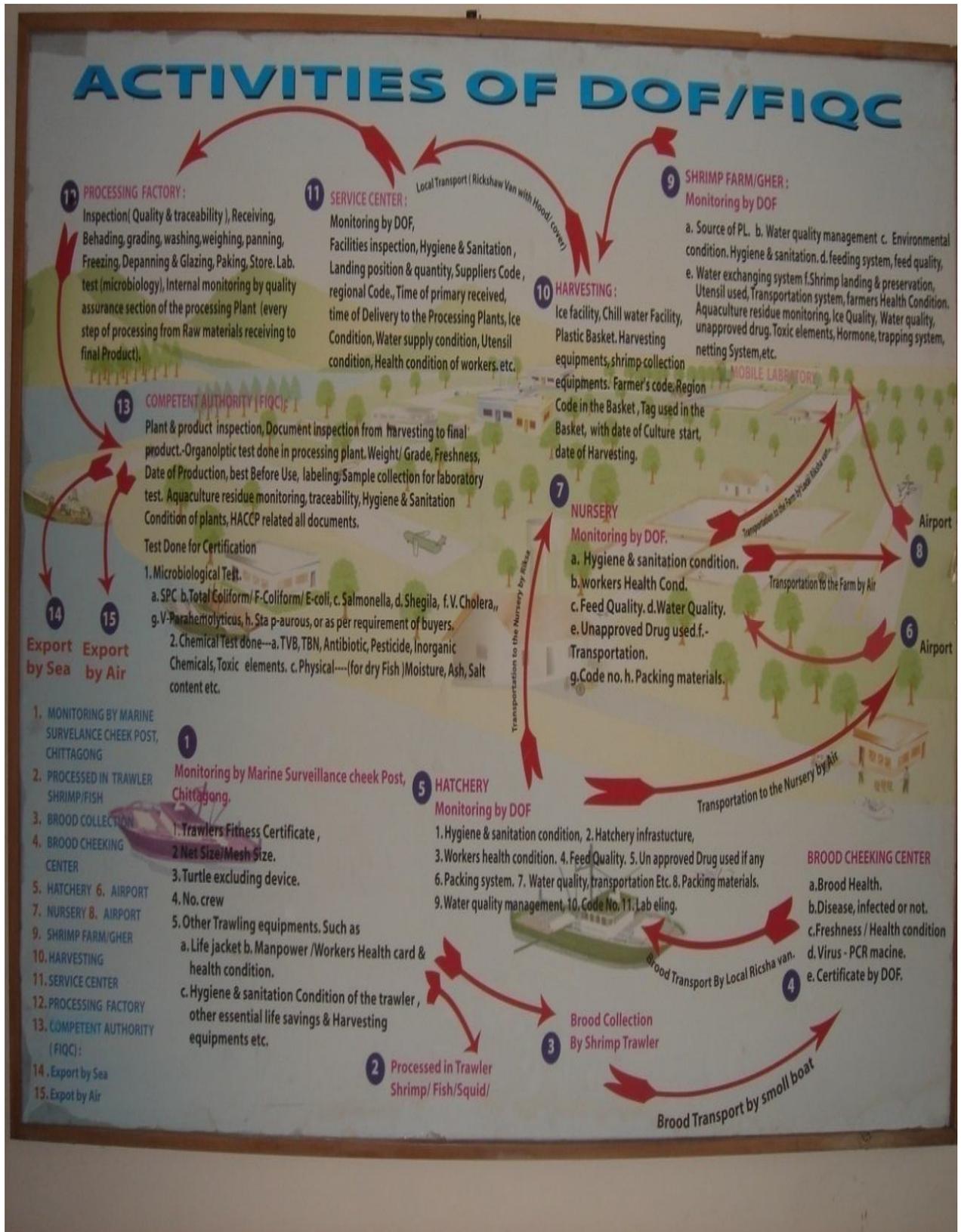


Figure 2: Activities of FIQC-DOF



1.6 Better Work and Standard Programme-Better Fisheries Quality (BEST-BFQ)

Better Work and Standards- Better Fisheries Quality (BEST-BFQ) is a program funded by European Union, NORAD and Government of Bangladesh and implemented by United Nations Industrial Development Organization (UNIDO). This is a follow up program of Bangladesh Quality Support Program (BQSP) which was implemented during 2005-10. BEST-BFQ is a unique programme with farm to fork approach focusing on strengthening the national fisheries quality infrastructure of Bangladesh.

During BQSP, the national testing capabilities and inspection system of the shrimp industry at all stages of the value chain have substantially been improved. To make this system further sustainable, the BEST-BFQ has been working for the strengthening of fish inspection and quality control measures at all stages of shrimp supply chain, establishing a credible laboratory services and assisting the private entrepreneurs in improving their productivity and compliance with international market requirements.

The overall objective of the BEST-BFQ program is to contribute to economic growth and poverty reduction by supporting Bangladesh to take the advantages of global market opportunities.

The purposes of this project are to strengthen the national quality infrastructure for fish and fishery products to meet safety and quality requirements for export markets particularly the EU, improve competitiveness and take advantage of global market opportunities; this would also ensure the food security and safety of the domestic seafood consumers. The project has been implementing with farm to fork approach which are: (i) Capacity building; (ii) Legislative reforms; (iii) Training on food safety; (iv) Assisting private sector; (v) Better social compliance; (vi) Institutional strengthening; (vi) Accreditation of laboratories; and (vii) Simplification of supply chain

1.7 Objectives of the Current Assignment

The main objectives of the evaluation are:

- i) to review the implementation status of the project in respect of:
 - financial aspect;
 - existing functional status of fish inspection and quality control laboratories;
 - institutional capacity development of DOF;
 - improvement and general awareness of food safety and quality of fish/shrimps products
- ii. to review compliance and implementation of HACCP and Traceability system in all stages from pre-harvesting to export level through up-gradation of on-farm and in-plant own check system;
- iii. to assess the impact of the project activities in relation to employment of destitute people especially women, increased export earning and poverty reduction of the people at the catchment areas
- iv. to identify the strengths, weaknesses and threats towards project activities
- v. to recommend measures for continued sustainable international demand for fish/shrimps products and improved management of project activities in future and similar other project in the country.

1.8 Scope of Work of the Study

The scope of work of the study has been presented below:

Sl. No.	Activities Component of the Project	Area Covered under the Project	Sample to be Covered during Study
1	Functional status of fish inspection and quality control laboratories	3 laboratories at Dhaka, Chittagong and Khulna	100%
2	Assessing the capacity and skill development of the concerned persons-at least 50% of the trained person	persons of public and private sector persons	20%
3	Direct and Indirect beneficiaries	Fish farmers, Processors, ice and depot owners, middleman and destitute women etc	Statistical Representative

**CHAPTER 2
APPROACH AND METHODOLOGY**

2.1 Approach

The study intended to accomplish the objectives of the study in line with the main objective of the study that intends to gather information and provide complete picture on the implementation status of the project including the functional status of fish inspection and quality control (FIQC) laboratories, capacity development of DOF officials, awareness building on food safety and quality control, impact created in employment generation of poor especially destitute women, increment of export earning, and poverty reduction at the catchments areas. In addition, the study had been designed to identify the strengths, weakness and threats of the project and to formulate necessary recommendations to protect international export market of fisheries and shrimp products.

2.2 Methodology

The methodology for impact evaluation study has been furnished below:

2.2.1 Design of the Study

2.2.1.1 Program Group Survey

Considering the nature of study, it is appropriate to determine a representative sample size of beneficiaries at first. For such purpose we adopted a sound statistical formula as given below.

$$\text{Sample size (SS)} = \frac{Z^2 * p * (1 - p)}{M^2} = \frac{Z^2 * p * q}{M^2}$$

Z= Z value (e.g. 1.96 for 95% confidence level)

P=0.5 for sample size

M= Margin of Error (0.05)

Corrected formula

$$\text{New SS} = \frac{SS}{1 + \frac{SS - 1}{Pop}}$$

Where: Pop=Population

Using 95% confidence level with maximum 5% margin of error we have obtained a representative sample size of beneficiary n = 1,689 for this study. However, in order to reach such beneficiaries we adopted two-stage random sampling procedure. Firstly, around sixteen upazilas from four (4) project districts were randomly selected. Secondly, then totally 1,689 beneficiaries were selected by using stratified random sampling procedure on the basis of catchment areas and location, and level of destitute women from the upazila.

In order to reach stipulated beneficiaries a list of 190,000 registered fish/shrimp farmers was collected from the office of BEST-BFQ office at Khulna. In consultation with the concerned personnel of the SFIQC, 4000 beneficiary farmers have been identified from 190,000 registered farmers. Such initiative was taken to identify targeted population in the upazila. From this sampling frame the allotted number of respondents has been deducted and adjusted to make up the total number of 1,689. Considering the percentage of fisheries

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activities of the division, the following allocation has been done for data collection. In case the required numbers of respondents were not available in the selected catchments area, then the adjacent upazilas were selected.

Table 1: Allocation of Project Respondents in Study Districts

Division	No. of Sample Upazila		Beneficiary 1	Beneficiary 2	Total
	No	Name	(Fisherman & Destitute women)	Processors, Ice plant owners, Depot & other traders	
Chittagong	1	Chittagong	25	3	28
	2	Teknaf	50	6	56
Cox's Bazar	3	Sadar	130	15	145
	4	Chakoria	130	15	145
	5	Pekua	130	15	145
Khulna	6	Rupsha	129	17	146
	7	Fultola	129	17	146
	8	Batiaghata	129	17	146
	9	Digholia	129	17	146
	10	Dacope	130	16	146
	11	Dumuria	130	17	147
	12	Terokhada	130	17	147
Satkhira	13	Sadar	30	4	34
	14	Debhata	40	4	44
	15	Kaliganj	30	4	34
	16	Ashashuni	30	4	34
Total	16		1501	188	1,689

2.2.1.2 Control Group Survey

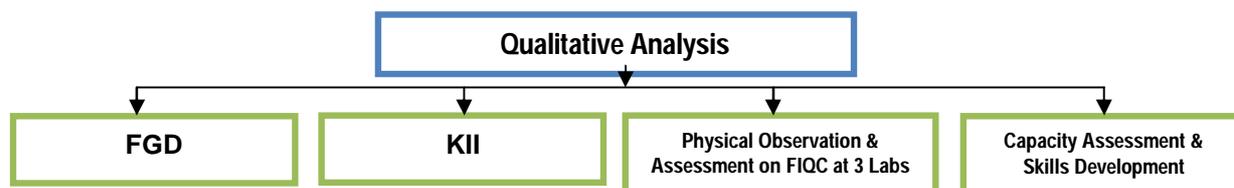
In order to reach such respondents we adopted two-stage random sampling procedure. Firstly, the required number of catchments areas/Upazilas from each division was selected by using simple random sampling based on activities of fisheries. Secondly, total 844 (50% of the program group) respondents were selected on the basis of similar nature of works in terms of fish production and processing etc. The non-program group study included fish farmers, depot owners, ice plant, suppliers, vendors, aratdars, and middleman etc. including destitute poor women.

Table 2: Allocation of Control Group Respondents in District

Division	No of sample Upazila/ Other than program Area	Control Group 1	Control Group 2	TOTAL
		Fish Farmers & Destitute Women	Processors, Depot, Ice plant & other traders	
Chittagong	1	37	8	45
Khulna	4	480	32	202
Satkhira	1	69	20	500
Cox's Bazar	1	170	28	97
Total	6	756	88	844

2.2.1.3 Qualitative Analysis

The most appropriate tools used for the analysis are presented below:



2.2.1.4 Instruments for data collection and Respondents

- (a) **Program Group:** The questionnaire covering project beneficiary (fisherman, depot, ice plant, processors includes destitute women) has been filled in by a set of pre-designed questions in program upazila/catchment areas.
- (b) **Control Group:** The questionnaire covering non-program group respondents have been filled in a set of pre-designed questionnaire other than program upazila/catchment areas.
- (c) **Focus Group Discussion:** Total 6 Focus Group Discussions (FGDs) each with 20 participants was conducted against the target of 3 FGDs. FGD participants were fish farmers, processors, and ice plant and depot owners.
- (d) **Key Informant Interview (KII):** Total 12 Key Informant Interviews four from each division were organized generally about project management including financial aspects, contract management, project implementation period i.e. planned and actual period, costing, strengths, weakness and threats etc of the projects.
- (e) **Physical Observation and Inspection of Functional Status of Fish Inspection and Quality Control of 3 Laboratories:** Physical verification of the laboratories has been undertaken and inspection was carried out regarding functional status of 3 laboratories whether they have been maintaining Fish Inspection and Quality Control of Fish/Shrimp products as per international standard and requirement of HACCP so that fish/shrimp products can be exported without any problem. The following specific information was verified from the laboratories:

Area to be verified	Checklist Indicators
Quality of construction and related works	Size and quality of lab construction works includes garage, floor improvement, boundary wall and internal road, renovation works, plan and design, soil testing etc quality, durability, present status
Supply of equipment and its present condition	Lab fitting, fixing, furniture, generators and cooling system quality and present operational condition to meet up international standard of lab requirement
Availability of chemicals for inspection and quality control of fish/shrimp products	Supply of chemicals and their preservation. Availability of required number of technician at lab, whether necessary knowledge and skills of the lab operational people or not, ability to handle quality control of fish/shrimp products
Accessibility of lab	Whether lab is providing necessary support to exporters or not?, Are they able to meet up present demand? Is there any additional capacity needed, Are exporters satisfied their performance, what additional

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	support is needed for more support to the exporters etc,
Execution status of works/supply including cost	Planned and actual time of works/goods execution period, quality of the works/supply, cost of planned and actual works/supply, any dispute during execution
Impact on foreign currency earnings and socio-economic development	Is there any impact on foreign currency earnings due to construction/renovation includes equipped of three labs? What is the impact in exporting, what is the impact in employment generation and poverty reduction? What is the difference between before and after construction/renovation of labs?

(f) Capacity Assessment and Skills Analysis: The capacity assessment and skill analysis have been conducted for about 50% of the total trained persons. Information of skills assessment was collected in using interview questionnaire to assess the capacity of the concerned persons and laboratories. The following specific information has been assessed from the field:

Training Field	Assessment Indicators
Strengthen overall improvement of management and lab personnel on inspection and quality assurance monitoring of fish products	Knowledge and experience of lab persons with regards to safety and quality of the products, testing and monitoring system of products, compliance with HACCP procedure followed by the importing countries etc
Strengthen capacity of institutions	Increase manpower, effective and efficient monitoring and analysis of fish and fish products for pathogen, toxic elements, pesticide residues, antibiotics, hormones etc, developed facilities for freshness of raw materials and minimizing risk of contamination in the important landing centers and depots, facilitated computerized database, checking analysis system for quality assurance of export item and overall improvement of management skills etc
Improve skills and knowledge of poor farmers on production and processing of fish/shrimp products	production, processing, post harvest handling, cleaning, washing, sorting, grading, packing etc of fish/shrimp products

2.2.1.5 Summary of the data and information collection has been presented below:

Table 3: Summary of Sample size for the Study

District	Sample Size									Total Number
	Program Group						Non-Program Group			
	Beneficiary		FGD participants	KII Participant	Physical Observation & Inspection	Sample Size of Training Assessment	Respondent		FGD participants	
	Group 1	Group 2					Group 1	Group 2		
Dhaka	-	-	-	10	1	-	-	-	-	11
Chittagong	75	9	20	5	1	30	37	8	20	212
Cox Bazar	395	45	20	-	-	388	170	28	20	1,066
Khulna	902	118	20	6	1	700	480	32	20	2279
Satkhira	129	16	-	-	-	75	69	20	-	309
Total	1501	188	60	21	3	1200	756	88	60	3,877

2.2.1.6 Implementation and Data Management Plan

The implementation and data management plan included data collection, data management, processing, analysing and report writing with work plan and quality assurance of the data collection and management etc.

a. Quantitative Survey

2.2.1.6.1 Program/Project Group Survey: From the targeted beneficiaries list of selected upazila, the required number of respondents was randomly selected using a Simple Random Sampling (SRS) procedure. This provided unbiased parameter estimates with minimum standard errors (s.e.). As per the program, emphasis was particularly for the inclusion of destitute women and catchment areas etc.

2.2.1.6.2 Selection of Respondents: The respondent selected from each selected Upazila/catchment areas other than program upazila included poor, destitute women from the Upazila. After selecting the location and identifying the respondents randomly, the required data was collected using structured questionnaire to cover the required numbers of respondents so that the representative samples of data can be obtained.

b. Qualitative Survey

2.2.1.6.3 Focus Group Discussions (FGDs): Total six (6) FGD sessions were conducted in Chittagong, Cox's Bazaar, Khulna and Satkhira. Each FGD session was conducted with target audiences, depot owners, ice plant owners, processors and fish farmers etc regarding fish quality and safety in production, processing, transportation and storage. Size of each FGD session was within the range of 18-20 participants. Findings have been compiled using both kinds of field records i.e. taped record and notes.

2.2.1.6.4 Key Informants Interview (KII): A total of maximum 21 KII was conducted covering study area. The respondent was selected based on successful intervention of the project activities from each of the district. The information was collected regarding key sub outputs of the project.

2.2.1.6.5 Control Group Survey

Quantitative Survey

Following same procedure of the program group, the data of the Control (Non-Project) group was collected based on catchment areas from 844 respondents of the adjacent catchment areas, other than project by using simple random sampling methods. Necessary data was collected from a total of 844 randomly selected respondents based on the similar nature of works such as fish production, processing, storage, transportation and earning of foreign currency etc.

Qualitative Survey

Similar procedure and methods including same numbers of the project/program group was used for collection of qualitative data for Control (Non-Project/Program) group using same guidelines of the project group.

2.2.1.6.6 Development of Methods, Tools, and Checklist: Five sets of data and feedback were used for the purposes. First one- through statistical data using structured questionnaire, second one through PRA using focus group discussion methods and

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checklists, third one through KII. Fourth and fifth methods included checklist and interview schedule for physical verification and capacity assessment. The first set has provided quantitative data and the second to fifth set has given qualitative information and feedback. While the five sets were compared each other in few areas, these were found complementary in general. Some data were both in quantitative and qualitative form while some were better in either quantitative or qualitative form.

2.2.1.6.7 Instruments used for the assessment and survey: To keep similarity and consistency in the reports, the following instruments were used for the survey.

- ❖ Checklist for Collection of Secondary Data
- ❖ Questionnaire for beneficiaries
- ❖ Checklist for Focus Group Discussion
- ❖ Guidelines for Key Informants Interview (KII)
- ❖ Checklist for Physical observation
- ❖ Interview schedule for capacity assessment

2.2.1.6.8 Finalization of Questionnaire: Based on the comments and suggestions of the Technical Committee meeting on 10 February 2013, the questionnaire was revised as per study objectives, scope of works and indicators. The questionnaire was further reviewed by the Steering Committee (SC) of IMED and then finalized incorporating comments and suggestions of SC. On the basis of pre-testing the questionnaire was finalized for data collection.

Classification	Indicators
Demographic characteristics	Age, sex, religion and marital status
Socio-economic characteristics	Occupation, education, land/pond tenure, assets, and liabilities
Quality Assurance	Freshness for raw materials, improved transportation, hygienic conditions of depot, infrastructure facilities such as water supply, drainage facilities, primary grading, and packing system, supply hygienic ice, portable waters in the harvesting areas,
Product Development	Traditional block frozen product availability, risk, new various types value added products opportunities and opportunities of additional foreign exchange earnings
Development of in-plant quality control system	Fish processing plants in-plant quality current system, own check system practice and opportunities of its improvement
Human Resources Development	Compliance to HACCP system, Training of DOF personnel regarding adoption of HACCP, managerial staff of leading processing industries, project management and implementation persons, Women development regarding post harvest, handling, cleaning, washing, sorting, grading, packing etc. Involvement of women in fish technology, microbiology and management sectors of the processing plants, depots and service centers. Study tour for MOFL, DOF, PC, top management personnel of processing plants, 30 factory management personnel, consultative meetings and visit, monitoring and supervision etc.

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Classification	Indicators
Capacity & Management development of Institutions	Recruitment of appropriate man power at the depot and suppliers industries, plan for designing renovation of existing fish plants based on int'l standard, establish computerized database system of checking, data analysis
Research, Investigation and support services	To rescue from probable risk research and investigation team formed and support services rendered.

2.2.1.6.9 Recruitment and Training of Field Staff: A total of 16 enumerators and 03 supervisors were recruited through an interview board headed by the Team Leader having knowledge and previous experience in conducting similar studies and data collection in the similar area.

Three days Intensive training was provided to the field staff on questionnaire so as to keep uniformity of the data collection techniques and approaches among all the field enumerators, and to maintain the desired quality of data. The training programs were of three days duration. First day was class room lecture, second day was field demonstration and third day was refreshing training.

2.2.1.6.10 Method of Data Collection: Direct personal interview approach was adopted for collection of primary data. Each enumerators was provided with an identity card (to hang outside the front pocket of the shirt), a set guideline for code and data collection system and overall administration of the study, a check list to ascertain the target beneficiary and, the designed and pre-tested questionnaire for data collection and administration of the study. The supervisors supervised the field study activity on full time basis. After collecting all the filled in questionnaires from the enumerators of a location, supervisors sent those by special messenger to the project office in Dhaka for further action and punching in the computer software designed for the study.

2.2.1.6.11 Inspections and Supervision of Field Work: The supervisors were responsible for overall implementation of the study. They supervised the field works of the field enumerators. In addition of the supervisors, the consultants conducted monitoring of field survey activities in selected places to oversee the survey activities so as to ensure quality. More importantly, the consultants participated in Focus Group Discussion (FGD). The consultant also conducted physical verification and observation of Dhaka, Chittagong and Khulna FIQC laboratories and few capacity assessments.

2.2.1.6.12 Data Management, Processing and Analysis

Data/Information Management: Data management, processing and analysis included registration of the questionnaires, code construction, coding, data verification and quality control, data punching, data processing and finally the analysis to facilitate the required output generation. More specifically the data management comprised the following activities: (a) registration of data/data input, (b) data processing, and (c) report preparation. Triangulation was done by cross checking data/information from different categories through different methods (Interview Schedules, FGDs, stakeholder discussion meetings etc.).

Data Origination: The filled-in questionnaires have considered as the source of raw data for effective and accurate analysis and quality output generation. The following activities were undertaken on the collected data.

Editing and Coding of Questionnaires: Each questionnaire was edited and coded before entry into the computer. Coding of information was initially done by coders with guidance of the Experts and then verified by coding verifiers provided by the firm as extra manpower.

Data Input to Computer: Data input into the computer included (a) developing appropriate computer program and (b) data entry operation. Keeping the objectives of the impact study in view, the most suitable program (Excel, MS Access & SPSS) was used as per the necessity.

Data entry and processing: The filled-in questionnaires were considered as the sources of raw data. For effective analysis and quality output generation, the following activities were undertaken:

- Filing the filled-in questionnaires and checklists;
- Editing and coding the questionnaires and checklists for entry into the computer; and
- Quality control and coding of open-ended responses.

The edited and coded questionnaires were dispatched to computer operators for data entry/punching to the software installed for this purpose.

Data Analysis: The data obtained through survey was analyzed for project aggregate. However, the data was disaggregated by gender (to see equal opportunity of employment and equal wage), production and processing, and economic development, etc. The data analysis tools were developed (programs) after finalization of data collection s (questionnaire and data collection sheets) as an advance action so that data could be entered as these were collected from farmers one by one (as they are completed). Primary data tables were generated for all major indicators as its measurements and were annexed to the main report. However, secondary analysis was also undertaken for selected indicators and presented in text tables after in-depth analysis through crossing relevant interrelated indicators and proxy indicators.

Data Analysis by Category: The data was analysed separately for all the four districts for showing differences of Project interventions by area, Project and non project data was analyzed separately. Each indicator was shown separately from the collected tabulation for making comparison among the project and non-project interventions.

CHAPTER 3 STATUS OF FIQC LABORATORIES AND PROJECT

3.1 Introduction

This chapter describes overall implementation status and achievements of the Strengthening of Fish Inspection and Quality Control Services which was implemented under Bangladesh Quality Support Programme (BQSP). The objective of the BQSP was to contribute the growth and poverty reduction by assisting Bangladesh in the development, strengthening, and diversification of its production and export base. As per the objectives, findings of the study have been presented herewith mainly based on the primary and secondary data.

The project was initially planned to be implemented in five years starting from January 2004 to December 2008 with a total cost of BDT: 4338.83 lakh. On December 2003, the government approved the TAPP as per objectives of the project and according to the requirement of EU but project could not start in time due to delayed signing of the agreement with the EU. On behalf of EU, a technical team visited Bangladesh on June 2004 to examine the rationality of original TAPP and submitted a mission report. As a result, the original TAPP was revised 1st time based on the report with reduced project duration from five years to three years (from July 2005 to June 2008) before starting the implementation of the project and the budget was reduced accordingly to BDT: 3851.52 lakh. Later on EU recommended extending project until December 2009 through 2nd revision of the DPP. But actually the project was completed during June, 2010 with an additional 6 months extension.

3.2 Status of Financial Management

Based on secondary information¹, collected from the IMED and DOF, the status of financial aspects relating to target and achievement of the project has been furnished in Table-4.

Table 4: Major item-wise Financial Target and Achievement

Item	Unit	Target Financial			% of Total Budget	Quantity	Actual Financial			% of Total Budget	Quantity
		GOB	RPA	Total			GOB	RPA	Total		
		Salary & Allowance	person	177.64				177.64	4.71%		
Supplies and Services	L.S	51.98	337.1	389.08	10.31%		49.97	38.14	88.11	2.41%	
Research and Studies		8		8	0.21%		5.65		5.65	0.15%	
Training											
Foreign	Nos		175.67	175.67	4.66%	30		172.35	172.35	4.72%	30
Local	Nos		81.53	81.53	2.16%	6430		271.64	271.64	7.44%	21885
Seminar and logistics	L.S	10	10	20	0.53%	LS	8.39	8.6	16.99	0.47%	LS
Casual Labor		3		3	0.08%		2.47		2.47	0.07%	LS
Consultancy										29.62%	
Foreign	mm		636.58	636.58	16.87%	114		655	655	17.95%	84
Local	mm		269.02	269.02	7.13%	110		426.22	426.22	11.68%	273
Sub-contract shrimp cell, accreditation & ice			280	280	7.42%	Reallocated					
Honorarium	LS	1		1	0.03%	LS	0.5		0.5	0.01%	LS
Computer Materials		3		3	0.08%	LS	3		3	0.08%	
Other Expenses	LS	8	141.14	149.14	3.95%		7.97	258.72	266.69	7.31%	LS
Repair, Maintenance and Rehabilitation	LS	15		15	0.40%		14.59		14.59	0.40%	LS
Acquisition/Purchase of Assets	Nos	13.03		13.03	0.35%	24	13.03		13.03	0.36%	24
Laboratories Equipment	LS	50.26	725.98	776.24	20.57%	LS	50.24	747.81	798.05	21.86%	LS
Construction Works	sft	475.38		475.38	12.60%	16000 sft	456.39		456.39	12.50%	16000
CD/VAT		300		300	7.95%		300		300	8.22%	

It is revealed from the Table-4 that almost 96.73% (BDT 36.50 crore out of BDT 37.73 crore) budget of the project was utilized efficiently and effectively for the project. Only 3.27% (BDT 1.23 core) fund was remained unutilized under the line item of foreign consultancy due to the change of consultant procurement cost. The maximum fund was utilized under line item of consultancy (foreign and local) which was 29.62% followed by purchase of FIQC laboratory equipments

¹ Project Completion Report-July 2010 & revised DPP of SFIQC, DOF

(21.86%), construction works of laboratory (12.50%), and CD/VAT (8%). The lowest budget was utilized under honorarium for technical evaluation committee (0.01%) followed by casual labor (0.07%), computer materials (0.08%), and research and studies (0.15%). The budget (BDT: 280 Lakh) relating to the allocation against shrimp cell, accreditation and ice production had been reallocated to other line items. The maximum reallocation (BDT: 157.20 lakh) of the budget was utilized under the services of local consultants due to increased input from 110 man-months to 273 man-months and the rest amount (BDT:122.80 lakh) was utilized in local level training considering the needs of more training on traceability and HACCP to ensure quality from production to processing level.

3.3 Rationale of the Project Concept and Design

The EC imposed a ban in July 1997 on the importation of fisheries products from Bangladesh due to non-compliance of HACCP system by the processing industries and inadequate monitoring mechanism by the competent authority. The past system of inspection and quality control was mainly confined to end products testing system rather than HACCP system due to lack of required facilities and logistic support. In view of this, it was necessary to establish effective monitoring mechanism to oversee the activities of the processing plants, as well as, all other stages in the processing cycle. To ensure the effective monitoring system, the DOF's existing manpower was not adequate. It demanded more technical manpower in this field.

Under such a situation, the government tackled the matter exercising special measures and support through SFIQC project. To mitigate the shortage of sound technical manpower and other supporting staff additional 41 manpower has been recruited through this project. DOF's existing laboratories was modernized up to a level of international standard. Two new laboratories have been established in FIQC area according to the international accreditation standards. Thus the export earnings of the sector have increased leading to increased employment opportunities and enhanced socio-economic condition of the people. Therefore, it can be concluded that the concept and design of the project was relevant to the needs of the sector specially to sustain the fish/shrimp export market.

3.4 Implementation Status regarding the Modernization of FIQC Laboratories

The implementation status regarding up-gradation and modernization of FIQC laboratories has been studied in the project areas through physical visit at Dhaka, Chittagong and Khulna laboratories. The visit has been conducted among SFIQC project areas starting from the Deputy Director (DD) of the FIQC, DOF at Muradpur, Chittagong on 24 to 26 March 2013 and then to the Deputy Director (DD) of the FIQC of Khulna on 29 to 31 March 2013. Later on, the team visited Dhaka FIQC laboratory on 02, 17 and 21 April 2013. The data regarding the implementation status of



Plate 1: Two Storey FIQC laboratory Building of Khulna

the works related to up-gradation, construction, purchase and installation of modern equipments, training, present operational conditions and outputs including the attainment of the status of international accreditation etc. of the project were collected and recorded as per design of the assignment.

DOF has completed the construction of two new FIQC laboratory buildings during 2008. Fitting, fixing, installation and training on the new equipment was completed during early 2010. The existing system of FIQC laboratories was upgraded with modern equipment, machinery, chemicals, glassware and other ancillary facilities. FIQC personnel including laboratory personnel were trained. Besides, the procedures or methods to find out various parameters of aquaculture residues in water, fish, and shrimp etc were also established under the support of the project.

**Impact Evaluation Study of the Strengthening of Fish Inspection and Quality Control Services
(2nd Revised) under IMED**

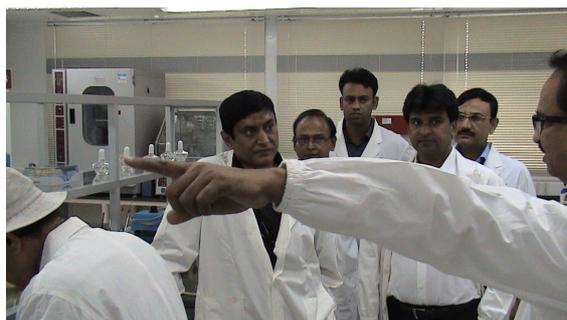


Plate 2: FIQC laboratory with Skilled Manpower of Khulna

All works under Chittagong and Khulna FIQC laboratories have been found similar during physical visit of the FIQC laboratories. The status of the two-storied laboratory building, roads, room design, record room, coding/decoding room, laboratory information management system (LIMS), documentation room, sample room, testing room etc for chemical and microbiological laboratories has also been found in standard reputation and good conditions except few which are out of order. Adequate initiatives have so far been taken from the

DD office but it was hardly possible to repair the equipment because of the current limited delegation of financial authority. As such, it was found to take long time for the completion of official formalities. Chemical laboratories of Chittagong and Khulna were yet to start testing in full extent but it was indicated to start soon as required skilled manpower along with the equipments were found quite ready to start. Under the current situation, laboratory testing in Khulna and Chittagong needs to be started immediately. This will reduce at least 5-10 days in getting the desired certificated if regional laboratories can run as is done in Dhaka laboratories. To have certificates from Dhaka, it takes 5-10 days to send the sample from Khulna and Chittagong to Dhaka for testing exclusive of the testing times. Processing industries are incurring huge loss due to this delay. They also prefer to test their products as quick as possible and it will be possible only once the regional FIQC laboratories can start the chemical testing at their fullest extent. Thus regional station like Chittagong and Khulna need to be started soon with full capacity. The item-wise laboratory status regarding up-gradation /construction works has been furnished in Table 3.2 to Table 3.7.

Status of Upgradation and Construction Work of FIQC Laboratories: From the Table-5 it is evident that the construction cost of Chittagong and Khulna laboratories was the same (BDT: 151 lakh each) whereas the relevant data regarding the up-gradation of Dhaka laboratory could not be found though DOF has confirmed that the up-gradation of Dhaka laboratory has been undertaken during this project. The construction and up-gradation works were reported to complete during 2008. The overall quality of construction was found good at both laboratories. However, as per the data, the completion of construction work was found delayed by about 7 months in both laboratories.

Table 5: Implementation of Upgradation and Construction Work

Location	Quantity	Type of Work	Procurement Method	Implemented by	Cost of Works (in Lakh BDT)	Procurement Schedule		Quality of the Work	Implementation Schedule		Remarks
						Tender invitation	Contract signing		As per contract	Actual	
Dhaka	1	Upgrading	NCB-PPR	Contractor	-	-	-	good	-	-	Data not available
Chittagong	1	Construction	NCB-PPR	Contractor	151.0	01.02 .2007	27.05 .2007	good	31.01. 2008	15.09. 2008	Delay more than 7 months
Khulna	1	Construction	NCB-PPR	Contractor	151.0	01.02 .2007	27.05 .2007	good	31.01. 2008	15.09. 2008	Delay more than 7 months
Total	3				302.0						

Quality of Construction and Related Works: From the above data (Table-6), it appears that Chittagong and Khulna laboratories have an area of 8000 sq ft and both are two- storied building. Both laboratories have two floors each with more than 7-8 rooms wherein the chemical laboratory is situated at the ground floor and the microbiological laboratory is at the 1st floor. Both laboratories of Chittagong and Khulna are connected with DD, FIQC office building. So far design is concerned; it appeared to be of international standard laboratories though Khulna office expressed concerns over the design. According to DD, FIQC, Khulna there was more scope to improvise the design in better quality provided it could be shared well before the finalization by the International Design Consultant. The quality of construction and up-gradation work was found good.

Table 6: Quality of Construction and Related Works

Location	Quantity	Size of Work	Construction/Upgradation Works				Design & Plan	Soil Testing	Quality of Construction/Upgradation Works			
			lab	Floor	Wall	Road			lab	Floor	Wall	Road
Dhaka	1	6000 sqft	1	1	4	4	Int'l Standard	N/A	good	good	good	n/a
Chittagong	1	8000 sqft	1	2	4	1	Int'l Standard	Done	good	good	good	good
Khulna	1	8000 sqft	1	2	4	1	Int'l Standard	Done	good	good	good	good

FIQC lab Equipment and Its Present Condition:

It is evident from the Table-7 that the laboratory fitting, fixing, furniture, coding system and quality of supplied item were found good in case of Dhaka, Chittagong and Khulna laboratories. All laboratories were able to meet the present demand of 40-45 microbiological tests and 10-15 chemical tests per day. Khulna laboratory has been using external gas cylinder as there is no



Plate 3: FIQC laboratory with Modern Equipments

pipeline gas facilities. Despite this, internal built-in supply system of gas from bottle would be better and decent looking which will also ensures more safety net at the laboratory. Dhaka laboratory has been rendering services of chemical and microbiological tests as per requirement of the processing industries whereas Khulna and Chittagong laboratories are unable to render the services of Chemical test wherein about 98% clients are coming from Khulna and Chittagong area. As a result, clients from these areas had to suffer a lot in getting the chemical test report from Dhaka. The present establishment of FIQC laboratory can meet all the tests except pesticides residual test which need to be tested from Bangladesh Agricultural Research Institute (BARI) laboratory. Dhaka laboratory is expecting to procure and install required equipment soon and would be able to test all of these from Dhaka.

Table 7: Supply of Equipment and Its Present Condition

Location	Supply Items Number and its Present Operational Condition								Quality of Supply Item	Can meet Req. ?	Remarks
	Laboratories Equipment		Fitting & Fixings	Furniture	Generator		Cooling system				
	Number	Working	Status	Status	Number	Status	Number	Status			
Dhaka	M-51 C-69	M-50 C-65	good	good	1	good	5	good	good	Yes	Both tests
Chittagong	M-65 C-52	M-64 C-52	good	good	1	Good	7	good	good	Yes	Except chemical test
Khulna	M-65 C-52	M-56 C-50	Good	good	1	good	7	good	good	Yes	Except chemical test



Plate 4: Equipment Not in Use at FIQC, Khulna

Status of Available Chemicals for FIQC laboratory: Data from table-8 indicated that number and quantity of chemical, preservation method, availability of FIQC laboratory chemicals, presence of skilled person, accessibility etc. were international standard for all laboratories. In Khulna, it was found that seven (7) equipments were out of order and unable to repair despite of several efforts. All staff of the

laboratories and FIQC office has received training from local and overseas countries in the field of laboratory activities, quality assurance, equipment installation and operation includes LC-MS/MS, Elisa, AAS incubators etc. Dhaka laboratory was found to equip with 34 laboratory staff out of 41 posts, whereas Chittagong and Khulna laboratories showed the 32 and 26 staff out of 41 approved positions.

Table 8: Status of Available Chemicals for FIQC laboratory

Location	Supply duration	Status of Preservation method	Availability of chemical	Skills person availability	Has received Training or not?	Are they skilled to meet FIQC standard	Purchase method	Remarks
Dhaka	More than month rev	good	Locally available	32	yes	yes	PPR 2008	2 out of order
Chittagong	More than month rev	good	Locally available	32 out of 40	Yes	Yes	PPR 2008	1 chamber is out of order
Khulna	More than month rev	good	Locally available	26	yes	yes	PPR 2006/08	7 equipments are out of order



Plate 5: Consultant with Senior Officials of DOF and IMED include Hon'ble Secretary, IMED visited Dhaka FIQC Lab

Status of Laboratory Capacity: The data relating to the status of laboratory capacity have been presented in Table-9. It is observed that more than 70 to 85 internationally acceptable microbiological tests can be completed in Dhaka, Chittagong and Khulna laboratories in a day. The present demand of customers for conducting microbiological test stands well below the capacity of the laboratory which is 25 to 45 maximum in a day. Dhaka laboratory has the fullest capacity for conducting microbiological and chemical test but Chittagong and Khulna laboratories are yet to

start chemical analysis. Most of the processing plants (about 98%) are located in Khulna and Chittagong region but to have a certificate on chemical test, they are to run Dhaka laboratory causing a delay in the processing system. This has resulted discontentment among the processing plant owners. As such, they expressed their grave concern to initiate necessary steps so that the laboratories of Khulna and Chittagong region can start chemical testing without further delay.

Table 9: Status of Laboratory Capacity

Location	Customers # handled/day	Can able to meet up present demand?	Capacity of Lab		Satisfaction level of customers	Service quality	Access to Lab	Time needed to issue Certificate
			Present	Additional				
Dhaka	Microbiology 25-40/day Chemical : 15-25/day	Yes	70-75	10-15	good	Excellent	Well-connected all over the country	3-5 days microbiologic 10-15 days chemical test
Chittagong	Microbiology 25-35/day Chemical : Yet to start	Yes	70-80	10-15	Good for microbiological test	Excellent	Well-connected all over country	microbiological test only 5-7 days
Khulna	Microbiology Test: 40-45/day Chemical: Yet to start	Yes	75-85	10-15	Good for microbiological tests	Excellent	Well-connected all over the country	microbiological test only 4-5 days

Status of Test Facilities of the Laboratories

It is revealed from the secondary source of data² that the existing facilities of the laboratories test were limited to: (i) Microbiological, (ii) Organo Loptic, (iii) Dryness, and (iv) Chemical test include only TVN, TVBN, Hypoxanthen and Tri-methylamine. The existing facilities of the test were inadequate as per present requirement of the importing countries. To fulfill the present requirement of international community, the project has provided required facilities to the laboratories to handle diverse nature of international standard laboratory test such as: (i) Heavy Metal, (ii) Antibiotic, (iii) Pesticide, (iv) Hormone, and (v) Bacteria & Mesophiles test. Due to this additional test facility, FIQC laboratories are now able to provide international acceptable test.

² RDPP-Page-8, August 2007

FIQC lab Impact on Foreign Currency Earnings: The status relating to the impact of the project on foreign currency earnings has been furnished in Table-10. It is shown that none of the laboratories were able to issue any certificate regarding chemical test before implementation of the project but all laboratories have been issuing certificates on microbiological test since 1977 but the capacity of issuing certificate was ranged between 300- 450 in a month only. The current capacity of Dhaka laboratory is almost 4 times (1500/month) to that of the previous capacity. A similar trend of capacity has also been found in Khulna and Chittagong laboratory which is 1400 and 1200 respectively. More than 41 laboratory personnel have been recruited and trained under this project to strengthening the capacity of laboratories and transferred to the revenue structure of the government after completion of the project for the sustainability of the laboratory activities. The revenue income of the government has increased from BDT: 50 lakh to 410 taka in case of Dhaka laboratory, 25 lakh to 147 lakh for Chittagong, and 30 lakh to 172 lakh for Khulna laboratory. Similarly average export earnings from fish/shrimp have also been increased from 370.89 million US\$ to 623.21 million US\$ in last five years.

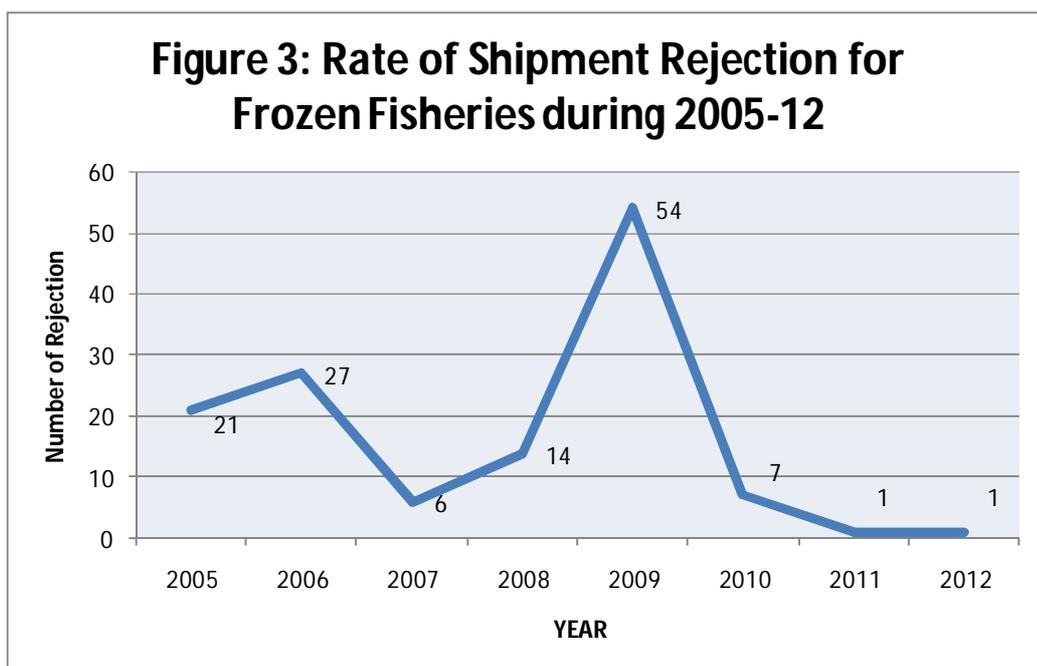
Table 10: Impact on Foreign Currency Earnings and Poverty Reduction

Location	Certificate # Issued/Month		Items # Exported		Employment		Applicability of HACCP		Economic Benefit (Lakh BDT)		Export Earnings ³	
	Before	After	Before	After	Before	After	Before	after	Before	after	Before (M. US\$)	After (M. US\$)
Dhaka	M-450 C-0	M-1500 C-450	9	13	19	13	None	good	Less than 50	410		
Chittagong	M-300 C-0	M- 900 C- 0	9	13	19	19	None	good	Less Than 25	147	168.77	256.20
Khulna	M-300 C-0	M-1300 C-0	9	13	15	11	None	good	Less Than 30	172	202.12	367.01
							Total				370.89	623.21

Impact on Shipment Rejection for Frozen Fisheries/Rapid Alert System for Fish and Feed (RASFF): The data⁴ relating to the rate of shipment rejection for frozen fisheries or Rapid Alert System for Fish and Feed (RASFF) have been presented in figure-3. It is observed from the linear chart that highest 54 numbers of shipment rejection/RASFF has been recorded in 2009 followed by 27 numbers and 21 numbers in the year of 2006 and 2005 respectively whereas lowest shipment rejection has been noticed in 2011 and 2012 which is only 1 number. This is clearly recognized the international standard testing facilities of FIQC laboratories of DOF. In recognition of the international standard testing of FIQC laboratories, EU has also withdrawn 20% mandatory testing of the fish and shrimp products of Bangladesh which is still applicable for neighboring countries like India, Vietnam and Myanmar etc.

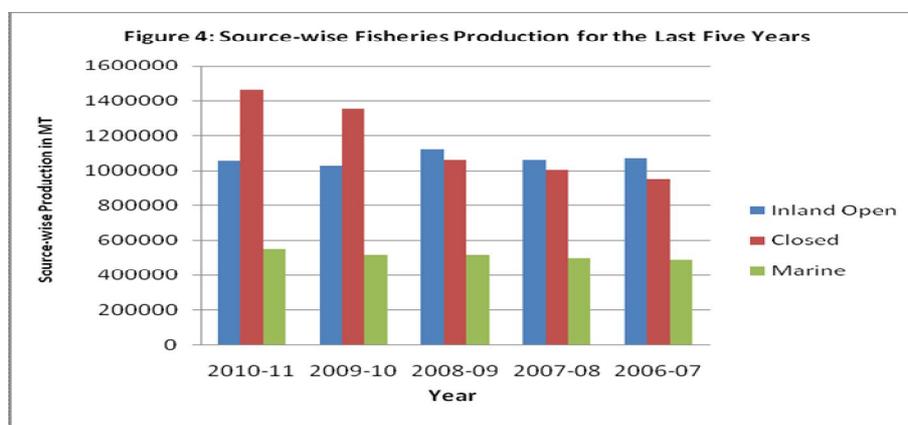
³ DD and EPB, FIQC-DOF, Dhaka, Chittagong and Khulna

⁴ NPD-BEST-BFQ, DOF



3.5 Fisheries Production

Secondary information regarding fisheries shrimp production⁵ has been collected from the fisheries statistical year book of 2010-11. Source wise production of fish/shrimp of the last 5 years has been shown in Figure-4.



During the year 2010-2011 the total fish production was 30.62 lakh Metric Ton (MT). Average annual growth rate of fish production during the last 3 years was 6.11%.

The current status of the shrimp area and production has been furnished in Table-11. It is evident that both the area and per hectare production has been increased over the years which is definitely a reflection towards significant improvement in the culture technology. Shrimp is one of the major export items in Bangladesh. To fulfill the extended export demand of shrimp and shrimp product, shrimp culture has been promoted with the increase in shrimp farm area from 1.41 lakh ha in 2002-2003 to 2.76 lakh ha in 2010-11 with the concomitant increase of shrimp farm production from 0.67 lakh MT in 2002-2003 to 1.25 lakh MT during 2010-2011.

⁵ Fisheries Statistical Year Book, 2010-11

Table 11: Division-wise Status of Shrimp/Prawn Farm Area and Production during the Last Five Years³

Division	Year-wise Area (Ha) and Yield (MT)										Rate of increase (%)	
	2006-07		2007-08		2008-09		2009-10		2010-11		Area	Yield
	Area	Yield	Area	Yield	Area	Yield	Area	Yield	Area	Yield		
Chittagong	34704		34704		34704	20193.6	60440		65200	21883.7	87.87	
Khulna	171506		171506		171506	73650.11	179420		202576	96934.52	18.12	
Dhaka	242		242		242	80.56	1301		1515	1335.07	51.68	
Barisal	11425		11425		11425	3822.11	4957		7128	4461.48	-37.61	
Rangpur	0	0	0	0	0	0	25		49	17.39	49	
Rajshahi	0	0	0	0	0	0	55		16	12.47	16	
Sylhet	0	0	0	0	0	0	0		8	4.13	8	
Total	217877	86840	217877	94211	217877	102854	246198	97972	276492	124648.8	26.90	43.58

3.6 Impact on Export of Fish and Fish Product

Secondary data regarding export of fish and fisheries product and export earnings for the last five years have been presented in Table-12.

It appeared from the table-12 that both the quantity and value of shrimp and prawn exported during last five years⁶ indicated a positive increase due to international standard testing facilities of DOF and HACCP compliance at all level. Similarly the quantity of fish and other fisheries product exportation also showed a positive increase both in terms of quantity and value. This has been possible because of the modernization and up-gradation of FIQC laboratories and the subsequent improvement flow towards the total firming system. Besides, the HACCP system has been followed in all the stages concerning the quality assurance.



Plate 6: Headless Exportable Shrimp

Major exporting countries are European countries, USA and Japan. About 98% of total fish products are exported to those countries. Remaining is being exported to the countries of Southeast Asia and Middle East. New countries like Russia and Qatar are exploring for exporting. Major export items of fish products are raw shrimp block frozen, IQF shrimp and white fish, PUD and P&D shrimp block frozen, consumer pack of raw frozen shrimp, chilled & frozen Hilsa, dry, salted and dehydrated fish, live fish, eel fish & crab, turtles, tortoises, shark, fin fish maws and a little quantity of value added fish and shrimp products.

Table 12: Year-wise Annual Export of Fish and Fish product

Quantity in Metric Ton and Value in Crore Taka

Year	Frozen Shrimp/Prawn		Fish & Fish product		Others		Total		% of Total Export
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	
2010-11	54891	3568.2	34312.7	947.48	7265.2	88.11	96469	4603.83	2.73
2009-10	51599	2885.2	23869	496.28	2175	26.93	77643	3408.52	2.74
2008-09	50368	2744.1	20215.58	466.9	2801	32.48	72888	3243.41	3
2007-08	49907	2863.9	24393	524.79	1031.48	7.11	75299	3396.28	4.04
2006-07	53361	2992.3	18898	340.21	1445	20.45	73704	3352.89	4.9

⁶ Fisheries Statistical Year Book, 2010-11 & EPB, FIQC, Dhaka

3.7 Khulna Division Export



Plate 7: Exportable Shrimp without Head

Khulna division along is exporting around 70% of the total export of the shrimp. It appeared from the table-13⁷ that the fish and other fisheries product exportation was showed a positive increase both in terms of quantity and value over before project (2004-05) during last seven years. Highest (25.89%) rate of increase in regards of production has shown during fiscal year of 2010-11 followed by 21.43% during 2006-07 while lowest (1.00%) increase has found during 2005-06. Similarly, highest (38.33%) rate of value has found during 2010-11 followed by 13.63% during 2006-07 and lowest in 2009-10 which is 6.21%. The quantity and value of export earnings is increasing very slow compare to the export sector opportunities and within the range of 37,659.94 MT to 47,411.45 MT and US\$ 264.26 million to US\$ 367.007 million respectively.

Table 13: Export from Khulna Division in Last Seven years (Before & After Project)

Financial Year	Shrimp		Fin-Fish		Hilsa		Total		Rate of Increase (%) over before project	
	Qty (M.T)	Value (Million US\$)	Qty	Value						
2010-11	36890.67	320.057	5835.76	18.84	4685.02	28.11	47411.45	367.007	25.89	38.88
2009-10	35086.27	261.99	3465.08	9.1	1598.27	9.58	40149.61	280.67	6.61	6.21
2008-09	36591.96	268.039	1769.85	5.41	3122.62	18.74	41484.44	292.189	10.16	10.57
2007-08	34874	276.09	2927.25	7.14	2200.19	9.61	40001.44	292.84	6.22	10.82
2006-07	39704.85	304.64	2987.37	6.31	3038.92	8.4	45731.15	319.35	21.43	13.63
2005-06	33829.83	270.89	1442.80	2.83	2765.30	7.33	38037.93	281.05	1.00	6.35
2004-05	34248.04	254.82	573.99	2.4	2837.92	7.04	37659.94	264.26	-	-

⁷ Office of the Deputy Director, FIQC, DOF, Khulna

CHAPTER 4

Impact Analysis of Quality Assurance, Export and Poverty Reduction

4.1 Introduction

For impact evaluation of the project, we have analyzed the changes in knowledge of food safety and quality control, export earnings, stock of wealth and wellbeing of the beneficiaries after the project intervention. In this chapter, we have also analyzed the pattern of changes in land holding, income, knowledge of food safety and quality control, production, processing, marketing, household assets and human assets. Data was collected from the beneficiary-1 comprising fish farmers and destitute women and beneficiary-2 comprising processors, depot and ice plant owners, middleman, aratdars, and suppliers etc. The data of control group 1 and 2 was also collected from the similar types of respondents from the control group areas.



Plate 8: Exportable Shrimp

4.2 Functional Status of FIQC Laboratories {Ref. objective 1 (b)}



Plate 9: Consultant with DD and Lab Expert at FIQC, Chittagong

DOF has completed the construction of two new FIQC laboratory buildings during 2008. Fitting, fixing it, installation and training on the new equipment have also been completed during early 2010. The FIQC laboratories have been expanded up to international standard in terms of all accessories. Steps have also been taken for getting necessary accreditation for the three laboratories.

In addition of the above, support has also been provided to upgrade environmental controls and power supply, installation of a local area network, and repair and transfer of equipment from the existing laboratories. A Laboratory Information Management System (LIMS) has been designed and 28 laboratory personnel been trained on LIMS through workshops in all five of the seafood testing laboratories.

4.2.1 Change of the Level of Knowledge-Beneficiary 1

The extent of the status of knowledge on modernization of laboratories and its impact on the project group has been verified and compared with that of control group. The results have been presented in Table-14. It has been found that 81.8% (1228) of the respondent beneficiary under project group replied in affirmative and 18.2% (273) in negative regarding quality control measures and knowledge of modernization of the laboratories. In case of control group, only 13.1% (99) respondent responded in affirmative while 81.2% (614) in negative.



Plate 10: Lab Personnel Operating Latest Equipment

We also asked them whether any need to conduct test in any organization and maximum 82.4% (1237) respondents opined affirmative answer as compared to 8.2% (62) in control

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group. Similar trends of results has also found in case of type and quality of work rendered by the FIQC laboratories etc and highest 59.6% (895) and 75% (1126) respondents opined positive reply as compared to only 40.4% (606) and 25% (375) in control group. While we asked their production and income increment then 59.6% (895) respondents expressed that their production and income has increased slightly as compared to only 29.8% (225) in control group. From this quantitative analysis and from discussion with the beneficiaries it is revealed that project intervention has impact on enhancing the level of knowledge on food safety and quality, income and export earnings.

4.2.2 Change of the Level of Knowledge-Beneficiary 2

The extent of the status of knowledge on modernization of laboratories and its impact on the project group has been verified and compared with that of control group. The results have been presented in Table-15. It has been found that 89.4% of the respondent beneficiary under project group replied in affirmative and 10.6 % in negative regarding their knowledge of test requirement under any organization for export and modernization of FIQC laboratories. In case of control group, only 9.1% respondent responded in affirmative while 90.9% in negative. Around 68.6% of project group respondents indicated to have increased their income due to modernization of FIQC laboratories whereas in control group the positive response was only 9%. Similar trends has also been found in the increment of export earnings (58%) and acceptance of laboratory testing at international markets (79.3%) but the same was found only 10% in control group (Table 4.12). From this quantitative analysis and from discussion with the beneficiaries, it was revealed that project intervention has impacted positively on enhancing the level of knowledge regarding food safety, quality assurance, income generation and export earnings.

Table 14: Beneficiary-1 Knowledge on Modernization of FIQC Laboratories

Item	Project Group (%), N=1501		Control Group (%), N=756	
	Yes	No	Yes	No
Do you take quality control measures?	81.8% (1228)	18.2% (273)	13.1% (99)	86.9% (657)
Knowledge of modernization of FIQC laboratories	81.8% (1228)	18.21% (273)	18.8% (142)	81.2% (614)
Whether test is required under any organization for export	82.4% (1237)	17.6% (264)	8.2% (62)	91.8% (694)
Do you know the quality of the work of the FIQC lab?	59.6% (895)	40.4% (606)	6.4% (48)	93.6% (708)
Do you know what service rendered by FIQC lab	75% (1126)	25% (375)	7% (53)	93% (703)
Has your production and income increased due to FIQC lab	59.6% (895)	40.4% (606)	29.8% (225)	70.2% (531)
If yes how much in a year?				
Production 100-500 kg and; Income: BDT 6000-30,000	50% (751)			
Production 501 kg & above: Income: BDT 30,000 & above	9.6% (144)			

Table 15: Beneficiary-2 Knowledge on FIQC Laboratories

Item	Project Group (%), N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Knowledge of test requirement for export	89.4% (168)	10.6% (20)	9.1% (8)	90.9% (80)
Knowledge on modernization of FIQC laboratories	89.4% (168)	10.6% (20)	9.1% (8)	90.9% (80)
Acceptability of lab test as per int'l standard requirement	79.3% (149)	20.7% (39)	10% (8)	90% (80)
Impact of lab on income enhancement	68.6% (129)	31.4% (59)	9.1% (8)	90.9% (80)
Impact of lab on enhancement of export earning	58% (109)	42% (79)	10% (8)	90% (80)

4.3 Institutional Capacity Development of DOF {Ref. objective i(c)}

The project has strengthened the institutional capacity through the recruitment of appropriate (41) manpower with specific responsibilities to ensure effective and efficient monitoring and analysis of fish and fish products particularly for pathogen, toxic elements, pesticide residue, antibiotic, hormones etc. Public and private sector laboratory staff have also been trained on good laboratory practices, standard operating procedures, chemical and microbiological testing, laboratory accreditation and operation of new HPLC, PCR, AAS, and ELISA equipment. Besides, 74 seafood processors' have been assisted to upgrade their laboratories for self-check system. DOF capacity has been strengthened to provide training to the private sector through in-country and overseas training courses, workshops, seminars, study tours and conferences.

The parameters relating to the enhancement of knowledge on capacity improvement of FIQC wing and processing plants have been studied and presented in Table-16. It has been found that 69.7% beneficiary of the project group responded positively regarding the capacity enhancement while none of the control group showed any positive response but 100% responded negatively. The responses regarding renovation of production and landing station, depot and ice plant, additional manpower recruitment, drinking water availability exhibited a positive response of 56%, 69.7% and 69.7% respectively while the same was not found in control group, The project has enhanced the skills and capability of FIQC officials (69.7%) while it was found none in control group. The beneficiary responded positively (69.7%) regarding the training received while it was none in control group. It was also indicated that the availability of trained officials at the FIQC laboratories increased (56%) whereas nobody received any training from the control group. From the above it can be concluded that project intervention has impacted positively on enhancing the level of technical knowledge and skill of the FIQC officer.

Table 16: Status of the Institutional Capacity Development of DOF

Item	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Do you know capacity of FIQC lab has increased through the project?	69.7% (131)	30.3% (57)	-	100% (88)
If yes, what type of support provided	<i>Multiple responses</i>			
<i>Renovation of shrimp production and landing station, depot & ice plant</i>	56% (840)		-	-
<i>Recruit new Manpower</i>	69.7% (131)		-	-
<i>Pure drinking water</i>	36%		-	-

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	(47)			
Do you know the ability of officer?	69.7% (131)		10% (2)	90% (80)
Has officer received training?	69.7% (131)		-	100% (88)
Are trained officers available with FIQC?	56% (105)		-	100% (88)
Improvement of skills and capacity of the officers	79% (149)	21% (39)	-	-

4.4 Food Safety and Quality of Fish/Shrimp Products {Ref. objective i(d)}

The status of the improvement and general awareness of food safety and quality of fish/shrimp products has been furnished in Table-17-18.

4.4.1 Beneficiary-1

Survey was conducted based on the set parameter both from the project and control groups. The data of the table-17 appeared that 78% (1171) respondent from the project group indicated positive response regarding the attainment of proper postharvest management whereas the same was noticed as 49.2% (372) in case of the control group. All of them (78%) have also adequate knowledge on post harvest activities like washing, cleaning, sorting and grading. We have also asked them what happen to perform proper post harvest



Plate 11: QA method briefed by Trained Lab Personnel at FIQC lab of Chittagong

activities and highest 79% (1186) respondents replied for good income while around 52% (782) respondents opined that it ensure quality of product and good value of products as compared to 6.7% to maximum 43% in different items in control group. The lowest 39.7% (596) respondents stated that it ensure to get buyer easily. When we asked them about project support for quality shrimp production, maximum 86.9% (1113) respondents opined that they didn't receive any support as compared to 100% (756) in control group. Similar results have also found in idea about present standard of FIQC laboratories where only 32% (411) respondents confirmed that they have an idea about this as compared to 3% (10) in control group. From this quantitative analysis it is revealed that project intervention has impact on quality control but very minimum impact in production technology.

4.4.2 Beneficiary-2

It appeared from the table-18 that 79.3% respondent from the project group indicated positive response regarding the attainment of proper postharvest management whereas the same was noticed as 33% in case of the control group. Similar trends have also been found regarding quality control mechanism from production to processing representing 79.3% affirmative in project group compared to only 35% in control group beneficiary. The respondents regarding the use of fresh raw materials, hygienic condition of the depot and sanitation facilities under the project group responded positively at the tune of 20%, 39% and 35% respectively whereas nobody maintained the same in case of the control group.

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With regard to the issues of improved transportation system 39% beneficiary responded in favor of it under the project group while nobody used the same in control group. Regarding the use of hygienic ice and plastic baskets almost 100% beneficiary responded positively in project group while none of the control group used hygienic ice but 50% beneficiary of the control group used 50% plastic basket in their daily operations.

While asking whether they have received any support on quality shrimp production from the project, 62% respondents replied in affirmative as compared to only 10% in control group. All the respondents (100%) of project and control group replied negatively while it was asked whether they visited the FIQC laboratories.

Similar results have also shown in case of importance of FIQC laboratories, acceptance of certificate at the international level and decrease of consignment rejection and withdrawn of mandatory test wherein 66% respondents replied affirmatively compared to 9.1% in control group. It has also been found that 79.3% respondents of project group realized the necessity of the compliance of HACCP system to ensure export of shrimp products as compared to only 20% in control group. While asking whether FIQC laboratories can deliver the desired service or not then 52.7% respondent under project group replied positively as compared to only 10% in control group.

Table 17: Status of Food Safety and Quality of Fish/Shrimp Products: Beneficiary-1

Item	Project Group (%) N=1501		Control Group (%) N=756	
	Yes	No	Yes	No
Status of knowledge on post-harvest management	78% (1171)	22% (330)	49.2% (372)	50.8% (384)
Adherence of quality control mechanism from production to processing	78% (1171)	22% (330)	27.1% (205)	50.8% (384)
If yes what are these?	<i>Multiple responses</i>			
Use HACCP compliance gher & fish feed	78% (1171)		11% (83)	
Washing & Cleaning	68% (1021)		27.1% (205)	
Sorting & Grading	68% (1021)		27.1% (205)	
Use of plastic basket & fresh water ice	78% (1171)		27.1% (205)	
All above	71% (1066)		23% (174)	
What happen for these post-harvest activities?	<i>Multiple responses</i>			
Ensure quality of product	52.1% (782)	47.9% (719)	27.1% (205)	72.9% (551)
Ensure good value of product	52.1% (782)	47.9% (719)	43.5% (329)	56.5% (329)
Easy to get buyer	39.7% (596)	60.3% (905)	6.7% (51)	93.3% (705)
Good income	79% (1186)	21% (315)	18.5% (140)	81.5% (616)
Above all	79% (1186)	7% (105)	27.1% (205)	72.9% (551)
Have you received any support from DOF/SFIQC for quality shrimp production?	12.8% (164)	86.9% (1113)	-	100% (756)
Do you have any idea about present standard of FIQC laboratories?	32.1% (411)	67.9% (870)	3% (10)	97% (319)

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Table 18: Status of Food Safety and Quality of Fish/Shrimp Products: Beneficiary-2

Item	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Status of knowledge on post-harvest management	79.3% (149)	20.7% (39)	33% (28)	67% (60)
Adherence of quality control mechanism from production to processing	79.3% (149)	20.7% (39)	35% (32)	65% (56)
If yes areas:	Multiple responses			
Use of fresh raw materials	20% (38)		5% (4)	
Hygienic conditions of depot	39% (73)		10% (9)	
Status of sanitation	35% (76)		5% (4)	
Improved Transportation	39% (73)		5% (4)	
Supply of Hygienic Ice	79.3% (149)		10% (9)	
Use of Plastic basket	79.3% (149)		33% (32)	
Processing, grading and packing	22.9% (43)		25% (22)	
Improved supervision	10.6% (20)		10% (9)	
Microbiological test	29.3% (55)			
Chemical test	10.6% (20)			
Status of support received from project on quality of fish/shrimp production	62.8% (118)	37.2% (70)	10% (9)	90% (20)
Have you visited at FIQC lab?	-	100% (188)		100% (20)
Importance of FIQC certificate	66% (124)	34% (64)	10% (2)	90% (20)
Is FIQC certificate international standard?	66% (124)	34% (64)	9.1% (2)	90.9% (20)
Does consignment rejection decrease and 20% mandatory test withdrawn?	66% (124)	34% (64)	9.1% (2)	90.9% (20)
Is it necessary to ensure HACCP compliance for exporting?	79.3% (149)	20.7% (39)	20% (4)	80% (14)
Do you think FIQC can deliver your required service?	52.7% (99)	47.3% (89)	10% (2)	90% (20)

4.5 Implementation Status of HACCP and Traceability (Ref. objective ii)

The implementation status of Hazard Analysis Critical Control Point (HACCP) and traceability system in all stages from pre-harvesting to export level through up-gradation of on-farm and in-plant own check system has been furnished in the following pages:

4.5.1 Changing Scenario of HACCP and Traceability Implementation

A total of 30 workshops and short courses were conducted for laboratory personnel from DOF/FIQC, DOF field laboratories, BCSIR, BAEC, BARI, and from processing plant focusing the topics of sample preparation, good laboratory practice, standard operating procedures, microbiology, quality management, ISO 17025, microbiological contamination, laboratory information management systems, and training on the new installed equipment - HPLC, LC-MS-MS, Real Time PCR, ELISA, and AAS. Besides, 37 scientists and



Plate 16: Follow up Training on HACCP, DD, FIQC Chittagong

technicians from FIQC, BCSIR, BARI and BAEC were also trained in Portugal, Spain, Netherlands, Austria, India, Ireland, Sri Lanka and the UK in addition of 20,885 target group training on HACCP and traceability for the development of adequate human resources both in public and private sector.

The results regarding the current status of human resources development have been presented in Table-19. In real terms, there has been a significant increase of knowledge regarding HACCP compliance after the project intervention. It is evident from the Table-19 that 56.4% respondent replied positively regarding the required skills of FIQC laboratory personnel for the compliance of HACCP while only 9.1% responded positively in control group. A similar trend (56.4%) was also found in FIQC personnel regarding the training on HACCP compliance compared to the control group (9.1%). With regard to Laboratory activities, HACCP compliance, product development, quality management, WID & Labor Law the positive responses from the beneficiaries were in the tune of 43.6%, 58%, 23%, 41%, and 6% respectively.

HACCP (Hazard Analysis Critical Control Point) is the systematic preventative approach to food safety. It addresses physical, chemical, and biological hazards as a means of prevention rather than finished product inspection.

The most important issue of food quality and safety such as traceability, respondents have some knowledge as they received training on that which is 74.6% (1120) as compared to none in control group. Similar result (74.5%) was also found in implementation of traceability system compared to none in the control group.

Traceability can be defined as an unbroken record of documentation. In other words "traceability means the ability to trace the producer/supplier, location, and/or history of an activity or item by means of recorded data at all of the stages of production, processing and distribution."

Thus in terms of knowledge and training on HACCP compliance, project group showed a significant improvement comparing to that of control group. In view of the above, the changing scenario of the improvement of human resources development particularly for the HACCP and traceability compliance is apparently visible.

Table 19: Implementation Status of HACCP and Traceability

Parameter	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Availability of required skilled manpower of FIQC lab to comply HACCP	56.4% (106)	43.6% (82)	9.1% (8)	90.9% (80)
Do you have skilled on HACCP compliance & implementation?	56.4% (106)	43.6% (82)	9.1% (8)	90.9% (80)
If yes, what are the areas:				
Laboratories activities	43.6% (46)		9.1% (8)	
Production and processing	56.4% (106)		9.1% (8)	
Product development	23% (24)		-	
Quality management	41% (43)		9.1% (8)	
WID & labor law	6% (6)		9.1% (8)	
All above	29% (31)		5% (4)	
Have you received any training on traceability?	74.6% (1120)	25.4% (381)		100% (756)
Are you implementing traceability system/framework?	74.6% (1120)	25.4% (381)		100% (329)

4.5.2 Change of In-Plant “Own Check” System

The project has provided technical support to strengthen in-plant quality control system for every fish processing plants to ensure quality products by adapting “own check” system, with a view to introduce HACCP system. Attempts were taken to develop skill and efficiency of the different stakeholders in the form of training, study tour, meeting and seminars.



Plate 14: In-Plant Check in System of SAR & Co Ltd.



Plate 15: Exportable Packed Shrimp at Processing Plant

The results of the services have been shown in Table-20 representing the data of beneficiary-2 only. It is apparent from the Table-20 that 76.1% respondents have adequate knowledge on quality control of their own organization after the project intervention as compared to only 10% in control group. Almost similar trends have also been seen in case of the importance and method wherein 73.9% respondents have

opined positively compared to 9.1% in control group. The status “own check” system of the processing plant has received the EU international standard acceptance. As such, the possible threats for the exportation of fish/shrimp products have been reduced to greater extent.

Table 20: Status of the Development of In-Plant Quality Control System

Item	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Status of the knowledge of quality control (In-plant) at the organization level	76.1% (143)	23.9% (45)	10% (8)	90% (80)
Quality Control at organization level in 2005	23.9% (45)		5% (4)	
Quality control at organization level in 2012	76.1% (143)		5% (4)	
Understanding the importance of traceability at field level	73.9% (139)	26.1% (39)	9.1% (8)	90.9% (80)
Understanding of traceability method at the organization level	73.9% (139)	26.1% (39)	9.1% (8)	90.9% (80)

4.5.3 Change of Idea about Product Development and Foreign Currency Earning

At present Bangladesh has been producing mostly traditional block frozen product. But world requirement has been shifting from the traditional block frozen product gradually towards value added and readymade products for immediate consumption. The project has been implemented with the strategies for developing and producing new types of various value added products so as to enhance foreign exchange earnings. During the field survey attempts were taken to assess the status of changed idea and aptitudes regarding shrimp product development and diversification from the respondents.

4.5.3.1 Beneficiary-1

The results of the survey have been presented in Table-21. Around 18% (270) respondents indicated that there has been considerable increase of product development idea after the project compared to only 16.4% (124) in control group. Manifestation of the positive responses regarding shrimp product development were in the forms of frozen shrimp/hilsa 17%, dry and salted fish 10%, frozen packed shrimp 15% and white fish (16%) etc. Regarding the impact of project on value added product development only



Plate 12: Cooked PD Tail on Shrimp

17.5% (270) respondents replied positively whereas none responded positively in control group. In case of support received from the project on shrimp product development, only 6% (90) respondents replied affirmatively compared to 100% negative in control group. From this analysis it is revealed that project has no major impact on production and product development to the beneficiary-1.

4.5.3.2 Beneficiary-2



Plate 13: Cooked PD Tail off Shrimp

The results of the survey have been presented in Table-22. Around 48.4% respondents indicated that there has been considerable increase of product development idea after the project compared to only 10% (2) in control group. Manifestation of the positive responses regarding shrimp product development were in the forms of chilled and frozen shrimp (52.2%), hilsa (10.6%), dry and salted fish (6%), frozen packed shrimp (53.2%) and white fish 53.2%) etc. While asking whether foreign currency earnings have increased after the project due to product diversification, 58% of project respondents reported to have increased foreign exchange earnings. Highest 65% incidence of

increased income was noticed in the project group under the income range of 1-10% followed by 11-20%. Regarding the impact of project on value added product development only 47.9% respondents replied positively whereas none responded positively in control group. In case of support received from the project on shrimp product development, the highest number (74.5%) respondents replied affirmatively compared to 100% negative in control group. Regarding the support provided from the project 74.5% beneficiary indicated positively and the same was manifested in the form of training and awareness campaign.

Table 21: Status of the Product Development –Beneficiary-1

Item	Project Group (%) N=1501		Control Group (%) N=756	
	Yes	No	Yes	No
Do you have any idea about shrimp product development & diversification	18% (270)	82% (1231)	16.4% (124)	83.6% (632)
If yes, please mention:				
Frozen shrimp/hilsa	17% (255)	83% (1246)	15% (113)	85% (643)
Dry and salted fish	10% (150)	90% (1351)	11% (91)	89% (673)
Frozen packet shrimp for consumer	15% (225)	85% (1276)	13% (98)	87% (658)
Raw/Cooked-PD tail/Tail-off Blanched/Skewer/Butterfly IQF shrimp	-	100 (1501)	-	100% (756)
Is there any impact of project to produce value added product of shrimp/fish	17.5% (263)	82.5% (1238)	-	100% (756)
Have you received any support regarding shrimp production and product development from the project?	6% (90)	94% (1411)	-	100% (756)

Table 22: Status of the Product Development and Foreign Currency Earning: B-2

Parameters	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Do you have an idea about shrimp product development & diversification?	48.4% (91)	51.6% (97)	10% (8)	90% (80)
If yes, areas of idea:	Multiple responses			
Chilled and frozen shrimp	24% (45)		5% (4)	
Chilled and frozen hilsa	12.1% (20)		5% (4)	
Dry and salted fish	6% (10)		5% (4)	
Frozen packet shrimp for consumer	25.5% (48)			
White fish	25% (27)		5% (4)	
Status of the increment of foreign currency earnings due to product diversification?	58% (109)	42% (79)	15% (3)	85% (19)
1-10%	65% (71)		100% (3)	
11-20%	21% (23)			
21% & above	14% (15)			
impact of project on value added production of shrimp/fish	47.9% (90)	52.1% (98)	-	100% (88)
supportive status regarding shrimp production and product development from the project	74.5% (140)	25.5% (48)	-	100% (88)
Training	74.5% (140)		-	-
Technical Support			-	-
Awareness campaign	74.5% (140)		-	-

4.5.4 Status of Organization in View of HACCP

Among the project group, 81.4% respondent indicated that they have only 1 organization while 85% in control group responded to have 1 organization. Regarding manpower deployment, 81.9% beneficiary indicated have 1-10 manpower followed by 12.8% in 11-20 manpower and only 5.3% in 21 and above staff compared to 85% under 1-10 manpower and 10% under 11-20 manpower and 5% under 21 and above manpower in control group. Around 51% respondents have given positive reply on staff training from



Plate 17: Processing Plant Working Environment

the project as compared to 100% of normative in control group. While asked about the source of selling/buying of shrimp, 81% respondents replied from the depot/aratdars and 6% other sources. Regarding the type of work delivery, 33% replied positively for exporting, 10.6% for dealers, 25.5% for processing, 81% for Depot/aratdars/middleman, and 15% in different work categories under multiple choice. Around 100% of the respondents opined that they have bought/sell more than 1001 kg of shrimp in a month as compared to 85% in control group. While asked whether their skills have increased due to training, 76.1% beneficiary replied positively compared to 100% of normative in control group. While it was asked whether their organization has been approved from any authority

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almost 87% has confirmed that they have been approved from DOF as compared to no response in control group. None of the project group and control group organization has any child labor in their organization. From the data it can easily understand the status of the organization.

Table 23: Status of Organizational in View of HACCP

Item	Project Group (%) N=188			Control Group (%) N=88		
	Yes		No	Yes	No	
	1	1>		1	1>	
Number of organization posses	81.4% (153)	18.6% (35)	-	85% (76)	15% (12)	
Manpower number		-	-			
1-10	81.9% (154)	-	-	85% (76)		
11-20	12.8% (24)	-	-	10% (8)		
21 & above	5.3% (10)	-	-	5% (4)		
Are they trained	51% (96)	-	49% (92)		100% (88)	
Shrimps purchase place for the organization						
Open market						
Depot/Aratdar	81% (164)					
Wholesaler	13% (24)			85% (76)		
Others	6% (11)			15% (12)		
Nature of work performed						
Exporting	33% (62)			10% (8)		
Dealers	10.6% (20)			10% (8)		
Processors	25.5% (48)			20% (16)		
Depot/Godown	81% (164)			50% (44)		
Supplier	15% (28)			10% (8)		
Quantity of shrimp buy/sell per month						
500-1000	-			15% (12)		
1001 & above	100% (188)			85% (76)		
Has training increased staff efficiency?	76.1% (143)		26.9% (45)	-	100% (88)	
Presence of child labor	-		100% (188)	-	100% (88)	
Approval status from proper authority			-	-	100% (88)	
DOF	100% (188)		-	-	-	
EU	87% (164)		-	-	-	
ISO	13% (24)		-	-	-	

4.5.5 HACCP Compliance Fish/Shrimp Production

4.5.5.1 Status of Assets

The status of respondent assets and production are important elements of livelihood. Here we shall look into the status of these individual elements of respondent's assets, and production to marketing separately.

4.5.5.2 Assets: Pond/Gher



Plate 18: Golda Gher at Khulna

Assets/Pond/Gher is one of the most important indicators of livelihood and outcomes of project intervention. Three types of pond/gher size have been categorized which is up to 1 acre, 1.1 acre to 2 acre and above 2 acre. From the data of the table-24 below it is found that only 10% family has more than 2 acre

pond/gher before the project as compared to 29% after the project. There is no major variation observed in control group in before and after project period which is 15%. This change of pond/gher size indicates positive impact of the project areas livelihood improvement.

4.5.5.3 Production (Kg/ha)

Production is an important development indicator of income. As indicated in Table-24, 87% (1306) respondents of the project group has opined that their production ranged is between 300-500 kg/ha while 13% (195) has expressed that their production rang is above 500 kg/ha. There is no significant variation observed in before and after project even

control group in regards of production. From the data, it is revealed that project has not any impact on production.



Plate 19: Shrimp just After Harvest at Depot

4.5.5.4 Marketing

From the table it is revealed that around 72% (1081) respondents indicated that they sell their products to the depot/aratdar followed by 28% (420) in open market as compared to 27% (204) and 28% (212) respectively in control group. The highest 79% (597) respondents of the control group opined that they sell their products in wholesale market as compared to only 19% (285) in project group.

4.5.5.5 Fish Feed

Among the project group, 69.3 (1040) respondent indicated that they are using market brand fish feed like quality, titas etc and rest of 30.7% (461) are still using homemade mixed non-toxic fish feed as compared to only 39.8% (301) and 60.2% (455) in control group. Around 78% (1171) respondents stated that they are using fish feed twice in a day (morning and evening) while rest of 22% opined that they are using only once at the evening. Highest 94% (1411) respondents of the project group opined that they are not using any chemical at their gher as compared to 27% in control group. Most of them (97.2%) expressed that they are not selling their products directly to the processing plant. Maximum (82%) of respondents confirmed that they can sell 100-500 kg on an average per month as compared to 80% in control group. Most of them (77.4%) respondents opined that project has no impact on

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production increment. While asked them to whether you face any problem to sell your products then 34.3% (515) indicated that they are facing problem like low price (19.3%), commission (6%), Extortion 4%, broker intervention 3% and transport problem 2% as compared to 72.9% in control group.

Table 24: HACCP Compliance Fish/Shrimp Production History

Item	Project Group (%) N=1501		Control Group (%) N=756	
	Before	Now	Before	Now
Pond/Gher Size in Decimal				
1 acre (100 decimal)	32% (480)	23% (345)	30% (227)	28% (212)
1.1 acre to 2 acre	58% (871)	48% (720)	55% (416)	57% (431)
Above 2 acre	10% (150)	29% (435)	15% (113)	15% (113)
Fish/Shrimp production (Kg/ha)				
300-500 kg	87% (1306)	87% (1306)	86% (650)	86% (650)
Above 500 kg	13% (195)	15% (113)	14% (106)	14% (106)
Source of Shrimp PL				
Hatchery	31% (465)	51% (766)	23% (174)	31% (234)
River/other	69% (1036)	49% (735)	77% (582)	69% (522)
Where do you sell your fish/shrimp product?				
Open Market	34% (510)	-	33% (249)	45% (340)
Depot/Aratdar	19% (285)	88% (1321)	17% (129)	5% (38)
Wholesale market	37% (555)	09% (135)	39% (295)	39% (295)
Processing plant	-	3% (45)	-	-
Others	10% (150)	-	11% (83)	11% (83)
Type of fish feed used for shrimp production				
Market available brand fish feed	30.7% (461)	69.3% (1040)	39.8% (301)	60.2% (455)
Homemade mixed non-toxic fish feed	69.3% (1040)	30.7% (461)	60.2% (455)	39.8% (301)
Amount of fish feed used for shrimp production				
Once time in a day	22% (330)	78% (1171)	79% (597)	21% (159)
Two times in a day	78% (1171)	22% (330)	21% (159)	79% (597)
	Yes	No	Yes	No
Do you use any chemical at your gher?	6% (90)	94% (1411)	73% (552)	27% (204)
If yes type of chemical you used				
Lime	3% (45)	-	48% (363)	48% (363)
TSP	3% (45)	-	25% (189)	25% (189)
Urea	3% (45)	-	13% (98)	13% (98)

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Cow dung	6% (90)	-	73% (552)	73% (552)
Quick growth hormone	2% (30)	-	4% (30)	4% (30)
Medicine	2% (30)	-	3% (23)	3% (23)
Has your fish/shrimp production increased due to the project	22.6% (339)	77.4% (1162)		100% (756)
Do you face any problem to sell your products?	34.3 (515)	65.7% (986)	72.9% (551)	27.1% (205)
If yes what types of problem?				
Low price	19.3% (290)		36% (272)	
Commission	6% (90)		13% (98)	
Extortion	4% (60)		11% (83)	
Broker intervention	3% (45)		5% (38)	
Transportation problem	2% (30)		7% (53)	

4.6 Impact on Employment and Poverty Reduction (Ref. objective iii)

The impact of project activities in relation to employment of destitute people especially women and poverty reduction of the people at the catchment areas/upazilas has been furnished in the following pages:

4.6.1 Employment Generation

We have asked about the status of employment generation due to project intervention after the project. The data was collected from the both categories and are presented below:

4.6.1.1 Beneficiary-1

Around 84% respondents (table-32) have told that there has been considerable increase of employment opportunities after the intervention of project. When asked about the status of socio-economic status improvement due to project, around 72.9% (1094) beneficiary responded positively while 100% (22) of control group replied negatively. Regarding the creation of scope for women employment, 79.2% (1189) beneficiary under project group replied positively compared to none in control group. Around 68% of respondents confirmed that the project has ensured environmental friendly working condition for the staff. Though there has been some improvement perceptible with regards to women empowerment after project intervention but productivity remained crucial factors to sustain and further growth of the sector.

4.6.1.2 Beneficiary-2

The data of the table-26 indicated that around 84% respondents have been considerable increase of employment opportunities after the intervention of project. Manifestation of the increases in processing plants was around 53%, fish/shrimp farm around 21% and Income Generating Activities (IGAs) around 26% has created due to project. When asked about the status of socio-economic status improvement due to project, around 68% beneficiary responded positively while 100% (88) of control group replied negatively. The beneficiaries included fish farmers 31%, business person 10%, processors 43%, and others 16%. While asking of own in-plant check in system 75% beneficiary confirmed that they were able to run

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own check in system without anyone help from the project. Regarding the creation of scope for women employment, 94.7% beneficiary under project group replied positively compared to only 5% in control group. Similar trends have also been found in self employment wherein 89.4% beneficiary responded positively whereas only 5% in control group. With regard to negative impact on environment 100% beneficiary responded negatively in project group and control group. Around 92% of respondents confirmed that the project ensured environmental friendly working condition for the staff. The similar results were also found in consignment rejection which was 89.4 compared to 10% in control group. But in case of raw materials availability for the processing plants only 14% respondents has opined the availability of raw material whereas maximum 85.1% has expressed their serious concerns over non-availability of raw material and thus unable to run all 74 approved processing plants and ill practice is going on due to this. Only 20% of the total approved plants can get raw material. Urgent measures like high yielding variety need to be introduced to increase productivity to save the industries. All the efforts of food safety and quality and top up approach like modernization of laboratories will be useless if raw material availability is not ensured. Though there has been some improvement perceptible with regards to women empowerment after project intervention but productivity remained crucial factors to sustain and further growth of the sector.

Table 25: Employment Generation-Beneficiary-1

Item	Project Group (%) N=1501		Control Group (%) N=756	
	Yes	No	Yes	No
Overall employment generation due to the project	84% (1261)	16% (240)	-	100% (756)
Improvement of socio-economic condition of the target group	72.9% (1094)	27.1% (407)	-	100% (329)
Impact on destitute women employment generation	79.2% (1189)	20.8% (312)		100% (756)
Project contribution on healthy working environment	68% (1021)	32% (480)		100% (756)

Table 26: Employment Generation: Beneficiary-2

Item	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Project status on employment generation?	100% (188)		9.1% (8)	90.9% (80)
Processing plant	52.7% (99)		9.1% (8)	
Fish/shrimp culture	21.2% (40)			
IGA activities	25.8% (49)			
Project status on the improvement of socio-economic condition of the target group	68.1% (128)	31.9% (60)	-	100% (88)
Fish/shrimp farmers	31% (40)	-	-	-
Business person	10% (13)	-	-	-
Processors	43% (55)	-	-	-
Others	16% (20)	-	-	-
Ability to run Own Plant Quality Check-in without	75%	25%	-	100%

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the help of project?	(141)	(47)		(80)
Insufficient training		75% (35)		100% (88)
Insufficient technical support		11% (5)		100% (88)
Lack of skills		9% (4)		100% (88)
Weak capacity of institution		5% (2)		100% (88)
Project status regarding women employment generation?	94.7% (178)	5.3% (10)	5% (4)	95% (84)
Project impact on the creation of self-employment?	89.4% (168)	10.6% (20)	5% (4)	95% (84)
Fish/shrimp production	37% (62)		5% (4)	
Processing, marketing & exporting	57% (96)		5% (4)	
Ice production	6% (16)			
All	43% (72)		5% (4)	

4.6.2 Impact on Income and Poverty Reduction

The impact of income and poverty reduction has been assessed through number of socio-economic indicators which are change in landholding and tenural pattern, annual income and expenditure, women empowerment and daily food intake etc. The detailed findings of the data have been presented in the following sub-heads:

4.6.2.1 Change in Land Holding and Tenural Patterns

Beneficiary 1: The results relating to the change in land holding and tenural pattern have been presented in table-28. It appeared that average holding of <acre owned land is around 51% (766), 13% (195) and 57% (856) after project intervention while the same was noticed as 79% (1186), 5% (75) and 47% (705) in pond/gher, cultivable land and owned homestead respectively before the project intervention. In case of above one acre (>acre) own land is around 49% (735), 10% (150) and 13% (195) after project intervention while the same was noticed as 21% (315), 1% (15) and 2% (30) in pond/gher, cultivable land and owned homestead respectively before the project intervention. Similar trends were also observed in case of share/lease land wherein 33% (495) and 5% (75) were observed in case of <acre and >acre before project intervention while the same was found to be 5% (75) and 56% (363) in <acre and >acre after the project. There has been no significant variation in case of the land ownership and share or lease land for the control group-1 (Table-28). Functionally land ownership status on more than a acre own and lease land have been increased on average and now it is around 72% in aggregate as compared to 24% before the project.

Beneficiary 2: The results relating to the change in land holding and tenural pattern have been presented in table-29. It appeared that average holding of owned land was around 66%, 13% and 8% in small, medium and large group after project intervention while the same was noticed as 51% 9% and 5% in small, medium and large group respectively before the project intervention. Similar trends were also observed in case of partnership organization wherein 16% 8% and 7% (2) improvements were observed in case of small, medium and large groups after project intervention while the same was found to be 12% 3% 1% before the project. With regard to rental system all the three categories has also shown a increasing trend after the project intervention. These were 20%, 12%, and 7% after project

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intervention as against of 5%, 6% and 5% before project intervention. There have been no major changes in case of the land ownership, partnership and rental for the control groups (Table-29). Functionally land ownership status among all the groups have been increased on average and now it is around 87% in aggregate as compared to 65% before the project which clearly indicates the socio-economic improvement of the people.

Table 27: Beneficiaries-1 Land Holdings and Tenure Patters-Beneficiary-1

Type of Land	Project Group (%), N=1501				Control Group (%), N=756			
	Area				Area			
	2005		2012		2005		2012	
Own Land	<Acre	Acre>	<Acre	Acre>	<Acre	Acre>	<Acre	Acre>
Pond/Gher	79% (1186)	21% (315)	51% (766)	49% (735)	77% (582)	23% (174)	75% (567)	25% (189)
Cultivable land	5% (75)	1% (15)	13% (195)	10% (150)	6% (45)	5% (38)	6% (45)	5% (38)
Owned homestead	47% (705)	2% (30)	57% (856)	13% (195)	66% (499)	5% (38)	67% (220)	5% (38)
Share/ Lease Land								
Lease/temporary contractual pond	33% (495)	5% (75)	5% (75)	56% (841)	48% (363)	3% (23)	18% (136)	23% (174)

*Multiple responses

Table 28: Beneficiaries-2 Land Holdings and Tenure Patters-Beneficiary-2

Ownership Type		Project Group (%), N=188			Control Group (%), N=88		
		Small (5-10 person)	Medium (11-20 person)	Large (above 21 person)	Small (5-10 person)	Medium (11-20 person)	Large (above 21 person)
Own	Before	51% (96)	9% (17)	5% (9)	50% (11)	10% (2)	5% (1)
	After	66% (124)	13% (24)	8% (15)	50% (11)	10% (2)	5% (1)
Partnership	Before	12% (23)	3% (6)	1% (2)	10% (2)	5% (1)	5% (1)
	After	16% (31)	8% (15)	7% (13)	10% (2)	5% (1)	5% (1)
Rent	Before	5% (15)	6% (11)	5% (9)	5% (1)	5% (1)	5% (1)
	After	20% (38)	12% (23)	7% (13)	5% (1)	5% (1)	5% (1)

*Multiple responses

4.6.2.2 Changes in Level of Income Flow

Income is the measure of economic performance of target respondents and is a source of consumption and saving of a household. It reflects inflow of wealth as a result of different economic activities. The World Bank defines poverty in absolute terms. The bank defines extreme poverty as living on less than US\$1.25 per day, and moderate poverty as less than \$2 a day.

Beneficiary 1: The results regarding the changes in income flow of the respondent have been summarized in Table-30. It can be mentioned here that the comparative study was made under project and control group representing fish farmers and destitute women. The total respondent was 1501 in project group and 756 in control group. Regarding the magnitude of income three source of income were used within the time frame of 2005 and that of 2012. The data indicated that the average gross annual income of beneficiary household was found to increase up to 55% under the income range of BDT 75,001- lakh

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and 34% under the income range of BDT above lakh after project intervention whereas 22% and 2% was found under the both income group before the project intervention. In the control group that enhancement was found to be 20% and 8% after project period whereas 18% and 7% was found under the income group of BDT 75001-lakh and above lakh before the project intervention. Among the source of income fish/shrimp represented the highest income gain after project intervention than any other source of income. The lowest enhancement of income was noticed in case of other income.

Beneficiary 2: The results regarding the changes in income flow of the respondent have been summarized in Table-31. It can be mentioned here that the comparative study was made under project and control group representing processors, depot owners, ice plant owners and others. The total respondent was 188 in project group and 88 in control group. Regarding the magnitude of income three times were used within the time frame of 2005 and that of 2012. The data indicated that the average gross annual income of beneficiary household (ice plant owners) was found to increase up to 100% under the income range of BDT 26-50 lakh after project intervention whereas none was found under the same income group before the project intervention. In the control group that enhancement was found to be 55%. Among the respondents the processors represented the highest income gain followed by depot after project intervention than any other groups. The lowest enhancement of income (40%) was noticed in case of other groups. In case of the processors, the income increased up to 100% under the income range of BDT: 51 lakh and above after project interventions while the same was found as 20% before project intervention. In control group, 100% income gain was noticed in case of the processors under the income range of BDT 26-51 lakh but none were found under the income group of BDT > 51 lakh and above. Similar results have also been found in case of depot owners. It showed an increment of 40%-60% under the income groups of BDT 26-50 lakh after project in all groups except processors whereas 100% was in BDT 1-25 lakh before project.

Table 29: Status of Income Flow from the Beneficiaries-1

Sources of Income	Project Group (%): N=1501								Control Group (%), N=756							
	Average Gross Annual Income (Tk.)								Average Gross Annual Income (Tk.)							
	Before Project (2005)				After Project (2012)				2005				2012			
	25000-50,000	50001-75,000	75001-100,000	> 1 Lakh	1-50,000	50001-75,000	75001-100,000	> 1 Lakh	1-50,000	50001-75,000	75001-100,000	> 1 Lakh	1-50,000	50001-75,000	75001-100,000	> 1 Lakh
Fish/Shrimp	89% (1336)	9% (135)	2% (30)	-	-	18% (270)	51% (766)	31% (465)	75% (567)	15% (113)	7% (53)	3% (23)	67% (507)	23% (174)	7% (53)	4% (30)
Agriculture	37% (555)	10% (150)	-	-	56% (841)	13% (195)	3% (45)	2% (30)	43% (325)	5% (38)	8% (60)	2% (15)	43% (325)	5% (38)	8% (60)	2% (15)
Other	32% (480)	3% (45)	-	-	33% (495)	4% (60)	1% (15)	1% (15)	57% (431)	13% (98)	3% (23)	2% (15)	55% (416)	15% (113)	5% (38)	2% (15)

*Multiple responses

Table 30: Status of Income flow from the Beneficiaries-2

Beneficiary Type	Project Group (%); N=188						Control Group (%); N=88					
	Average Gross Annual Income (Tk.)						Average Gross Annual Income (Tk.)					
	2005			2012			2005			2012		
	1-25 lakh	26-50 lakh	51 lakh & above	1-25 lakh	26-50 lakh	51 lakh & above	1-25 lakh	26-50 lakh	51 lakh & above	1-25 lakh	26-50 lakh	51 lakh & above
Processors		80% (15)	20% (4)			100% (19)		100% (5)			100% (5)	
Depot	100% (111)				45% (50)	55% (61)	100% (57)			45% (26)	55% (31)	
Ice Plant	100% (19)				100% (19)		100% (12)			40% (5)	60% (7)	
Others	100% (39)			40% (15)	60% (24)		100% (14)			40% (6)	60% (8)	
Total	(169)	15	4	15	93	80	83	5		37	51	

*Multiple responses

4.6.2.3 Changes in Average Annual Expenditure

Beneficiary 1: Results regarding the status of gross annual expenditure flow of the respondents have been presented in Table-32. The highest number of respondents 89% (1335) expressed their family food consumption related expenditure within 10,000-25,000 taka as compared to none in that range of amount but around 51% (766) within 75,001 to 1 lakh taka after project intervention. But the lowest number of respondents 2% (30) expressed their family food related expenditure within 50001-75000 taka as compared to 31% (465) after project intervention. The maximum 37% (555) respondents stated that their expenditure is within 10,000-25,000 taka for education and health whereas 56% (841) can spend same amount of money for education and health after the project intervention which indicates more income. The expenditure under other category and control group in all areas is almost same and there is no significant variation before and after the project. This apparently indicated an increase of annual income flow leading to increased expenditure for further betterment.

Beneficiary 2: Results regarding the status of gross annual expenditure flow of the respondents have been presented in Table-33. It is revealed that average gross annual expenditure in most of the cases of pond/land purchases, business expansion, processing cost, additional manpower and others item was in the range of BDT 1-15 lakh before the project intervention representing 7%, 7%, 25%, 10% and 10% except modernization of plant. Similar results have also been found under the expenditure range of BDT16-30 lakh. Only 6% and 1% expenditure was recorded for pond/land purchase and additional manpower category under the expenditure range of BDT 31 lakh and above before project intervention. But after the project intervention, the expenditure has increased in all cases such as pond/land purchases, business expansion, processing cost, modernization of plant, additional manpower and others item exhibiting 10%, 7%, 1%, 10% and 6% under the expenditure range of BDT 16 to 30 lakh. Besides, an increment of expenditure was recorded as 15%, 10%, 27%, 10%, 2% and 2% in all cases under a the expenditure range of BDT 31lakh and above group excepting family maintenance whereas 10% family expenditure has increased up to 16-30 lakh taka. This apparently indicated an increase of annual income flow leading to increased expenditure for further betterment.

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Table 31: Status of the Gross Annual Expenditure Flow of the Respondent

Area of Expenditure	Project Group (%) N=1501								Control Group (%), N=756							
	Average Gross Annual Expenditure (Tk.)								Average Gross Annual Expenditure (Tk.)							
	Before Project (2005)				After Project (2012)				2005				2012			
	10,000-25,000	25001-50,000	50001-75,000	> 75,000	10000-25,000	25001-50,000	50001-75,000	> 75,000	1-25,000	25001-50,000	50001-75,000	> 75,000	1-25,000	25001-50,000	50001-75,000	> 75,000
Food	89% (1336)	9% (135)	2% (30)	-	-	18% (270)	51% (766)	31% (465)	75% (567)	15% (113)	7% (53)	3% (23)	67% (507)	23% (174)	6% (45)	4% (30)
Edu/health	37% (555)	10% (150)	-	-	56% (841)	13% (195)	3% (45)	2% (30)	43% (325)	5% (38)	8% (60)	2% (15)	43% (325)	5% (38)	8% (60)	2% (15)
Othe	32% (480)	3% (45)	-	-	33% (495)	4% (60)	1% (15)	1% (15)	57% (431)	13% (98)	3% (23)	2% (15)	55% (416)	15% (113)	3% (23)	2% (15)

Table 32: Status of the gross annual expenditure flow of the respondent

Types of Expenditure	Average Gross Annual Expenditure Project Group (%) (N=188)					
	Before			Present		
	1-15 lakh	16-30 lakh	31 lakh & above	1-15 lakh	16-30 lakh	31 lakh & above
Family	100% (188)			90% (169)	10% (19)	
Pond/Land purchase	7% (13)	8% (315)	6% (11)	-	10% (22)	15% (34)
Business Expansion	7% (9)	4% (6)	-	-	-	10% (19)
Processing Cost	25% (53)	5% (13)	-	-	7% (13)	27% (51)
Modernization of Plant	-	-	-	1% (2)	1% (2)	10% (19)
Additional Manpower	10% (19)	4% (7)	1% (2)	-	10% (19)	2% (4)
Others	10% (19)	4% (7)	-	-	6% (11)	2% (4)

* Multiple responses

4.6.2.5 Project Impact on Daily Food Intake

When measured, poverty may be absolute or relative poverty. Absolute poverty refers to a set standard which is consistent over time and between countries. An example of an absolute measurement would be the percentage of the population eating less food than is required to sustain the human body (approximately 2000–2500 **calories** per day). In this section, we have estimated daily food intake in different groups in both pre-post periods for comparison, measured the relative changes of poverty situation in project households with respect to control, tried to see whether the project could lead to increase food intake, tried to find out timing of and root causes of poverty and find out ways of poverty reduction. This data was collected from the beneficiary-1 only.

It is observed from the table-34 below that around 79% of households family of project group cooked food twice in a day while rest 21% family members has found thrice in a day as

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compared to 70.3% of households family cooked food twice in a day while rest 29.7% family members has found once in a day before the project. But in control group similar trend of results have also seen in both cases of project and control group without any major variation in once (29.8% & 26%) and twice (70.2% & 74%) times of food is cooked in a day. We also asked them how many number of meals taken in a day. The highest 99.8% respondents of project group have stated that they eat food three times as compared to 70.3% before the project and 72% in control group. Around 99.2% of the project group has opined that they don't have any experience of food shortage/deficit in a year as compared to 26.1% in control group. Only 0.2% of the respondents have expressed that they have permanently deficit of food after project as compared to 26.1% in control group. Around 46.8% of the project group respondents have opined that they eat fish everyday followed by three days 34.2% while 34.3% of the control has opined same view followed by three days 9.7%. From the above analysis of the data, it is indicated that overall consumption of food of beneficiaries of project group has increased compared to before project intervention and control group. Around 30% increment of food consumption has found after project implementation. All respondents (1501) are above absolute poverty as their food intake range is above 2000-2500 calories.

Table 33: Impact on Daily Food Intake

Item	Project Group (%) N=1501		Control Group (%) N=756	
	2005	2012	2005	2012
How many times food is cooked in a day?				
One time	29.7% (446)	-	29.8% (225)	26% (197)
Two times	70.3% (1055)	79% (1186)	70.2% (531)	74% (559)
Three times	-	21% (315)	-	-
Number of meals taken in a day				
One time				
Two times	29.7% (446)	0.2% (3)	28% (212)	26.1% (197)
Three times	70.3% (1055)	99.8% (1498)	72% (544)	73.9% (559)
Other	-	-	-	-
Do you have any experience of food shortage in a year?	0.2% (3)	99.2% (1490)	73.9% (559)	26.1% (197)
Do you consider food situation to be one of the following?	0.2% (3)	98.6% (1481)	73.9% (559)	26.1% (197)
If yes, how many times in year				
One time	0.2% (3)		26.1% (197)	
Two times				
Three times				
Do you consider food situation to be one of the following:	0.7% (3)	99.3% (1491)	26.1% (197)	73.9% (559)
Permanently deficient (No regular meal everyday)	0.2% (3)	99.8% (1493)	26.1% (197)	73.9% (559)
Occasional deficit				
No surplus – no deficit	40% (600)		73.9% (559)	
Surplus	48.8% (732)			
How many days in a week you consume fish				
One day	1.6%		10.6%	

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	(24)		(35)	
Two days	7.5% (113)		41.6% (137)	
Three days	34.2% (513)		9.7% (32)	
Everyday	46.8% (702)		34.3% (113)	
Other	10% (150)		3.6% (12)	

4.6.2.6 Project Impact on Women Empowerment

We have estimated the status of women consciousness of beneficiary-1 on their rights by judging the knowledge level of respondents on seven important areas of women in development and labor rights. We have arrived at level of knowledge in individual items as well as in aggregate for all items. The results show level of women consciousness as high as 98.8% for project as compared to 58% for control group. The level of women consciousness has increased by average 69.8% for project households as compared to 35% for control. High growth (98.8) of women should involve in shrimp post-harvest activities and IGA is visible in all groups indicating positive impact of the project on increased women consciousness. Highest 89% respondents of the project group opined that they can buy anything as per their choice as compared to 47% in control group. Similar results has also found in decision making for family which is 67% in project group and only 11% in control group. Relatively low level of consciousness is found in property against their name which is 17% in project group and 7% in control group. Around 49% respondents of the project stated that they give their salary to their husband while 91% of control group opined same view. The maximum of 96.8% respondents of the project group viewed that project support has increased their income as compared to none of them in control group. From the analysis of the data, it is clearly revealed that project has good impact on women empowerment.

Table 34: Project Impact on Women Empowerment

Item	Project Group (%) N=150		Control Group (%) N=76	
	Yes	No	Yes	No
At present are you a member of any Fish/shrimp processing plant?	-	100% (150)	-	100% (75)
Do you think women should be involved more and more in fish/shrimp post-harvest activities and income generation Activities?	98.8% (148)	1.2% (2)	58% (44)	42% (32)
Can you buy anything as per your choice?	89% (133)	11% (16)	47% (36)	53% (40)
Can you take any decision for family business?	67% (100)	33% (50)	11% (8)	89% (68)
Do you have any property in your name?	17% (26)	83% (124)	7% (5)	93% (71)
Do you give salary to your husband	49% (73)	51% (77)	91% (69)	9% (7)
Do you think project support has increased your income?	96.8% (145)	1.2% (2)	-	100% (76)

4.6.2.7 Environmental Impact Assessment: All respondents (100%) confirmed that project has no negative impact in environment. Most of the respondents, which is 90.7% (171) and 92% (173), confirmed that the project has ensured environmental friendly working condition for the staff and by-product utilization. The similar result has also found in consignment rejection which was 89.4 compared to 10% in control group. But in case of raw materials

availability for the processing plants only 14% respondents has opined the availability of raw material whereas maximum 85.1% has expressed their serious concerns over non-availability of raw material and thus unable to run all 74 approved processing plants and ill practice was going on due to this. Only 20% of the total approved plants can get raw material. Urgent measures like high yielding variety need to be introduced to increase productivity to save the industries. All the efforts of food safety and quality and top up approach will be useless if raw material availability is not ensured.

Table 35: Environmental Impact Assessment

Item	Project Group (%) N=188		Control Group (%) N=88	
	Yes	No	Yes	No
Do you think project has any negative impact on environment?		100% (188)	10% (9)	90% (80)
Project contribution to ensure healthy working environment	90.7% (171)	8% (15)	5% (4)	95% (84)
Do you think project has ensured environmental friendly by-product utilization?	92% (173)	8% (15)	-	100% (88)
Are raw materials of processing plant available?	14.9% (28)	85.1% (160)	10% (9)	90% (80)
Does consignment rejection decrease?	89.4% (168)	10.6% (20)	10% (9)	90% (80)

4.7 Findings of the Focus Group Discussion (FGD)

The Focus Group Discussion (FGD) for the “Impact evaluation study of the Strengthening of Fish Inspection and Quality Control Services (2nd Revised)” in the project areas covering FGD-1: Muradpur, Chittagong, FGD-2: Purba Rupsa, FGD-3: Rajbath, Botiakandi, Khulna FGD-4: Zamira Bazar, Fultula, Khulna, FGD-5 Satkhira and FGD-6: Dhaka supported by Development Technical Consultants Pvt. Limited, Dhaka, Bangladesh was done as per standard procedure. At least one FGD was organized for each division with 20 participants. Accordingly, covering all three divisions under the project altogether 120 respondents were participated to express their opinion regarding the impact of the project in quality assurance and export earnings of fish/shrimp products. Three FGDs has organized in Khulna division alone as around 80% of shrimp exports from the division.



Plate 20: View of FGD Participants at Botiakandi, Khulna

The Focus Group Discussion were done in the study area in order to assess the major impact of the project activities’ expected outputs, sustainability of the project activities as well as to assess the quality of works as per the technical specification of the project, identifying the strengths and weaknesses of the project, and recommending for future. The major findings of the FGD comprising focal points are briefly mentioned here.

The major findings of the results of the FGD for different areas are given below:

- i. Among the respondents participated in the Focus Group Discussion (FGD) under all six project areas, all the respondents said that the construction and upgrading works of the

FIQC laboratories in Dhaka, Chittagong and Khulna completed up to the international standard level that has ensured to increase the acceptability of fish products at the international market.

- ii. The laboratory personnel opined that construction and upgrading, equipment purchase, and installation, training on operation and maintenance of laboratory equipments, training on laboratory activities, HACCP, traceability etc were sufficient enough to test fish and shrimp products from the laboratory. Currently Dhaka laboratory has been performing microbiology and chemical tests whereas Khulna and Chittagong laboratories are conducting only microbiology test as laboratories are yet to get approval from the DOF and MOFL. Three processing plant representatives expressed similar view in respect of quality testing and HACCP compliances. The processing plant owner's representative stressed to start testing of chemical at the regional station like Khulna and Chittagong so that they can avoid 5-10 days delay of shipment which incurred them of financial loss.
- iii. All the respondents opined that quality and food safety has ensured from production to processing stages up to the shipment. This finding revealed that the Traceability and HACCP in the project areas are being efficiently used for exporting fish/shrimp products to the overseas country. The respondents were fish farmers, depot owners, ice plant owners, processing plant representative, middleman, laboratory personnel and DOF representatives etc from three divisions.
- iv. The depot owners, ice plant owners and middle man of fish/shrimp products also expressed that their happiness regarding quality of training received on HACCP and traceability. Based on these, they are ensuring hygiene and sanitary condition of the depots fixing floor and wall tiles, using fresh water in ice plant. Due to this they invested almost half of their money thus unable to go for large volume of shrimp purchase. If authority arrange low interest money/fund as well as long-term lease of the plants land from the ministry of land/railway they even able to ensure more hygienic and sanitary system at the depots and ice plants. Whatever now they are investing for upgrading and modernization of depot and ice plant it is on the other assets. They are also using plastic basket, fresh water ice, coding model etc to comply HACCP and traceability. They know about Dhaka, Chittagong and Khulna testing laboratories.
- v. At the discussion of FGD, some fish farmers opined that very few of the fish farmers have received training regarding HACCP and Traceability issues at the union level but most of them not received any training of that nature. They received training 4-5 years ago. Very few of them can explain about HACCP and Traceability. Though project registered 190,000 fish farmers but training had conducted on pilot basis at few locations with maximum 21,800 fish/shrimp farmers, depot, ice plant and others as training budget was not enough to do so. Few farmers are well known to sanitary and hygienic production in using of fresh water, good quality PL, and quality fish feed. They also know that they have to avoid use of cow dung, and poultry waste etc. Farmers have stressed on more training on production, quality post larvae (PL) availability, and HACCP and traceability technology at least 3 days with classroom and field demonstration with a provision of follow-up training at yearly basis. It would be a great help of fish farmers for sustainable production and supply of quality fish/shrimps products to the depot to the processing plants for exporting.
- vi. Fish farmers stressed on more support from DOF and BFRI regarding production technology so that they can increase their production many folds as being practiced for tilapia and pangus etc. They stressed on Upazila level fisheries officer extensive support which is rarely available now. In addition, farmers also requested to make provision of low interest loan so that they can increase their production that will ensure steady supply of fish/shrimps product to the processing plants thus increase export and foreign

currency earnings. In fact fish farmers are little bit aware of BQSP/SFIQC project activities as the project was focus mainly on top-up approach.

- vii. The most of them opined that it will be a big challenge to ensure regular repair and maintenance of the laboratories equipments if there is no provision of yearly services contract from the respective venders and more financial delegation of laboratory authority to repair, maintenance and purchase of new equipments without delay and political pressure under the special conditions on priority item.
- viii. All supplied laboratories equipment are very sophisticate and modern for quality testing and all lab personnel were also well trained to ensure international standard of testing.
- ix. All the participants agreed that laboratories are international standard and will get approval of international accreditation soon. Because of quality enhancement of shipment rejection has decreased from 54 to 1 (2009 to 2012) in recent year. The processing plants have also been ensuring their “own check-in system” for the maintenance of quality and food safety of their products. The improvement of laboratories and processing plant regarding quality enhancement was found quite excellent. skilled manpower,
- x. Laboratory equipments, chemicals and skilled manpower are competent enough to meet customer’s demand. They can even handle more than the present requirement of sample test. Against present capacity of 70-85 of microbiological test, laboratory is conducting maximum 25-40 sample test per day while chemical test has been conducting in Dhaka laboratory only.
- xi. All laboratories are earning economic benefit in the form of service charged BDT 1200/sample for microbiological test and BDT 2800-5000/sample for chemical tests. The laboratory total earning is around 1.50 core taka to 4.5 core taka per annum from the service charged of the sample tests. Part of the income may be allocated for repair, maintenance and upgrading of the laboratory for long-term sustainability of the testing and exporting.
- xii. Fish and shrimps exports were suffered badly in the past and sometimes received imposition several times from the importing country until modernization of the laboratories. After modernization and capacity development through this project, export become smoother with any further threats. In recognition of this, EU has also withdrawn mandatory 20% testing in 2011.
- xiii. Fish and shrimp production has slightly increased but are also facing problems in Satkhira from environmentalist showing the reason of environmental destruction but in reality shrimp cultivation has no adverse impact on environment rather enhanced employment generation and facilitated poverty reduction. Bangladesh is vulnerable for climate change affect and experts are assuming that part of the countries around the sea will be submerged with saline water. In this situation, saline water will inundate automatically to the cultivable land. Under this adverse condition, production can only continue, if the area bring under fish/shrimp culture which will create a big scope of the affected people to earn more money than land as shrimp is a value added products. In addition, Bangladesh Water Development Board (BWDB) needs to re-excavate of its channel of saline water which is now silted. Because of this, saline water is inundated in the cultivable land and blame is going to the fish farmers. If re-excavation is properly done at the silted channel, the present problem of scarcity of saline water for shrimp farmer and inundation of unwanted land with saline water can avoid easily. The project has also ensured environmental friendly use of by-product of shrimps in the processing plants to save environment.
- xiv. The participants of the FGDs indicated that modernization and upgradation of the laboratories facilitated slightly increased export rate and foreign currency earnings but it

can double if government gives further attention on production as present production is very low compare to other neighboring countries.

- xv. All participants were in the opinion to have a good business plan for the development of value added product like fish and shrimps.
- xvi. The current project main focus was on modernization and upgradation of laboratories, capacity building of DOF and Lab personnel, processing plant and food safety and quality etc but there was a little focus on fish farmers' production related activities. Therefore all participants expressed the need of new project of production enhancement through the introduction of low cost fish and shrimp technology, credit and quality assurance at the production and harvesting level to easy and steady supply of raw materials for processing plants and laboratories. The sector may be shutdown anytime without taking necessary step to increase production. So far present production of shrimps only can meet 15-20% demand of the processing plants.
- xvii. The project intervention has lead to an increment of fish and shrimp production and export earnings in the tune of 10-20%. Revenue earnings of the laboratories have increased up to 200%. Besides, employment generation and daily income of fish farmers has also increased from 100-200 taka thus reduce poverty.
- xviii. Employment opportunities have created significantly after modernization of laboratories works under different locations of the project areas.
- xix. The socio-economic condition of the people has been improved to a greater extend after project intervention.
- xx. The government needs to formulate necessary law to ensure food safety net and quality for local consumer. The relevant department/ministries need to step forward in this regards.

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Table 36: Data/Information Collection Form for Focus Group Discussion (FGD 1 to 6) covering all Three Divisions

Sl.	Broad Discussion Points	Chittagong	Khulna Division				Dhaka
		Moradpur	Purba, Rupsa	Rajbath, Botiakandi	Zamira Bazar, Fultola	Satkhira sadar	Sadar
1.	Quality of modernization and upgrading works of FIQC laboratories	Most of them have opined quality works of lab	They know that good quality testing lab at khulna	Few of them has only idea about Khulna & Dhaka laboratories	All most everyone have idea about Khulna testing laboratories	Few of them have idea about Khulna testing laboratories	All most everyone have stated that FIQC lab is now int'l standard
2	Present status of FIQC laboratories	Good but unable to test chemical	Good but unable to test chemical	Good but unable to test chemical	Good but unable to test chemical	Good but unable to test chemical	Good both tests can do
3	Regular repair & maintenance of laboratories especially equipments	PPR system restrict regular repair & maintenance	PPR system restrict regular repair & maintenance	PPR system restrict regular repair & maintenance	PPR system restrict regular repair & maintenance	PPR system restrict regular repair & maintenance	PPR system restrict regular repair & maintenance
4	Present condition of equipments	good	Good but few are out of order	good	good	good	Well and good
5	Availability of laboratories chemicals	Available at local market	Locally available	Locally available	available	available	
6	Processing plant Own Check in System status	Yes	Yes	Yes	Yes	Yes	
7	Is organization ready to ensure quality and food safety?	Processing plants complying at condition of food safety	Processing plants complying at condition of food safety	Processing plants complying at condition of food safety	Processing plants complying at condition of food safety	Processing plants complying at condition of food safety	Processing plants complying at condition of food safety
8	The users of laboratories	Processing plant/exporters	Processing plant/exporters	Processing plant/exporters	Processing plant/exporters	Processing plant/exporters	Processing plant/exporters
9	What financial cost is involved to test from the laboratories	Yes money need to pay	Yes money need to pay	Yes money need to pay	Yes money need to pay	Yes money need to pay	Yes money need to pay
10	Amount needed to test	Microbiology test	Microbiology	Microbiology test	Microbiology	Microbiology	Microbiology

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Sl.	Broad Discussion	Chittagong	Khulna Division				Dhaka
	each item	120 Tk/test	test 120 Tk/test	120 Tk/test	test 120 Tk/test	test 120 Tk/test	test 120 Tk/test and Chemical Test 5000 taka/test
11	Mode of payment against each test	Pay order to DOF	Pay order to DOF	Pay order to DOF	Pay order to DOF	Pay order to DOF	Pay order to DOF
12	Before and after staff at your organization/gher	3-8 staffs has increased	2-3 staffs has increased	1-2 staffs has increased	4-5 staffs has increased	3-6 staffs has increased	4-6 staffs has increased
13	Product diversification impact before and after project	Don't have clear idea	Most of them no idea	Most of them no idea	No idea	No idea	
14	Fish/shrimp production and foreign currency earnings impact due to the project	5-10% increase	10-15% increase	10-15% increase	10-15% increase	10-15% increase	5-8% increase
15	Impact on employment generation and poverty reduction	Most of them have agreed that its create employment and reduce poverty	Most of them have agreed that its create employment and reduce poverty	Most of them have agreed that its create employment and reduce poverty	Most of them have agreed that its create employment and reduce poverty	Most of them have agreed that its create employment and reduce poverty	Most of them have agreed that its create employment and reduce poverty
16	Impact on lab personnel life style	Yes it has changed their life style with training and accumulate them in govt revenue	Yes it has changed their life style due to permanent their job in govt. revenue	Yes it has changed their life style due to permanent their job in govt. revenue	Yes it has changed their life style due to permanent their job in govt. revenue	Yes it has changed their life style due to permanent their job in govt. revenue	Yes it has changed their life style due to permanent their job in govt. revenue
17	Capacity of laboratories/organization	Improved	Improved	Improved	Improved	Improved	Improved
18	Total number of skills person	29	26	26	26	26	32
19	Training received or not	yes	yes	yes	yes	yes	yes
20	Knowledge of fish/shrimp farmers on	excellent	excellent	excellent	excellent	excellent	excellent

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Sl.	Broad Discussion	Chittagong	Khulna Division				Dhaka
	HACCP compliance production and harvesting						
21	Mode of transportation	Plastic basket with fresh water ice	Plastic basket with fresh water ice	Plastic basket with fresh water ice	Plastic basket with fresh water ice	Plastic basket with fresh water ice	Plastic basket with fresh water ice
22	Gher preparation	As per requirement of HACCP	As per requirement of HACCP	As per requirement of HACCP	As per requirement of HACCP	As per requirement of HACCP	As per requirement of HACCP
23	Type of fish feed use	Quality fish feed, titas, chira, bushi etc	Quality fish feed	titas	chira	bushi etc	Quality fish feed, titas, chira, bushi etc
23	How many times and when fish feed use	Twice at morning and evening	Twice at morning & evening	Twice at morning & evening	Once at evening	Once at evening	Twice at morning & evening
24	Impact on WID and labour related activities	Very good impact on WID and labour law	Very good impact on WID and labour law	Very good impact on WID and labour law	Very good impact on WID and labour law	Very good impact on WID and labour law	Very good impact on WID and labour law
25	What additional support is needed for compliance of HACCP, traceability, quality production of PL and fish/shrimp etc	More intensive training, supply of quality PL Registration and supervision of Hatchery, production technology, credit, HYV of shrimp etc	More support and training from project and DOF	More support like HYV of shrimp PL, hatchery registration, production technology and DOF support	do	do	Do
26	Problems of the sector	Low production, water availability, environmentalist threats, PL, disease etc	Low production & Quality shrimp PL, water	Water availability, Quality PL, Threats of environmentalist, saline water	environmentalist threats, water, PL etc	Low production, quality PL, water	Low production, water availability, environmentalist threats, PL, disease etc

4.8 Assessment of the Strengths, Weaknesses and threats of the Project (Ref. objective iv)

The strengths, weaknesses and threats of the project were assessed and identified by the collection of the information consulted with the senior level officials (**Key Informants Interview-KII**) of Department of Fisheries (DOF) concerns officer related to project management and planning about the quality, durability, project components wise performance, procurement, project design, duration, cost, financial management of the project as against the designing system, and future planning of the shrimp/fisheries sector project in Bangladesh. The major strengths, weaknesses and threats identified by the KII are discussed below:



Plate 21: Consultant conducted KII at DD, FIQC, Khulna

4.8.1 Strengths of the project

- **Renovation and modernization of existing FIQC laboratory Facilities:** Reconstruction of Dhaka laboratory and two new FIQC laboratories have been built with all facilities in Khulna and Chittagong to the international accreditation standards. The required number of equipments includes ELISA, AAS incubators, LCS/M/MS etc, chemical, fixture and fitting procured and installed to increase the laboratory facilities. Along with the strengthening of FIQC (Dhaka, Chittagong and Khulna) three new sub-station for FIQC (Benepole-Jessore, Cox's Bazar and Satkhira) have been built through this project. All the laboratory personnel received in-country and overseas training on different aspects of quality assurance. Laboratories are under the process of getting international accreditation standards and consultant of BEST-BFQ is working hardly for this.
- **Comply and Implement HACCP and Traceability system in all stages from harvest to export:** The frame-work for HACCP and traceability has developed and implemented. The awareness and training program has conducted to ensure HACCP and Traceability at all level of production to export. HACCP and quality assurance has improved at all level of production, processing and transportation under supervision of Deputy Director and its team of inspection, quality assurance officer includes laboratory skills personnel and processing plant own check-in system.
- **Strengthen human resources development to carry out proper testing and inspection of Fishery products especially shrimps:** A total of 30 senior officials of DOF/MOFL including laboratory personnel have been trained abroad such as Portugal, Austria, India, Sri-lanka, UK and Spain in different areas of laboratory fellowship, quality, fisheries infrastructure, and accreditation etc for a period of two weeks. In addition a total of 21,885 target group among others fish farmers, processors, ice plant, middle man, women, and depot owners etc has received 1-3 days training on different topics including HACCP, traceability and WID and labor law etc.
- **Up-gradation of In-plant "Own Check" system to ensure product quality and safety:** About 74 processing plants out of approximately 96 have established/upgraded its in-plant "own check" in system to ensure product quality and safety from the plant. All 74 processing plants have adequate facilities for microbiological and chemical test through trained person.
- **Increased Export Earning through Quality Assurance and Product Development:** Trained manpower of the DOF are ensuring product quality and safety which is necessary for export earnings. Due to compliance of HACCP at all stages, FIQC laboratory testing has got recognition in the international level. In addition, the importing

countries/EU has withdrawn 20% mandatory testing of Bangladeshi products. Similarly, shipment rejection of shrimp has decreased from 54 to 1 number. Since export from Bangladesh was ban from importing countries for non-compliance of HACCP in this context it can easily say that 100% of export has increased after improvement of capacity of FIQC laboratories and implementation of HACCP and traceability framework at all stages of production to export but in consideration of previous export volume export has increased around 20-25%.

- **Raise Awareness on Environmental aspects and by-product utilization:** A good number of awareness workshops on environmental aspects have been conducted and training program was organized which has increased awareness on environment friendly by-product utilization.
- **Improved socio-economic conditions of target group's especially women through awareness creation and lobbying:** A total of 3,000 women have been trained to improve their socio-economic condition. Now women are fully aware about their rights, can deal their right with senior, how to write letter, to whom to talk etc they know very well. Target group especially women have received training and supports on quality of shrimp/fish production therefore they are now contributing more in export. As production and export has slightly increased thus family income of the target group has also increased thereby improving the socio-economic condition of the target group. Female farmers have also received training on small scale golda shrimp farming, and female PL collection which is directly contributing their family income.
- **Laws for Exports:** There is a law for exporting shrimp and fish products which is upgrading time to time as per requirements of the importing countries.

4.8.2 Weaknesses of the project implementation process

- **Approval of International Accreditation Standard:** International accreditation standard is international recognition of testing which will greatly help the sector. Though present interim arrangement is permitting our product for exporting but accreditation will be the permanent approval which is yet to receive.
- **Chemical Test:** Only Dhaka FIQC laboratory has been conducting microbiological and chemical test whereas Khulna and Chittagong laboratories have been undertaking only microbiological tests in spite of passing 2.5 years of project implementation. All laboratories have skilled manpower but need few equipments and approval from the respective ministry to start chemical test from the regional station. According to the information of DD, FIQC of Khulna and Chittagong around 80% of shrimp produced and export from Khulna division and 16% fish/shrimp produced and export from Chittagong division thus it is very important to start regional station with full extend. It will reduce additional time and will also save cost of the processing plants.
- **Regular repair and maintenance:** Most of the equipment of the laboratories are sophisticate and are not common in Bangladesh. So far one equipment at Chittagong and seven equipments at Khulna are out of order and unable to repair because of the obligation of financial delegation. Every purchase need service contract so that any kind of problem can repair without any procurement process. In addition DD, FIQC also need more financial delegation but under supervision of DG, DOF so that regular repairs and maintenance can be done without any difficulties.
- **Insufficient Training:** Project mainly focused on technical issues like modernization of laboratories, equipments, and capacity building of DOF and laboratory personnel, in-plant check in system at processing plant etc which is very important for quality and food safety. The little focus was given in fish farmers training and also in relevant people short and long-term training. The project was allocated small amount for training which is also important as HACCP compliance starting from production. In addition regional station relevant person like DD and laboratory supervisors also need to

included in overseas study so that they can understand what is international accreditation standards laboratory and how it run.

- **Ban to use river/sea PL at gher:** The government has banned use of PL collected from the river/sea due to bio-diversity. Fish farmers now need to collect PL from hatchery but hatchery are using small mother (ma) shrimp to make maximum profit. Farmers are losing their capital to buy PL from hatchery as shrimp size and production both decrease due to hatchery PL. Sometimes fish farmers are incurring huge loss as 50% PL can't survive while it release at gher. The government needs to ensure quality and disease free PL supply from hatchery otherwise fish farmers will face huge problem in production of shrimp. In addition, necessary infrastructure for nursing of shrimp PL is needed to increase productivity.
- **Hatchery need to be registered:** Hatchery should be under registration system and will be accountable for providing quality PL from big mother (ma) shrimp. If any fish farmers incur any loss due to PL the respective hatchery should be punished and registration should be cancelled immediately. Hatchery should be brought under government rules and regulations and supervision.
- **Delay completion of construction works:** The construction works was delayed about 7 months from the schedule date of January 2008. Due to this, all activities of the project delayed. Considering this construction delay, project need to extend 6 months from December 2009 to June 2010.

4.8.3 Threats of the project

- **Low Productivity of Shrimp/Availability of raw material for the processing plants:** Present production of shrimp can meet only 15-20% of processing plants shrimp demand. If the authority is failed to give attention to increase production of shrimps all the achievement of fish safety and quality control such as modernization of laboratories, capacity building, HACCP, and traceability etc will be worthless. In this context high yielding variety like benomine need to be introduced pilot basis to increase present production of 300 kg to 1000 kg in same area. In addition, marine resources need to be explored further to increase shrimp production.
- **Shrimp Zone:** Alike with export processing zone garments and textile there is no specific zone for shrimp despite of huge potential of export earnings thus farmers are facing problem to produce shrimp. There is need to demarcate the exclusive shrimp zone for exporting.
- **Common Landing Station:** There is no common landing station of shrimp thus it is difficult to maintain quality of shrimp.
- **Inadequate planning and intervention at costal area:** Coastal area need to be used for fish and shrimp cultivation in line with nature as saline water is suitable for this. Fish and shrimp cultivation is only possible at the coastal area without intervention of environment. Construction of embankment to protect entrance of saline water would be against the environment but this is happening frequently without conducting any feasibility study of cost-benefit and detailed environmental analysis. This need to be stopped.
- **Environmental intervention:** Fish farmers are under threats of environmentalist to cultivate shrimp. Golda shrimp needs saline water but channel of saline water has been silted. Farmers are trying to get saline water for their gher through the channel but it is inundating the crops field due to this siltation. If channel is properly re-excavated it can avoid thus farmers become victim of this.
- **New test requirement:** As most of the FIQC laboratories equipments are highly sophisticate and are not common in Bangladesh thus difficult to ensure regular repair and maintenance. In addition new threats of test and equipments requirement with

skills person requirement may come any time that need to be addressed in due time. Failure to address this issue in due courses lead to cancel shrimp export.

- **Water availability:** Scarcity of quality fresh/saline water lead to retain less quantity of water at gher thus decreases production.

4.9 Assessment of the Sustainability of the Works (Ref. objective v)

The sustainability of the modernization and upgrading works under the project were assessed by the collection of the information from Project Management Personnel especially NPD, DD, Laboratory personnel, BEST-BQF consultant etc through a semi-designed questionnaire interview regarding the quality assurance, HACCP, traceability, durability, sustainability, cost-effectiveness and maintenance works. The major findings of the assessment are discussed below:

- **Quality of the works:** All the project management personnel including consultants of UNIDO have ensured the quality control and management of the materials, quantity and timeliness of the works. In addition the contractor had carried out the laboratory tests of materials that used for construction works. Good performance for all kinds of quality control tests and no challenge was required for any field laboratory test. The soil test was done before the start of construction. All required measure was taken to ensure quality of works.
- **Durability of the works:** About 100 years durability period for newly construction laboratory buildings and 10 years maximum durability of laboratory equipment with regular repair and maintenance.
- **Sustainability of the Project:** The project has created a unique scope for sustainability and continuity of the project activities beyond its period. All trained people of laboratories including constructed building and procured equipments have been transferred to the revenue budget of the government. All three laboratories are earning revenue for government and export is subject to the laboratory test thus we need to run these laboratories by any cost
- **Management:** This was a small budget project in context of other donors funded project but it was managed and implemented very professionally under the leadership of the National Project Director, DOF and its team includes UNIDO consultants. Overall achievement of the project has highly appreciated by the development partners EU and GOB officials and the people in and around the project area. So far project is very successful giving desired benefit to the target group as well as country in earning of foreign currency. Considering the success of this activities and sustainability of its achievement a follow up project of BEST=BQF is implementing from 2010 to 2014 to improve good aquaculture practices and strengthen further FIQC laboratory in achieving international accreditation standards.
- **Cost-effectiveness of the works:** As FIQC laboratory is earning 1.5 core to 4.5 core taka per annum and it can even increase further if all the laboratories can work to their fullest capacity subject to the availability of raw material and new importing countries. The FIQC laboratories are a self-reliant and profitable organization of the government of the people's republic of Bangladesh which is performing to earn foreign currency for the country. Due to quality of testing of the FIQC laboratories international demand for shrimp products is increasing.

**CHAPTER 5
ASSESSMENT OF SKILLS AND CAPACITY**

5.1 Introduction

The Government of Bangladesh (GoB) has given significant importance on human resource development and seemingly created innovative policies and practices aimed at capacity development of the public and private sector personnel. However, despite of the considerable progress made so far, significant problems persist including the slow rate of technological development. Human resources both from Public and private sector with adequate skills and knowledge are the central of achieving equitable and sustainable development. Importance of manpower development for overall socio-economic upliftment of any nation should be emphasized.



Plate 22: Training on HACCP under BEST-BFQ

In this chapter, we have collected data from 1200 beneficiaries such as laboratories personnel (30), processors (40), depot owners (200), ice plant owners (30), middleman (100) and shrimp farmers (800) who received training from the project to improve their skills and capacity. From the analysis, the relative changes of capability of the trained personnel with respect to food safety and quality control have been assessed and attempts have been taken to see whether the program could be able to play a vital role in case of increased foreign currency earnings. Besides, attempts have also been taken to find out the root causes of quality assurance including the ways of improvement.

5.2 Training Facilities

Training was an important component of the Project. A brief of the total training activities has been presented in Table-36. It appeared that a total of 21,992 participants were trained during the project period. Of these 37 were from abroad and 21,885 were from in-country. Besides, 471 and 111 participants attended awareness meeting/seminars and conferences.

Table 37: Training Programs of the Project

Venue	Items	Participants¹ #
Overseas	Laboratories based fellowship training in Portugal	03
	Training in QA in Austria	02
	Laboratories based training & Visit ITI, Sri-lanka	07
	Laboratories based training FERA, York, UKI	02
	Laboratories based fellowship training in Portugal	02
	Study Visit in Fisheries Infrastructure, in UK and NL	07
	Study Visit in accreditation lab, India	07

¹ DPP and PCR of the SFIQC

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	Study Visit in Fisheries Infrastructure, Portugal and Spain	07
	Sub-total	37
In-country	Training	21,885
	Awareness Meeting/Seminar/Conference	582
	Sub-Total	22,467
	Total	22,504

5.3 Major Participants of Training

Results regarding the different types of participants of the training programs have been presented in Table-38. It is revealed that among the participants' of in-country training program, other groups represented the highest number (21885). The other groups included shrimp farmers, processors, middlemen, and depot and ice factory owners of the respective areas. The DOF, FIQC, BARI, BAEC, BCSIR officials represented about (185), BFFEA factory officials represented about (337) and project and UNIDO staff represented about (97). In international programs involvement of the BARI, BAEC, BCSIR, BFFEA factory officials was quite noticeable in addition of MOFL, DOF and FIQC who intern provided best of their services for quality improvement and assurance.

Table 38: Major Participants of the Training Program

Venue	Items	Participants #			
		DOF, FIQC, BARI, BAEC, BCSIR, BAU etc	BFFEA Factory staff	SFIQC/ UNIDO staff	Others Fish farmers, Ice and Depot owners, processors, middleman etc
Overseas	Training	12	-	04	-
	Study Visit	3	07	11	-
	Sub-total	15	07	15	
In-country	Training	-	-	-	21,885
	Awareness Meeting/Seminar/Conference	170	330	82	-
	Sub-Total	170	330	82	21885
	Total	185	337	97	22,504

5.4 Major Areas of Training

Results regarding areas of training including seminars/conferences have been presented in Table-39. It appeared that very important subjects relating to HACCP and good practices in sea food sector were asked to the respondents where processing, quality control, sanitation and hygiene, sample preparation, operating procedures, improved production, management of fish products and traceability systems were included among the training programs. Participants from DOF and from other stakeholders attended the programs. Fish/shrimp farmers were trained specially on Implementation of traceability and sea food management systems. All of these have enhanced the capacity building of the stakeholders regarding quality product development and diversifications. It is revealed from the table- 39 that the highest (86.82%) number of fish farmers followed by depot/suppliers (5.56%) and processors (3.08%) reported to participate in the training of HACCP and good practices in sea food sector and Implementation & control system of traceability. The lowest (0.48%) number of FIQC/DOF personnel followed by ice plant (2.06%) and middleman (2.04%) reported to participate in the training program organized by the project in the same subject. The same number and order was brought under the training of Implementation of traceability

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and sea food management except DOF/FIQC personnel. In case of training on GM, GFM, GLP PCR, sample preparation, LC-MS operation, fish inspection and implementation framework of HACCP and traceability etc training were provided to the DOF/FIQC personnel only and it is ranged between 0.05 to 0.28 percent. The period of training in most cases ranged from one to two days. The level of knowledge of training was medium.

Table 39: Major Areas of the Training Program Including Seminar and Conferences

Subjects	Types and number of participants (N=21885)					
	Multiple responses					
	DoF/FIQC Laborator y personnel	Processors	Depot/ Supplier	Middleman	Ice plant Owner	Fish Farmer
HACCP and good practices in sea food sector	0.48% (104)	3.08% (673)	5.54% (1212)	2.06% (450)	2.04% (446)	86.82% (19000)
Training on General Microbiology	0.05% (12)					
Training on General Food Microbiology	0.05% (12)					
Good Laboratory practices and standard operating procedures	0.26% (57)					
PCR Training to detect white Spot Virus	0.05% (12)					
Implementation of traceability and sea food management		3.08% (673)	5.54% (1212)	2.06% (450)	2.04% (446)	86.82% (19000)
Improved production and management of smoked and dried shrimp and fish		3.08% (673)				
Implementation of Traceability QAP in Fish processing Industry		3.08% (673)				
Sample preparation & operation of HPLC machine	0.05% (12)					
Sample preparation and operation of LC-MS-MS & HPLC	0.05% (12)					
Implementation & control system of traceability	0.48% (104)	3.08% (673)	5.54% (1212)	2.06% (450)	2.04% (446)	86.82% (19000)
Fish Inspection manual	0.17% (38)					
Seminar/Conference						
HACCP & Food Safety	0.28% (62)	0.50% (110)	0.86% (188)	100	122	-
Traceability	0.15% (32)	0.59% (130)	0.90% (198)	100	122	-

5.5 Status of Training

Training has been given several items on different topics. Survey data indicated that 21,885 number of target group received training from the project. Knowledge about the training was

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more spread among the depot, ice plant, middleman and processors. About 87.5% of ice plant followed by middleman (80%), depot/supplier (71%) and processors (66.7%) reported to participate in the training showing the highest participation. The lowest (10%) out of 190,000 registered fish farmers participated in the training program organized by the project. The period of training in most cases ranged from one to two days. The level of knowledge of training was medium.

Training has increased their knowledge and skill of fish culture more profitably. The beneficiaries were asked about the problems of the training program. Main problem related to training was of very short duration and that has been stopped after the phasing out of the project. In all cases follow up training was virtually absent. It was also asked for suggestions about the ways of improvement of training. They have suggested for more practical demonstration and allocation of more time, preferably 3-5 days and fund on continuous basis.

Table 40: Status of Training by Group Members

Items	Groups						Total
	FIQC per(sonnel	Processors	Depot/Supplier	Middleman	Ice plant Owner	Fish Farmer	
Number being trained	(60%) 104	(66.7%) 673	(71%) 1212	(80%) 450	(87.5%) 446	10% (19000)	(62.5%) 21885
Average number of training sessions	2	2	2	1	1	3	1.83
Total hours of training session	2	2	2	2	2	2	2
Total duration of training (day)	1	1	1	1	1	1	1

5.6 Impact of Training

The results relating to the impact on the improvement of personnel's efficiency has been summarized in Table-41. It appeared that 100% FIQC laboratory officials improved their efficiency relating to the service delivery and they did not face any problem in this regard. Similarly, the efficiency of the officials of the processing plants regarding daily service delivery were also found to be improved up to the tune of 100% but it was reported to face some problems (33.3%) for service delivery because of time spent for getting the certificate from Dhaka laboratory. An improvement in service delivery at the rate of 98%, 40%, 50% and 99% were reported to be increased in case of depot, middlemen, ice plant owner and fish farmers exhibiting the rate of problems faced as 41%, 100%, 100% and 43.3% respectively.

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Table 41: Status on the Improvement of Efficiency upon Training

Item	Status	Type of Respondents (%), N=1200					
		FIQC Laboratory personnel	Processors	Depot/ Supplier	Middle-man	Ice plant Owner	Fish Farmer
Benefit of training on service delivery	Yes	100% (30)	100% (40)	98% (196)	50% (50)	60% (18)	99% (792)
	No			2% (4)	50% (50)	40% (12)	1% (8)
Problem in service delivery	Yes		33.3% (13)	41% (82)	50% (50)	40% (12)	43.3% (346)
	No	100% (30)	66.7% (27)	59% (118)	50% (50)	60% (18)	56.7% (454)

5.7 Role of Training on Fish/Shrimp Exportation

The results regarding the impact of training on the exportation of fish and shrimp have been presented at Table-42. It is evident from the table that the role of FIQC laboratory has been increased up to 100% after receiving the training whereas in other sectors remarkable improvements have also been noticed. Most remarkably, a significant improvement has been observed in case of fish and shrimp production line. The level of marketing has been increased from 16.7 to 100% in case of processors to ice plant owners. The level of processing either at the processing plants and in depots was found to be increased to a larger extent.

Table 42: Impact on the Status of Fish/Shrimp Exportation

Item	Type of Respondents					
	FIQC Laboratory personnel	Processors	Depot/ Supplier	Middleman	Ice plant Owner	Fish Farmer
Production			63% (126)			97.1% (77)
Storage			51.7% (103)		100% (30)	
Processing		66.7% (26)	51.7% (103)			
Harvesting						71.3% (570)
FIQC test	100% (30)	16.7% (7)				
Marketing		16.7% (7)	92% (184)	100% (100)	100% (30)	67.5% (540)

5.8 Status of Skill Development

Results regarding the status of skill development through the training provided have been presented in Table-43. It has been observed that the major areas of skill development were found in the areas of fish/shrimp production technology, postharvest technology, processing including washing, cleaning, grading, packaging and laboratory testing. It is quite interesting to mention here that skill achievement through production technology and postharvest technology was found higher in case of fish farmer (49% and 86.5%). This has resulted very minimal impact on increment of fish/shrimp production from the field level. With regard to

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post harvest management, the highest (86.5%) response was found in fish farmer and the lowest response (16%) was found in case of middleman. The processing plants were also found to have increased their rate of processing (58.3%). The skill development of the middleman and ice plant owners was also found increasing (Table-43).

Table 43: Types of Skills Achieved through Training

Item	Type of Respondents (%), Multiple responses					
	FIQC Laboratory personnel	Processors	Depot/ Supplier	Middleman	Ice plant Owner	Fish Farmer
Production			47% (94)			49% (392)
Post harvest		25.7% (10)	80.5% (161)	16% (16)	46% (14)	86.5% (692)
Processing	100% (30)	58.3% (13)	19.5% (39)			2.1% (17)
washing			63.1% (126)	58% (58)	60.3% (18)	2.8% (22)
cleaning			60% (120)	42% (42)	58% (17)	3.1% (25)
grading			68% (136)	55% (55)	63.5% (19)	3.1% (25)
Packaging			61.5% (123)		57% (17)	
Lab testing	100% (30)		-			
all	40% (12)	16.7% (7)	-			

5.9 Status of the Training Knowledge on HACCP

The results regarding the development of technical knowledge on HACCP system have been shown at Table-44. It is clearly evident from the table that the highest numbers of processors received training on the HACCP system (96.8%) while the lowest in the laboratory personnel (50%). In all the cases of the exportation chain, majority of their personnel were found to have training on HACCP. These were processors 91.7%; depot/aratdar-95.4%; ice plant owners-87.5% and middleman as 80%. All of these represented a positive indication towards the benefit gained from the project.

Table 44: Status of the training on HACCP

Types of participants	Status of training received	
	Yes	No
Lab personnel	50% (15)	50% (15)
Processors	91.7% (37)	8.3% (3)
Depot /Aratdar/supplier	95.4% (191)	4.6% (9)
Middleman	80% (80)	20% (20)
Ice plant owners	87.5% (26)	12.5% (4)
Fish Farmer	96.8% (774)	3.2% (26)

5.10 Impact of the Traceability and HACCP Skills on Exportation

Results regarding the impact of traceability and HACCP training on export earnings have been presented at Table-45: The results relating to the status of knowledge on the implementation framework of traceability indicated the highest ranking (100%) in case of FIQC officials whereas the lowest in middleman (60%). With regard to the skill enhancement for conducting laboratory test by the FIQC, the highest response from FIQC personnel and processors were 100% and 72.5% whereas the lowest from fish farmers (53.6%). While asking about the quality of FIQC lab up to international standard, again FIQC officials replied as 100% of international standard while the middleman indicated lowest 58% response of international standard. Similarly, FIQC personnel were found to have 100% skilled on the compliance of HACCP whereas it was found the lowest in case of fish farmer (52%). This might be due to short duration of training. The increased knowledge on HACCP compliance has resulted increased exportation. As such, it was again found the highest in case of FIQC personnel (100%) while the lowest for middleman (51%). The training has not been found very useful for the middleman in case of environment friendly shrimp culture as only 33% middleman responded positively but in case of others the status of training regarding environment friendly was satisfactory. Above all the project played a very significant role regarding the development of technological knowledge for quality improvement and assurance and increased export earnings.

Table 45: Status of the Impact of Traceability and HACCP Skills on Export Earnings

Item	<i>Type of Respondents (%), N=1200 in total</i>											
	FIQC Laboratory personnel		Processors		Depot/ Supplier		Middleman		Ice plant Owner		Fish Farmer	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Knowledge on the implementation framework of traceability	100% (30)	-	83.3% (33)	16.7% (7)	79% (158)	21% (32)	60% (60)	40% (40)	66% (20)	34% (10)	69% (552)	31% (248)
Capability of FIQC lab to do quality testing sufficiently	100% (30)	-	72.5% (29)	27.5% (11)	69% (138)	31% (62)	55% (55)	45% (45)	55% (17)	45% (13)	53.6% (429)	46.4% (371)
Status of FIQC lab testing as of international standard	100% (30)	-	83.3% (33)	16.7% (7)	71% (142)	29% (58)	58% (58)	42% (42)	67% (20)	33% (10)	63% (504)	37% (296)
Status on the enhancement of skills up to the level of HACCP compliance	100% (30)	-	88.2% (35)	11.8% (5)	68% (136)	32% (64)	59% (59)	41% (41)	64% (19)	36% (11)	52% (416)	48% (384)
Influence of training on increased exportation	100% (30)	-	91.7% (37)	8.3% (3)	53% (106)	47% (94)	51% (51)	49% (49)	53% (16)	47% (14)	51.3% (410)	48.7% (390)
Status of training on environmental friendly shrimp cultivation	100% (30)	-	79% (32)	21% (8)	70% (140)	30% (60)	33% (33)	67% (67)	61% (18)	39% (12)	67.8% (542)	32.2% (258)

CHAPTER- 6 MAJOR FINDINGS, RECOMMENDATIONS AND CONCLUSION

6.1 Major Findings

6.1.1 Status of FIQC Laboratories and Project based

The project was initially planned to implement for a period of five years starting from January 2004 to December 2008 with a total cost of BDT: 4,338.83 lakh. Accordingly, government approved TAPP on December 2003 as per objective of the project and the requirement of EU but project couldn't able to start in due time due to delay in signing agreement with the EU. Based on EU mission report on rationality of project components, before start to implement the project, the original TAPP was revised 1st time with reduced project period from 5 years to 3 years (from July 2005 to June 2008) and a reduced budget of BDT: 3851.52 lakh. Again according to the decision of EU, the project was later extended until December 2009 through 2nd revision of TAPP. But the actual completion period of the project was June 2010 with another 6 months extension.

Component-wise major findings of the project activities are furnished below:

6.1.1.1 Status of Financial Management of the Project

Almost 96.73% (BDT 36.50 crore out of BDT 37.73 crore) fund of the project was utilized efficiently and effectively. Only 3.27% (BDT 1.23 core) fund was unutilized under the line item of foreign consultancy. The maximum fund was utilized under line item of consultancy (foreign and local) which was 29.62% and the lowest fund under honorarium for technical evaluation committee (0.01%)

6.1.1.2 Implementation Status of the Modernization of FIQC Laboratories

The consultant visited Fish Inspection and Quality Control (FIQC) Laboratories in Chittagong on 20 March 2013, Khulna on 30 March 2013 and finally Dhaka on 02 & 20 April 2013 in connection with the observation of current status of construction and up-gradation works. The major findings regarding the current status of construction and up-gradation works of the laboratories have been collected in using observation checklist and presented below:

- DOF completed construction of two new FIQC laboratory buildings during the year 2008. Fitting, fixing, installation and training on the new equipment was completed during early 2010.
- All works under Chittagong and Khulna FIQC laboratories were observed similar in nature during physical verification of the laboratories.
- The status of the two-storied laboratory building, roads, room design, record room, coding /decoding room, laboratory information management system (LIMS), documentation room, sample room, testing room etc for chemical and microbiological laboratories were found in good conditions except few equipments which were out of order.
- Chemical laboratories of Chittagong and Khulna were yet to start testing in full extent but it was expecting to start soon as the required skilled personnel along with equipments were also ready.
- The construction works was completed during 2008 having 6 months delay from the actual completion time. The quality of the construction and upgradation works was found in very good condition.
- Laboratory fitting, fixing, furniture, coding system and quality of supplied item were very good for the laboratories of Dhaka, Chittagong and Khulna.

- All laboratories were found to meet the present demand of 75-80 microbiological tests and 10-15 chemical tests per day as per standard of international.
- Dhaka laboratory is rendering international standard services of chemical and microbiological tests as per requirement of the importing countries.
- Dhaka laboratory has 32 lab staff out of 41 posts, whereas the Chittagong and Khulna laboratories showed the fullest capacity (41 laboratory personnel).
- The present demand of customers for conducting test of microbiology stands below the capacity of the laboratory which is 25 to 45 maximum in a day.
- All laboratories were found to issue microbiological test certificate since 1977 but the capacity of issuing certificate ranged between 300-450/month only. The current capacity of Dhaka laboratory was found almost 4 times (1500/month) of the previous capacity
- The Government revenue earning has increased from BDT: 50 lakh to 410 lakh in case of Dhaka laboratory, whereas the same was found as BDT: 25 lakh to 147 lakh for Chittagong and BDT: 30 lakh to 172 lakh for Khulna laboratory
- Because of quality enhancement of FIQC laboratories shipment rejection rate has been decreased from 54 numbers to 1 number. In addition, EU has also withdrawn mandatory 20% sample re-testing.

6.1.2 Impact Analysis of Quality Assurance, Export and Poverty Reduction

The qualitative and quantitative data was collected from the beneficiary-1 comprising fish farmers and destitute women and beneficiary 2 comprising processors, depot and ice plant owners, middleman, and aratdars/suppliers etc. The control group-1 and control group-2 data was also collected from the similar types of respondents from the control group areas. Brief outputs of the analysis have been furnished below:

Beneficiary-1 Selection: A total of 1501 beneficiaries were selected for the survey under beneficiary 1. These were fish farmers and destitute women under program group from Chittagong (75), Cox Bazar (395), Khulna (902), and Sarkhira (129) districts.

Beneficiary-2 Selection: A total of 188 beneficiaries were selected for the survey under beneficiary 2. These were processors, ice plant, depot owner and other traders etc under program group from Chittagong (9), Khulna (118), Sarkhira (16) and Cox Bazar (45) districts.

Basic Characteristic of Control Group-1: A total of 756 respondents were selected for the survey under control group-1. These represented fish farmers and destitute women selected from the adjacent area of the project activities such as Chittagong (37), Cox Bazar (170), Khulna (480), and Sarkhira (69) districts.

Basic Characteristic of Control Group-2: A total of 88 control beneficiaries were selected for the survey under control group-2. These represented processors, ice plant, depot owner and other traders etc selected from the adjacent area of the project activities such as Chittagong (8), Khulna (32), Sarkhira (20) and Cox Bazar (28) districts.

6.1.2.1 Functional Status of FIQC Laboratories {Ref. objective i (b)}

It has been found that 81.8% (1228) of the beneficiary-1 under program group replied in affirmative as compared to 13.1% (99) in control group in regards of test requirement. Around 64.3% (965) of program group respondents indicated to have increased quality control measures due to modernization of FIQC laboratories whereas in control group the positive response was only 9% (9). Similar trends has also been found while asked them how many places test is required, whether any need to conduct test in any organization and knowledge about FIQC laboratories etc. From this quantitative analysis and from discussion with the

beneficiaries, it is revealed that project intervention has impact on enhancing the level of knowledge on food safety and quality, income and export earnings but rarely any impact on production.

It has been found that 89.4% of beneficiary-2 under program group replied in affirmative regarding their understanding of the project and subsequent modernization of the respective laboratories as compared to only 9.1% respondent responded in affirmative in control group. Around 68.6% of program group respondents indicated to have increased their income due to modernization of FIQC laboratories whereas in control group the positive response was only 9%. Similar trends have also been found in the increment of export earnings (58%) and acceptance of laboratory testing at international markets (79.3%) but the same was found only 10% in control group.

6.1.2.2 Institutional Capacity Development of DOF {Ref. objective i(c)}

It has been found that 69.7% beneficiary responded positively regarding the capacity enhancement while none of the control group. The project has enhanced the capability of FIQC officials (26.7%) while it was found only 10% in control group. The beneficiary responded positively (75%) regarding the training received while it was none in control group. It was also indicated that the availability of trained officials at the FIQC laboratories increased (75%) whereas nobody received any training from the control group. From the above it can be concluded that project intervention has impacted positively on enhancing the level of technical knowledge and skill of the FIQC officer.

6.1.2.3 Food Safety and Quality of Fish/Shrimp Products {Ref. objective i(d)}

It is appeared that 78% (1171) respondent of beneficiary-1 from the program group indicated positive response regarding the attainment of proper postharvest management whereas the same was noticed as 49.2% (372) in case of the control group. All of them (78%) have also adequate knowledge on post harvest activities like washing, cleaning, sorting and grading. We have also asked them what happen to perform proper post harvest activities and highest 79% (1186) respondents replied for good income while around 52% (782) respondents opined that it ensure quality of product and good value of products as compared to 6.7% to maximum 43% in different items in control group. When we asked them about project support for quality shrimp production, maximum 86.9% (1113) respondents opined that they didn't receive any support as compared to 100% (756) in control group. Similar results have also found in idea about present standard of FIQC laboratories where only 32% (411) respondents confirmed that they have an idea about this as compared to 3% (10) in control group.

Around 79.3% respondent of beneficiary-2 from the program group indicated positive response regarding the attainment of proper postharvest management whereas the same was noticed as 33% in case of the control group. Similar trends have also been found regarding quality control mechanism. The respondents regarding the use of fresh raw materials, hygienic condition of the depot and sanitation facilities under the program group responded positively at the tune of 20%, 39% and 35% respectively whereas nobody maintained the same in case of the control group. With regard to the issues of improved transportation system 39%, use of hygienic ice and plastic baskets almost 100% beneficiary while none of the control group. Around 62% respondents received support from the project. Similar results have also shown in case of importance of FIQC laboratories, acceptance of certificate at the international level and decrease of consignment rejection and withdrawn of mandatory test wherein 66% respondents replied affirmatively compared to 9.1% in control group. It has also been found that 79.3% respondents of program group realized the necessity of the compliance of HACCP system to ensure export of shrimp products as compared to only 20% in control group. Regarding the status of training provided on HACCP system, 54.3% respondents replied in negative under program group whereas the same was noticed as 90.9% in control group. While asking whether FIQC laboratories can deliver the desired service or not then 52.7% respondent under program group replied positively as compared to only 10% in control group.

6.1.2.4 Implementation Status of HACCP and Traceability (Ref. objective ii)

It is evident that 56.4% respondent replied positively regarding the required skills of FIQC laboratory. A similar trend (56.4%) was also found in FIQC personnel regarding the training on HACCP compliance. With regard to laboratory activities, HACCP compliance, production and processing, product development, quality management, and WID & labor law the positive responses from the beneficiaries were in the tune of 43.6%, 58%, 23%, 41%, and 6% respectively. Thus in terms of knowledge and training on HACCP compliance, program group showed a significant improvement comparing to that of control group. In view of the above, the changing scenario of the improvement of human resources development particularly for the HACCP compliance is apparently visible. The most important issue of food quality and safety such as traceability, respondents have some knowledge as they received training on that which is 74.6% (1120) as compared to none in control group. Similar result (74.5%) was also found in implementation of traceability system compared to none in the control group.

Change of In-Plant “Own Check” System: Around 76.1% respondents have adequate knowledge on quality control of their own organization after the project intervention as compared to only 10% in control group. Similar results (73.9%) have also been seen in case of the importance and method as compared to 9.1% in control group. The in-plant “own check” system of the processing plant has received the EU international standard acceptance. As such, the possible threats for the exportation of fish/shrimp products have been reduced to greater extent.

Change of Idea about Product Development and Foreign Currency Earning: There has been insignificant (18%) increase of product development idea of beneficiary-1 after the program compared to only 16.4% (124) in control group. Regarding the impact of project on value added product development only 17.5% (263) respondents replied positively whereas none in control group. Only 6% (90) has received support (training and awareness) campaign from the project as compared to none in control group.

Around 48.4% respondents of beneficiary-2 indicated that there has been increase of product development idea after the program compared to only 10% (2) in control group. Around 58% of program respondents reported to have increased foreign exchange earnings. Similarly 65% incidence of increased income was noticed. Only 47.9% respondents replied positively about impact of project on value added product development. In case of support (training and awareness campaign) received from the project on shrimp product development, the highest number of 140 (74.5%) respondents replied affirmatively compared to 100% negative in control group.

Status of Organization in View of HACCP: Among the program group, 81.4% respondent indicated that they have only 1 organization while 85% in control group responded to have 1 organization. Regarding manpower deployment, 81.9% beneficiary indicated have 1-10 manpower followed by 12.8% in 11-20 manpower compared to 85% under 1-10 manpower and 10% under 11-20 manpower in control group. Around 51% respondents have given positive reply on staff training from the project as compared to 100% of normative in control group. While asked about the source of selling/buying of shrimp, 81% respondents replied from the depot/aratdars and 6% other sources. Regarding the type of work delivery, 33% replied positively for, exporting, 10.6% for dealers, 25.5% for processing, 81% for Depot/aratdars/middleman, and 15% in different work categories under multiple choice. 100% of the respondents opined that they have bought/sell more than 1001 kg of shrimp in a month as compared to 85% in control group. While asked whether their skills have increased due to training, 76.1% beneficiary replied positively compared to 100% of normative in control group. While it was asked whether their organization has been approved from any authority almost 87% has confirmed that they have been approved from DOF as compared to none in control group. None of the program group and control group organization has any child labor in their organization.

HACCP Compliance Fish/Shrimp Production: Only 10% family has more than 2 acre pond/gher before the project as compared to 29% after the project. There is no major variation observed in control group in before and after project period which is 15%. This change of pond/gher size indicates positive impact of the project.

Production (Kg/Acre): Around 87% (1306) respondents of the program group production range is between 200-300 kg/acre while 13% (195) has expressed that their production range is above 300 kg/acre. There is no significant variation observed in before and after project in control group in regards of production.

Marketing: Around 72% (1081) respondents sell their products to the depot/aratdar followed by 28% (420) in open market as compared to 27% (204) and 28% (212) respectively in control group.

Fish Feed: Highest 69.3 (1040) respondent of program group are using market brand fish feed as compared to only 39.8% (301) in control group. Manifestation are 78% (1171) twice in a day, and 22% once in a day. Highest 94% (1411) respondents are not using any chemical as compared to 27% in control group. Maximum (82%) of respondents can sell 100-500 kg per month as compared to 80% in control group. Most of them (77.4%) opined that project has no impact on production increment. Around 34.3% (515) indicated that they are facing problem like low price (19.3%), commission (6%), extortion 4%, broker intervention 3% and transport problem 2% as compared to 72.9% in control group.

6.1.2.5 Impact on Employment and Poverty Reduction (*Ref. objective iii*)

The impact of project activities in relation to employment of destitute people especially women and poverty reduction of the people at the catchment areas/upazilas has been furnished in the following pages:

Employment Generation: Around 84% respondents of beneficiary-1 have told that there has been considerable increase of employment opportunities after the intervention of project. Manifestation of the increases in processing plants was around 61.5%, fish/shrimp farm around 22.2% and Income Generating Activities (IGAs) around 16.2%. Similarly 72.9% (1094) and 79.2% (1189) beneficiary responded positively on socio-economic status improvement and women employment due to project intervention. All respondents (100%) confirmed that project has no negative impact in environment. Around 68% of respondents confirmed that the project ensured environmental friendly working condition for the staff. In regards of by-product utilization, respondents have no adequate knowledge on that and only 11% respondents have opined positive reply. The most important issue of food quality and safety such as traceability, respondents have some knowledge as they received training on that which is 74.6% (1120). Though there has been some improvement perceptible with regards to women empowerment after project intervention but productivity remained crucial factors to sustain and further growth of the sector. Almost similar types results has also found in case of beneficiary-2.

Around 84% respondents of beneficiary-2 have been considerable increase of employment opportunities after the intervention of project. Manifestation of the increases in processing plants was around 53%, fish/shrimp farm around 21% and IGAs around 26% has created due to project. When asked about the status of socio-economic status improvement due to project, around 68% beneficiary responded positively while 100% (22) of control group replied negatively. Around 75% beneficiary is able to run in-plant "own check" in system without anyone help from the project. Total 94.7% beneficiary under program group has told that project has created scope for women employment. Similar trends have also been found in self employment wherein 89.4%. With regard to negative impact on environment 100% beneficiary responded negatively in program group while it was 90% in control group. Around 92% of respondents confirmed that the project ensured environmental friendly working condition for the staff. The similar results were also found in consignment rejection. But in case of raw materials availability for the processing plants only 14% respondents has opined the availability of raw material whereas maximum 85.1% has expressed their serious concerns over non-availability

of raw material and thus unable to run all 74 approved processing plants and ill practice was going on due to this. Only 20% of the total approved plants can get raw material. Urgent measures like high yielding variety need to be introduced to increase productivity to save the industries. All the efforts of food safety and quality and top up approach will be useless if raw material availability is not ensured. Though there has been some improvement perceptible with regards to women empowerment after project intervention but productivity remained crucial factors to sustain and further growth of the sector.

Impact on Income and Poverty Reduction: The impact of income and poverty reduction has been assessed through number of socio-economic indicators which are change in landholding and tenural pattern, annual income and expenditure, women empowerment and daily food intake etc.

Change in Land holding and Tenural Patterns: Functionally land ownership status of beneficiary-1 on more than an acre own and lease land have been increased on average and now it is around 72% in aggregate as compared to 24% before the program. Similar trends of results has also found in beneficiary-2 where land ownership status among all the groups have been increased on average and now it is around 63% in aggregate as compared to 47% before the program.

Changes in Level of Income Flow: The data indicated that the average gross annual income of beneficiary-1 household was found to increase up to 55% under the income range of BDT 75,001- lakh and 34% under the income range of BDT above lakh after project intervention. Among the source of income fish/shrimp represented the highest income gain after project intervention than any other source of income. The lowest enhancement of income was noticed in case of other income.

Among the respondents of beneficiary-2 the depot owners represented the highest income gain after project intervention than any other groups. The lowest enhancement of income (40%) was noticed in case of other groups. In case of the processors, the income increased up to 100% under the income range of BDT: 51 lakh and above after project interventions while the same was found as 40% before project intervention.

Income is the measure of economic performance of target respondents and is a source of consumption and saving of a household. It reflects inflow of wealth as a result of different economic activities. The World Bank defines poverty in absolute terms. The bank defines extreme poverty as living on less than US\$1.25 per day, and moderate poverty as less than \$2 a day.

Changes in Average Annual Expenditure Flow: The highest 89% (1335) of respondents of beneficiary-1 expressed their family food consumption related expenditure within 10,000-25,000 taka before project as compared to 51% (766) within 75,001 to 1 lakh taka after project intervention. This apparently indicated an increase of annual income flow leading to increased expenditure for further betterment.

After the project intervention the expenditure of beneficiary-2 has increased in all cases such as pond/land purchases, business expansion, processing cost, modernization of plant, additional manpower and others item exhibiting 10%, 7%, 1%, 10% and 6% under the expenditure range of BDT 16 to 30 lakh. Besides, an increment of expenditure was recorded as 15%, 10%, 27%, 10%, 2% and 2% in all cases under the expenditure range of BDT 31 lakh and above group excepting family maintenance. This apparently indicated an increase of annual income flow leading to increased expenditure for further betterment.

Impact on Daily Food Intake: When measured, poverty may be absolute or relative poverty. An example of an absolute measurement would be the percentage of the population eating less food than is required to sustain the human body (approximately 2000–2500 **calories** per day). In this section, we have estimated poverty in different groups in both pre-post periods for

comparison, measured the relative changes of poverty situation in project households with respect to control, tried to see whether the program could lead to poor income growth, tried to find out timing of and root causes of poverty and find out ways of poverty alleviation. This data was collected from the beneficiary-1 only.

It is observed from the table 4.27 below that around 79% of households family of program group cooked food twice in a day while rest 21% family members has found thrice in a day as compared to 70.3% of households family cooked food twice in a day while rest 29.7% family members has found once in a day before the project. But in control group similar trend of results have also seen in both cases of program and control group without any major variation in once (29.8% & 26%) and twice (70.2% & 74%) times of food is cooked in a day. We also asked them how many number of meals taken in a day. The highest 99.8% respondents of program group have stated that they eat food three times as compared to 70.3% before the project and 72% in control group. Around 99.8% of the program group has opined that they don't have any experience of food shortage/deficit in a year as compared to 26.1% in control group. Only 0.2% of the respondents have expressed that they have permanently deficit of food after project as compared to 26.1% in control group. Around 46.8% of the program group respondents have opined that they eat fish everyday followed by three days 34.2% while 34.3% of the control has opined same view followed by three days 9.7%. All respondents (1501) are above absolute poverty as their food intake range is above 2000-2500 calories.

Project Impact on Women Empowerment: The results show level of women consciousness as high as 98.8% for program as compared to 58% for control group. The level of women consciousness has increased by 40% for program households as compared to 2% for control. Highest 89% respondents can buy anything as per their choice as compared to 47% in control group. Similar results has also found in decision making for family which is 67%. Relatively low level of consciousness is found in property against their name which is 17% in program group and 7% in control group. Around 49% respondents are still giving their salary to their husband while 91% of control group. Total 98.8% respondents of the program group income have increased due to project.

Environmental Impact Assessment: All respondents (100%) confirmed that project has no negative impact in environment. Most of the respondents, which is 90.7% (171) and 92% (173), confirmed that the project ensured environmental friendly working condition for the staff and by-product utilization. The similar result has also found in consignment rejection which was 89.4 compared to 10% in control group. But in case of raw materials availability for the processing plants only 14% respondents has opined the availability of raw material whereas maximum 85.1% has expressed their serious concerns over non-availability of raw material.

6.1.3 Assessment of Skills and Capacity

Total 1200 beneficiaries such as laboratories personnel (30), processors (40), depot owners (200), ice plant owners (30), middleman (100) and shrimp farmers (800) data were collected and analyzed who received training from the project to improve their skills and capacity.

Training Facilities: It appeared that a total of 21,992 participants were trained during the project period. Of these 37 were from abroad and 21,885 were from in-country. Besides, 471 and 111 participants attended awareness meeting/seminars and conferences.

Major Areas of Training It appeared that very important subjects relating to processing, quality control, improved production and management HACCP and traceability systems were included among the training programs. All of these have enhanced the capacity building of the stakeholders regarding quality product development and diversifications.

Status of Training: Training has been given several items on different topics. Survey data indicated that 62.53% of the members knew of the training facilities available.

Impact of Training: It appeared that 100% FIQC laboratory officials improved their efficiency relating to the service delivery and they did not face any problem. An improvement in service delivery at the rate of 100%, 98%, 40%, 50% and 99% were reported to be increased in case of processors, depot, middlemen, ice plant owner and fish farmers exhibiting the rate of problems faced as nil, 41%, 100%, 100% and 43.3% respectively.

Role on Fish/Shrimp Exporting: It is evident that role of FIQC laboratory has been increased up to 100% after receiving the training whereas in other sectors remarkable improvements have also been noticed.

Status of Skill Development: Skill achievement through production technology and postharvest technology was found higher in case of fish farmer (96% and 86.5%) and depot/supplier level (80.5%). The skill development of the processing, middleman and ice plant owners was also found increasing.

Status of the Training Knowledge on HACCP: The highest numbers of processors received training on the HACCP system (96.8%) while the lowest in the laboratory personnel (50%). All of these represented a positive indication towards the benefit gained from the project.

Impact of the Traceability and HACCP skills on Export Earnings: The results relating to the status of knowledge on the implementation frame work of traceability indicated the highest ranking (100%) in case of FIQC officials whereas the lowest in middleman (60%). Similar results has also found in quality laboratory test, The training has not been found very useful for the middleman in case of environment friendly shrimp culture as only 33% middleman responded positively but in case of others the status of training regarding environment friendly was satisfactory. Above all the project played a very significant role regarding the development of technological knowledge for quality improvement and assurance and increased export earnings.

6.1.4 Findings of the Focus Group Discussion (FGD)

Altogether six (6) FGDs were conducted for the impact evaluation of the study covering the areas of Muradpur, Chittagong, Purba Rupsa, Rajbath, Botiakandi, Zamira Bazar, Fultula, Khulna, Satkhira and Dhaka as per standard procedure. At least one FGD was organized for each division with 20 participants. Three FGDs were organized in Khulna Division alone as around 82% of shrimps are exported from the Division. The major findings of the results of the FGD for different areas are given below:

- i. Among the respondents participated in the Focus Group Discussion (FGD) under all six project areas, all the respondents opined that quality and food safety has ensured from the production to processing and shipment. This finding revealed that the HACCP in the project areas were being efficiently used for exporting fish/shrimp products to the overseas country.
- ii. All the respondents said that the construction and upgradation works of the FIQC laboratories in Dhaka, Chittagong and Khulna were of international standard.
- iii. The laboratory personnel opined that construction; up-gradation; equipment purchase; installation; training on operation and maintenance of laboratory equipments, training on laboratory activities, HACCP, traceability etc were sufficiently good enough to test fish and shrimp products from the laboratory. Currently Dhaka laboratory has been performing microbiological and chemical tests whereas Khulna and Chittagong laboratories are conducting only microbiological test as laboratories are yet to get approval from the DOF and MOFL.
- iv. The depot owners, ice plant owners and middle man of fish/shrimp trading also expressed that their happiness regarding the quality of training received on HACCP and traceability. Based on these, they were ensuring hygienic and sanitary condition of the depots fixing floor and wall tiles, using fresh water in ice plant.

- v. During the FGD, some fish farmers opined that very few of the fish farmers have received training regarding HACCP and Traceability issues at the union level but most of them have not received any training of that nature.
- vi. Fish farmers stressed on more support from DOF and BFRI regarding production technology so that they can increase their production many folds as being practiced for tilapia and pangus etc.
- vii. The most of them opined that it will be a big challenge to ensure regular repair and maintenance of the laboratories equipments if there is no provision of yearly services contract from the respective venders and more financial delegation of laboratory authority to repair, maintenance and purchase of new equipments without delay and political pressure under the special conditions on priority item.
- viii. All laboratory equipments were very good quality for sample testing and all lab personnel were also well trained to ensure international standard of testing.
- ix. All the participants agreed that laboratories were of international standard and will get approval of international accreditation soon. Because of quality enhancement shipment rejection rate has been decreased from 54 to 1. The processing plants have also been ensuring their own check in system for the maintenance of quality and food safety standard of their products. The improvement of the laboratories and processing plant regarding quality enhancement was found quite excellent.
- x. Laboratory equipments, chemicals and skilled personnel are competent enough to meet customer's demand.
- xi. All laboratories are earning economical benefit in the form of service charges as charged BDT 1200/sample for microbiological test and BDT 5000 for chemical tests.
- xii. Exportation of fish and shrimp products suffered very badly in the past and sometimes received imposition several times from the importing countries until modernization of the laboratories. But now such obligations have been withdrawn and EU has also withdrawn compulsory 20% re-testing.
- xiii. Fish and shrimp production has increased but are also facing some problems in Satkhira from environmentalist showing the reasons of environmental destruction but in reality shrimp cultivation has no adverse impact on environment rather enhanced employment generation and facilitated poverty reduction .
- xiv. The participants of the FGDs indicated that modernization and upgradation of the laboratories facilitated increased export rate and foreign exchange earnings.
- xv. All participants were in the opinion to have a good business plan for the development of value added product.
- xvi. All participants expressed the need of production enhancement through the introduction of low cost fish and shrimp production technology so as to ensure easy and steady flow of raw materials to the processing plants.
- xvii. The project intervention has lead to an increment of fish/shrimp production and export earnings in the tune of 10-20%. Revenue earning of the laboratories has increased up to 200%. Besides, daily income of fish farmers has also increased from 100-200 taka.
- xviii. Modernization and upgradation of laboratories and introduction of HACCP and traceability in the culture system have extended the field of employment generation.
- xix. The socio-economic condition of the people has been improved to a greater extend after project intervention.

6.1.5 Findings of the Assessment of Strengths, Weaknesses and Threats of the Project

The major findings of the assessment of strengths, weaknesses and threats of the project identified by the Key Informant Interviews (KII) are presented below:

6.1.5.1 Strengths of the project

- **Renovation and Modernization of Existing FIQC laboratory Facilities:** Reconstruction of Dhaka laboratory and two new FIQC laboratories have been built with all facilities in Khulna and Chittagong to the international accreditation standards. Along with the strengthening of FIQC (Dhaka, Chittagong and Khulna) three new sub-stations for FIQC (Benepole-Jessore, Cox's Bazar and Satkhira) have been built through this project. All the laboratory personnel have received in-country and overseas training on different aspects of quality assurance.
- **Comply and Implement HACCP and Traceability system in all stages from harvest to export:** The frame-work for HACCP and traceability has developed and implemented.
- **Strengthen human resources development to carry out proper testing and inspection of fishery products especially shrimps:** A total of 30 senior officials of DOF/MOFL including laboratory personnel have been trained abroad for a period of 2 weeks. In addition, a total of 21,885 target groups have also received 1-3 days training on different topics including HACCP and traceability.
- **Up-gradation of In-plant "Own Check" system to ensure product quality and safety:** About 74 processing plants have established/upgraded its in-plant "own check" in system to ensure product quality and safety.
- **Increased Export Earning through Quality Assurance and Product Development:** Trained manpower of the DOF can ensure product quality and safety which is necessary for export earnings. Rejection rate has decreased from 54 to 1 shipment and export has increased around 20-25%.
- **Raise Awareness on Environmental aspects and by-product utilization:** A good number of awareness workshops on environmental aspects have been conducted and training program was organized which has increased awareness on environment friendly by-product utilization.
- **Improved socio-economic conditions of target group's especially women through awareness creation and lobbying:** A total of 3,000 women have been trained to improve their socio-economic condition. Now women are fully aware about their rights, can deal their right with senior, how to write letter, to whom to talk etc they know very well. As production and export has increased thus family income of the target group also increased thereby improving the socio-economic condition of the target group.

6.1.5.2 Weaknesses of the Project Implementation Process

- **Approval of International Accreditation Standard:** International accreditation standard is international recognition of testing which will greatly help the sector. Though present interim arrangement is permitting our product for exporting but accreditation will be the permanent approval which is yet to receive.
- **Chemical Test:** Only Dhaka FIQC laboratory has been conducting microbiological and chemical test whereas Khulna and Chittagong laboratories have been undertaking only microbiological tests in-spite of passing 2.5 years of project implementation.
- **Regular repair and maintenance:** So far one-equipment at Chittagong and 7 equipments at Khulna are out of order and unable to repair because of the obligation of financial delegation. As such, authority needs more financial delegation.
- **Insufficient Training:** The training duration and focus was not enough to educate the shrimp/fish farmers.
- **Delay completion of construction works:** The construction works was delayed about 7 months from the schedule date of January 2008.

6.1.5.3 Threats of the Project

- **Low Productivity of Shrimp/Non-availability of Raw Material for the Processing Plants:** Present production of shrimp can meet only 15-20% of processing plants shrimp demand. In this context, high yielding variety like **benomin variety** can to be introduced (pilot basis) immediately to increase present production from 300 kg to 1500 kg/hectare.
- **Shrimp Zone:** Considering the economic importance of the sector, there is needed for demarcation of the exclusive shrimp production zone for better export.
- **Common Landing Station:** At present there is no common landing station for shrimp in the areas. Thus authority needs to take necessary action for common landing station for shrimp.
- **Inadequate planning and intervention at costal area:** Detailed costal area intervention plan need to be prepared upon conducting feasibility study with the representative of the relevant departments.
- **Environmentalism intervention:** Joint cost-benefit and environmental study is needed to stop unplanned intervention in the sector.
- **New test requirement:** New threats of test and equipments with skills personnel requirement may come any time that need to be addressed in due time. Provision should be made in this regards immediately.
- **Availability of disease frees PL at Gher:** The government needs to ensure healthy, quality and disease free shrimp PL supplies through the registered hatchery.

6.1.5.4 Assessment of the Sustainability of the Works

The major findings of the assessment are discussed below:

- **Quality of the works:** All the project management personnel including consultants of UNIDO have ensured the quality control and management of the materials, quantity and timeliness of the works. In addition, the contractor had carried out the laboratory tests of materials that used for construction works. Good performance was found for all kinds of quality control tests and no challenge was required for any field laboratory test. The soil test was done before the start of construction.
- **Durability of the works:** Maximum 100 years durability period considered for newly construction laboratory buildings and maximum 10 years durability for laboratory equipment subject to regular repair and maintenance.
- **Sustainability of the Project:** All trained people of laboratories including constructed building and procured equipments have been transferred to the revenue budget of the government. All three laboratories are earning revenue for government and export is subject to the laboratory test thus we need to run these laboratories by any cost.
- **Management:** The project was managed and implemented very professionally. Project has received appreciation from all corners. This is a very successful project which is giving desired benefit to the target group as well as country in earning of foreign currency.
- **Cost-effectiveness of the works:** As FIQC laboratory is earning 1.5 core to 4.5 core taka per annum and it can even be increased further if all the laboratories can work to their fullest capacity. The FIQC laboratories are a self-reliant and profitable organization.

6.2 Recommendations

The project has supported to establish internationally standard Fish Inspection and Quality Control services as well as the quality of exportable fisheries commodities has enhanced to an international level. This project has also increased employment generation of the distressed poor women in this sector causing a remarkable improvement for their socio-economic condition. Besides, the major recommendations of the project are given below:

- **Approval of International Accreditation Standard:** Immediate actions need to be taken to get International accreditation standard.
- **Chemical Test:** Chemical test at Khulna and Chittagong laboratories need to be started immediately without further delay for better benefit of the client.
- **Regular Repair and Maintenance:** All repairing and maintenance works needs to be done under the service contract. In addition authority needs more financial delegation so that regular repair and maintenance can be done without any delay.
- **Training:** Training program having longer duration and elaborated subject matter need to be organized for the farmers, depot, ice plant owners and extension workers of DOF for increasing shrimp production as well as HACCP compliance just starting from the production level.
- **Design of the works:** Due care need to be taken for the selection of technical personnel responsible for design works.
- **Project Design:** Projects need to be well thought and correctly designed. Too much revision and changes may cause delay in implementation. A number of changes have been noticed in project management and implementation. This trend should be avoided in future planning. Besides, feasibility study of the project may be carried out before final formulation.
- **Avoidance of Additional Time of Implementation:** To get the benefits from the project, delay of the project implementation should be avoided and it should be implemented within the stipulated time and work frame.
- **Stuffing Facilities at the Renowned Processing Plant Premises:** Currently few processing plants are enjoying full and few interim privileges for stuffing of shrimp at container at their premises. But most of them are not enjoying this facility despite of their good reputation. If authority arranges stuffing of shrimp at the processing plant premises based on the previous record of the industry it would be helpful for the reduction of export time and hassle at the port.
- **Raw Materials Availability and Product Diversification:** The DOF in general and BFRI in particular should their more attention to conduct more research on production and product diversification technology so as to provide easy and steady flow of raw materials to the shrimp processing plants round the year instead of the current 8 months.
- **Shrimp area Zonation:** Shrimp area should be demarcated and a separate zone is declared immediately for production intensification and increased export earnings.
- **Landing Station Strengthening:** Landing stations need to be up graded to ensure fair price and better quality.
- **Biodiversity conservation:** Very often voices are being raised from the environmentalist regarding the destruction of environment around the shrimp culture area although the reality is quite different need to be resolved through joint investigation involving the concerned Departments and shrimp farmers.

- **Branding of Unique Quality of Shrimp:** Bangladesh is producing unique quality shrimp which is very tasty and delicious compare to any other country. The government therefore needs to take immediate step for branding this unique item of shrimp.
- **Autonomous Body:** As per international accreditation standard, FIQC should be autonomous unit of DOF. In addition, inspection and quality control laboratory management unit should be separate otherwise it will be conflict of interest if both are at same unit.
- **Updating of Fish Farmer Registration:** The database of the 190,000 registered fish farmers need to be maintained and updated regularly.
- **New Project on Shrimp Productivity:** The government particularly the Department of Fisheries of the Ministry of Fisheries and Livestock immediately needs to take new project on shrimp productivity to ensure available and steady supply of shrimp to all processing plants. This additional production will support to increase export earnings of the sector and reduce the poverty of the country.
- **Availability of Quality Water:** The authority needs to take immediate step to ensure available and required depth of water for shrimp production. If necessary, silted channel of BWDB need to be re-excavated for ensuring smooth flow of water.
- **Policy:** Policy for country's Minimum Residue Level (MRL) of food in light with rules and regulations of fish and shrimp importing countries need to be formulated soon for local consumer. In addition, Consumer Association of Bangladesh (CAB) and BSTI include other relevant stakeholders need to work together for food safety and quality.
- The project should have baseline data for impact assessment.

6.3 Conclusion

- Strengthening of Fish Inspection and Quality Control Services (SFIQC) is an ideal example of EU aided project of the Government of Bangladesh that can replicate in other departments to ensure quality of food for local consumer.
- The project has succeeded in achieving its target to sustain export of shrimp in the international market as per standard of international and beneficial effects on the target are still visible.
- Modernization of three FIQC laboratories up to the international accreditation standard is well established in three divisional districts including regional stations for better food safety and quality assurance.
- Training programs supported by laboratories activities, HACCP and traceability facilitated the DOF personnel and beneficiary for the development of skills which ensure quality of shrimp products from production to export.
- The cooperation and coordination between the MOFL-DOF and Ministry of Commerce need to be established for importing fish quality control for local consumer and necessary law in this regards need to be enact.
- The project has significantly positive impact on increasing export and income, increasing capacity of DOF, increase of women's empowerment and raising consciousness level of the fish farmers, processors, ice plant and depot owners and middleman includes destitute women leading to increased export and improved livelihood of the beneficiary.

Annex-1: Data Collection Instruments

I.0 grm / iPsiD DrCv` tbi eZgub Ae`it

I.1 cKz/ tNi/ nvl i/ evl i

I.2 Ae`ib :	2005	2012
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I.3 Gj vKv (kZisk) :	2005	2012
	<input type="text"/>	<input type="text"/>

I.4 cKZ GKti (100 kZisk) KZ tKwR grm / iPsiD DrCv` b nq?	2005	2012
	<input type="text"/>	<input type="text"/>

I.5 cKti i PL e`envi Kivi dtj gvtQi tcvbv Drm iK?	2005	2012
1=cKwZK; 2= Ligtii DrCv` b; 3= Ab`ib` (Dtj L Kiab-----)	<input type="text"/>	<input type="text"/>

I.6 gvtQi tcvbv/ PL gRZ Kivi nvi (msL`v/ GK i)?	2005	2012
	<input type="text"/>	<input type="text"/>

I.7 gRZKZ.gvtQi tcvbv/ PL Gi AvKvi (BwA) 1= nvd BwA, 2= GK BwA; 3= t`o BwA; 4= BwA ev ZtZmaK	2005	2012
	<input type="text"/>	<input type="text"/>

I.8 AvCib iKfite Avcbvi cYs বিক্রি করেন? (GKwaK DEi t`qv hite)	2005	2012
1= খোলা বাজারে; 2= আড়ৎদারের নিকট; 3= পাইকারের নিকট; 8= প্রক্রিয়াকারীর নিকট, 5= Ab`ib` -----	<input type="text"/>	<input type="text"/>

I.9 iK ai tbi gvtQi Lvevi e`envi Kiv nq (GKwaK DEi t`qv hite)	2005	2012
1= iKj tUW Ges tMwW iCw; 2= iKj tUW iCw; 3= iBR`^dgtvi iKkLvevi; 4= fimgvb iKj tUW	<input type="text"/>	<input type="text"/>

I.10 cKti i Lvevi cUvtbi AbgvZ I nvi KZ? (GKwaK DEi t`qv hite)	2005	2012
1= B kZisk kixii I Rb; 2= iZb kZisk kixii I Rb; 3= Pvi kZisk kixii I Rb; 4= cUvtkZisk kixii I Rb i tB GKevi; 6= i tB B`evi	<input type="text"/>	<input type="text"/>

I.11 AvCib iK gvtQi DrCv` b evx` Kivi Rb` tKvb cKvi imvqubK `e` e`envi Ktib?	2005	2012
	1=nur; 2= bv	<input type="text"/>

I.12 hiv` nu`nq; Zvntj i imvqubK `e` Mj v iK iK? (GKwaK DEi t`qv hite)	2005	2012
1= Pz; 2= iUGmnc; 3= BDm qv; 4= tMei; 5= k` eaK Lvevi; 6= JIa	<input type="text"/>	<input type="text"/>

I.13 AvCib iK gvQ/ চিহ্নি প্রক্রিয়াজাত cKt` বিক্রি করেb?	2005	2012
	1=nur; 2= bv	<input type="text"/>

I.14 hiv` nu`nq, Zvntj , gvQ/iPsiD cwi gvb (tKwR) iBt`eDtj L Kiab	2005	2012
1= eM`v iPsiD <input type="text"/> 4= Bij k <input type="text"/>		
2= Mj `v iPsiD <input type="text"/> 5= KivKov <input type="text"/>		
3= miv`v/ evBb gvQ <input type="text"/> 6= Ab`ib` <input type="text"/>		

I.15 GB cKti i dtj Avcbvi gvQ/ iPsiD DrCv` b evx` tctqtQ iK?	2005	2012
	1= nur; 2= bv	<input type="text"/>

I.16 hiv` nu`nq; Zvntj cKti i cte` eZgub KZ tKwR DrCv` b ntqtQ?	2005	2012
	<input type="text"/>	<input type="text"/>

I.17 gvQ/iPsiD বিক্রি করতে কোন সমস্যা হয় কি?	2005	2012
	1= nur; 2= bv	<input type="text"/>

I.18 hiv` nu`nq; Zvntj iK iK mgm`v nq? 1= Kggj`; 2= Kigkb; 3= PuvemR; 4= `vj vtj i Dc`e; 5= cwi enb e`e`v	2005	2012
	<input type="text"/>	<input type="text"/>

J.0 bixi Kg`yZvex` t (gijv` i Rb`)

J.1 বর্তমানে আপনি কি মাছ/ চিহ্নি প্রক্রিয়াজাত করণের সদস্য?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.2 নারীদের মাছ/ চিহ্নি উৎপাদন কার্যক্রমে এবং আয় বৃদ্ধির ক্ষেত্রে অংশগ্রহণ করা উচিত কি?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.3 আপনি কি আপনার পছন্দের জিনিস ক্রয় করতে পারেন?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.4 AvCib iK Avcbvi cwi ev`i i e`enviq tKvb imx`vS`ib tZ cv`i b?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.5 Avcbvi bvtg iK tKvb cKvi m`u`E Av`Q?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.6 AvCib iK Avcbvi DcvR` Avcbvi `igtK t` b?	2005	2012
	1= nur; 2= bv	<input type="text"/>

J.7 AvCib iK gtb Ktib GB cKti iU gijv` i Avq Zj vmbZ Kti tQ?	2005	2012
	1= nur; 2= bv	<input type="text"/>

K.0 Kgms`vb mpt

K.1 AvCib iK gtb Ktib GB cKti iU Kgms`vb mpt Kti tQ?	2005	2012
	1= nur; 2= bv	<input type="text"/>

K.2 hiv` nu`nq; Zvntj tKv`iq? 1= c`mms cU; 2= iCm Kij Pvi; 3= iCm tcv`i nvi tfo; 4= AvBwRG GKiv`iU	2005	2012
	<input type="text"/>	<input type="text"/>

K.3 AvCib iK gtb Ktib GB cKti i gva`tg mgvtRi iBw` iKQzj vtKi Ae`vi DbwZ ntqtQ?	2005	2012
	1= nur; 2= bv	<input type="text"/>

Annex-1: Data Collection Instruments

- K.4 হার নূন্য; Zintj Kiti? 1= grm Plix; 2= grm e'emqx; 3= মস্য প্রক্রিয়াকারী; 8= Ab'rb (Dij L Kiab-----)|
- K.5 Avcib K gtb Ktib GB cKíU gnrj vt`i Kgrms`rb mwp KtiQ? 1= nür; 2= bvl
- K.6 হার bvl nq; Zintj K Ktib?
 ~~~~~|
- K.7 Avcib K gtb Ktib GB cKíi dtj cwi tetki Dci tKvb tbiZeiPK cFve ctotQ? 1= nür; 2= bvl
- K.8 হার নূন্য; Zintj K Fite?  
 1= jebvতা বৃদ্ধি; 2= উপজাত দ্রব্যের পরিবেশ বান্ধব প্রক্রিয়াকরণ না করা 3= ফসলি জমি নিধন, 8= জলাবদ্ধতা; 5= eý wab, 6= Ab'rb-----|
- K.9 Avcib K gtb Ktib G cKíU dtj grm RmeKvi mit\_ m3 tjk`i Kiri Dbz `p` mZ  
 cwi tek mwp ntqQ? 1= nür; 2= bvl
- K.10 Avcib K gtb Ktib G cKíU dtj grm/Psioi DcRvZ `te`i cwi tek eÜe e`envi ubwZ ntqQ?  
 1= nür; 2= bvl
- K.11 gvQ/ Psio gRy cieZx TraceabilityKvR K Avor`vi iv Ktib? 1= nür; 2= bvl
- K.12 হার bvl nq; Zintj K Ktib?  
 1= প্রক্রিয়াকারী; 2= mieivnKix; 3= ,`ig gnrj K; 4= e'emqx; 5=Ab'rb (Dij L Kiab-----)|
- K.13 Avcib K Traceability gv chiq wbi c` Lv` e`vV m3x tKvb `yZv AR KtiQb? 1= nür; 2= bvl



Name of Enumerator's : ..... Date: .....

Address: District : ..... Upazila: .....

Catchment Area/Union/Village: .....

Supervisor Signature : .....

**Annex-1: Data Collection Instruments**

মৎস্য অধিদপ্তর কর্তৃক বাস্তবায়িত মৎস্য পণ্য পরিদর্শন ও মাননিয়ন্ত্রণ কার্যক্রম জোরদারকরণ প্রকল্প (২য় পর্যায়) শীর্ষক প্রভাব মূল্যায়ন সমীক্ষা

ev`éiqb cui exyY I gj`iqb uefM  
cui Kí bv gšbj q  
MYcRvZšy esj t` k mi Kvi

**DĒi`vZvi ckeĪ (Processors, Ice/ Depot Owner)**

**mytZi bt` Riej x**

- DĒi`vZvi AbgnZ PibZ nte|
- DĒi`vZvtK RvbtZ nte th Zvi t`qv Z` , tj v tMvcb i vLv nte|
- mgxyvi Dt`k` ebv Ki tZ nte|

tRj v tKw:    DctRj v tKw:    Aibw baf:

**A.0 DĒi`vZvi cui PviZt**

A.1 DĒi`vZvi brg :

A.2 ucZvi /`tgi brg:

A.3 wKivr: tRj v :  DctRj v:

BDibqb :  Mlg/ gvQ aivi Gj vKv:

A.4 eqm :  ermi

A.5 wj ½ : 1= cjad ; 2= gvnj v|

A.6 ag : 1= gvnj g; 2= wn`y3= tešx; 4= Ltövb; 5= Ab`vb` (Dt`j L Ki ab N`N`N`-N`)|

A.7 %ewwK Ae`v : 1= weewwZ; 2= AweewwZ; 3= weaev/wecZwK; 4= Zvj vKcšB; 5= Aij v`v|

A.8 tckv : cšvb wZxq

1= grm` i BwbKvi K; 2= cui tekK; 3= আড়দার; 8= সরবরাহকারী; ৫= প্রক্রিয়াকারী; ৬= ব্যবসায়ী; 7= ,`vg gvnj K; 8= eid ,`tgi gvnj K|

**B.0 cšZövb gi Kiv Ges ai Yt**

B.1 bt`Ri cšZövb : 1=tQvU cšZövb (5-10) Rb KgPvi x; 2= gvSwi cšZövb (11-20) Rb KgPvi x; 3=eo cšZövb 21 Rtb  tekx|

B.2 Askx`vix cšZövb: 1=tQvU cšZövb (5-10) Rb KgPvi x; 2= gvSwi cšZövb (11-20) Rb KgPvi x; 3=eo cšZövb 21  tekx|

B.3 fivovq Pwj Z cšZövb: 1=tQvU cšZövb (5-10) Rb KgPvi x; 2= gvSwi cšZövb (11-20) Rb KgPvi x; 3=eo cšZövb 21  tekx|

**C.0 DĒi`vZvi Avq Ges e`qt**

**C.1 grm` Ges grm`RvZ`e` t`tK ewl R Avq:**

Avtqi Drm

ewl R Mo Avq (UvKv)      cui Prj br e`q (UvKv)  
2005    2012                      2005    2012

C1.1 প্রক্রিয়াজাতকরণ

C1.2 evRvi RvZKi Y

C.1.3 i BwbKi Y

**Annex-1: Data Collection Instruments**

C.1.4 Ab'vb" (DtjL Kiab -----)|

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|----------------------|

**C.2 DEi`vZvi emlR e`q (Ukq)t**

|      |                      |      |                      |
|------|----------------------|------|----------------------|
| 2005 | <input type="text"/> | 2012 | <input type="text"/> |
|      | 2005                 |      | 2012                 |

**C.3 nebtqullt**

C.3.1 evoM/ জমি ক্রয়

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

C.3.2 e`emv epX

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

C.3.3 প্রক্রিয়াজাতকরণ

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
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C.3.4 AvaybWKKiY

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

C.3.5 tjvKej epX

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

C.3.6 Ab'vb" (DtjL Kiab NNNNNNNNNNNNNNNNNNNNN)

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

**D.0 grm" cui`k@ I gubiqsY cui`yMvi AvaybKiYt**

D.1 AvciB Wk Rvbb, XivKv, PAMlg I Ljvbyq Aew`Z cixyMvi , tjv GB cKfI i AvI Zvq wbgfY I DbqY Kiv ntqtQ? 1= nu; 2= bv/

D.2 SFIOC cKfI I cixyMvti i Rb" Avcbvi Avq epX tctqtQ Wk?

1= nu; 2= bv/

D.3 hv` n`vunq; Zvntj cui`yMvti i cti Wk cui`gub Avq epX tctqtQ?

UvKv

D.4 AvciB Wk gtb Ktib, SFIOC cKfI i cixyMvti i Rb" Avcbvi grm`RvZ `e` iBvb I %e`WkK gyf Avq epX tctqtQ?

1= nu; 2= bv/

D.5 hv` nu`nq; Wk cui`gub UvKv:

2005



D.6 FIOC cui`yMvi , tjv Wk AvSRWZK `KZcB I ISO mb` cB Wkbv?

1= nu; 2= bv/

D.7 hv` bv`nq, Zvntj tKb? (GKwaK DEi t`qv hvte)|

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|----------------------|

1= DbZ KtRi cui`tetk Afve; 2= AvSRWZK k@ AvBb j`yb; 3= me`r mieivn wbdZ KitiYi Afve; 4= `y e`e`vcbv I KmiMvi Rbetj i Afve, 5= wbgqZ I `yZv Abjvq teZb Kivtgv i AbjiY bv Kiv, 6= c@qvRbq hScwZ I imvqwbK `te`i AchfBZv, 7= me, tjv, 8= Ab'vb-----|

**E.0 grm" /iPsvoi , bMZ gub wbdZKiYt**

E.1 grm" AniY cieZP, `vtg mWkfute e`e`MAY m`u`K AvciB Wk WQZvbb?

1= nu; 2= bv/

E.2 আপনি কি মৎস্য বা চিংড়ি আহরণ থেকে ব্যবস্থাগ্রহণ পর্যন্ত বিশুদ্ধকরণ প্রক্রিয়া অনুকরণ করেন?

1= nu; 2= bv/

E.3 যদি হ্যাঁ হয়; তাহলে বিশুদ্ধীকরণ প্রক্রিয়া কিভাবে অনুকরণ করেন? (GKwaK DEi t`qv hvte)|

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|----------------------|

1= meix Kivgvy e`envi Kiv; 2= `vtgi cui`vi-cui`ObwAe`v; 3= c@wgK hvPvB-বাছাই ও মোড়কীকরণ প্রক্রিয়ায় বিশুদ্ধ পানি mieivn I b`@v e`e`v wbdZ KiY; 4= Pvlv` GjvKvq meix cwb mieivnKiY wbdZ Kiv; 5= cui`enb e`e`vi Dbq; 6= meix eid mieivn wbdZ KiY; 7= cui`OK Swoi e`envi, 8= me, tjv, 9= Ab'vb-----|

E.4 AvciB Wkfute grm" /iPsvoi , bMZ gub wbdZ Ktib?

|                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|----------------------|----------------------|

1= প্রক্রিয়াকরণ; 2= chqKiY; 8= tgvOKRvZKiY; 3= Drcv`tbi gub chfeYy c`uZ; 4= HACCP Abtgv`Z Drcv`b KitiYi mst½ GKTxKiY; 5= grm" Ges grmRvZ `e` chfjvPbv Kivi Rb" c`v`tRb UikBij tgvU, tciomiBU tiimWDM, GwUevtqmUKm, nitgvb BZ`w; 6= Kivgvtj i meixZv; 7= Riavx AeZib tK`tjv, eid tK`tjv Ges , `vg, tjvi `Hb gy` Kiv; 8= meix cwb mieivn I b`@v e`e`v DbZ Kti, 9=me, tjv, 10= Ab'vb-----|

E.5 AvciB Wk gub m`Z grm" Drcv`b Kivi Rb" cKfI t`tK tKib cKvi mnthmZv tctqtQb?

1= nu; 2= bv/

E.6 AvciB Wk gubm`Z grm" Drcv`b Kivi Rb" grm" Ana`Bti i FIOC cixyMvi cui`k@ Kti`Qb? 1= nu; 2= bv/

E.7 hv` n`vunq; Zvntj tKv`vq cui`k@ Kti`Qb? 1= XivKv cixyMvi; 2= PUMlg cixyMvi; 3= Ljvby cixyMvi, 4= me

|                      |                      |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
|----------------------|----------------------|

E.8 grm" /iPsvoi iBvb Kivi Rb" grm" Ana`Bti i FIOC mbt`i , iaZ;m`u`K AvciB Rvbb Wk?

1= nu; 2= bv/



**Annex-1: Data Collection Instruments**

**I.0 `yZv Ges e`e`cbv DbqYt**

- I.1 Avcib wK Rv`bb GB cK`i wU grm` Awa` Bi Ges Brvi mn`thwMx cZ`ovb, tj vi grm` wPsw Drcv` b ep`x`Z  
mnvqZv c`ovb Kti`q? 1= nür, 2= bv/
- I.2 hw` n`vunq; Zvntj cK`i t`\_tK Kx ai`bi mn`thwMZv c`ovb Kti`q|  
1= eZg`ib grm` Drcv` b tK` `a, tj v cb`ogv`b; 2= h`\_vh`\_ Rbkw`<sup>3</sup> ep`x; 3= cw`b mie`ivn l c`ovRbxq e`e`v|
- I.3 KZRZv`Kgpvix` i mvq` m`u`K Avcib wK wKQZv`bb? 1= nür, 2= bv/
- I.4 KgRZ`Kgpvixiv` c`k`y`Yc`b n`q`q` wK? 1= nür, 2= bv/
- I.5 hw` nürnq, Zvntj KZRb? Rb
- I.6 c`k`y`Yc`b Rbej wK eZg`ib Kg`Z Av`q? 1= nür, 2= bv/
- I.7 hw` bv nq; Zvntj tKb Ges tKv`vq Av`q?

~~~~~

J.0 mn`thwMx tmev

- J.1 Avcib wK Rv`bb temi Kvix LvZ gvb wq`š`bi Rb` cK`i t`_tK Kw`i Mw`i mn`thwMZv t`c`q`q? 1= nür, 2= bv/
- J.2 hw` n`vunq; Zviv Kviv?
১= বরফ গুদামের মালিক; ২= প্রক্রিয়াকারী; ৩= সরবরাহকারী; ৪= গুদাম মালিক; ৫= ব্যবসায়ী; ৬= অন্যান্য (উল্লেখ করুন-----
--)|
- J.3 Avcib wK g`tb Kti`b temi Kvix LvZ Av`iv tekx Kti` gvb wq`š`b Kv`R mi`vmwi m`u`³ n l qv Dv`PZ? 1= nür, 2= bv/

K.0 cZ`ovbi eZg`ib Ae`it

- K.1 Avcbvi eZg`ib KZwU cZ`ovb Av`q? 1= 1wU; 2= 2wU; 3= 3wU ev Z`ZwaK|
- K.2 Avcbvi cZ`ovb tgwU KZRb Rbej Kg`Z Av`q? 1= 1-10 Rb; 2= 11-20 Rb; 3= 21 R`bi Aw`K|
- K.3 Avcbvi cZ`ovbi KgRZ` KgPvix c`k`y`Y c`b wKbv? 1= nür, 2= bv/
- K.4 Avcbvi cZ`ovbi grm` wPswi Drm wK?
1= tLvj v evRvi t`_tK; 2= Avor`vi i w`bKU t`_tK; 3= cvBKv`i i w`bKU t`_tK; 4= Ab`ib` (D`j` L` Ki`ab-----)|
- K.5 Avcbvi cZ`ovbi Kv`Ri ai`Y wK? 1= grm` i Bwb; 2= c`ri`beshk; 3= p`kri`y`aj`at; 4= g`ud`am`j`at` k`ar`n; 5= s`ar`b
- K.6 wK cwi gvb grm` wPswi cizg`it`m Avcbvi cZ`ovbi gva`tg` tj b`b` nq?
1= 500-1000 tKwR; 2= 1001-1500 tKwR; 3= 1501-2000 tKwR; 4= 2001 -2500 tKwR; 5=2501- 3000
tKwR; 6= 3001 tKwR Gi Aw`K|
- K.7 cK`i`i c`k`y`i`i dtj Avcbvi cZ`ovbi KgRZv`Kgpvix` i Kv`Ri gvb l Mw`i ep`x` t`c`q`q` wKbv? 1= nür, 2= b
- K.8 Avcbvi cZ`ovbi tKvb 18 eQ`i i w`b`P tKvb k`g`K Av`q` wKbv? 1= nür, 2= bv/
- K.9 Avcbvi cZ`ovbi wK mb` c`b` wKbv? 1= nür, 2= bv/
- K.10 hw` nürnq, Zte DE`i w`b| 1= DOF; 2= EU; 3= ISO; 4= me,`tj`v; 5= Ab`ib`-----

L.0 Kg`is`ib m`p`

- L.1 Avcib wK g`tb Kti`b GB cK`i wU Kg`is`ib m`p` Kti`q? 1= nür, 2= bv/
- L.2 hw` nürnq; Zvntj wKf`te? 1= c`m`ms` cwU; 2= w`dm` Kij` Pvi; 3= w`dm` t`cv`o` nvi` t`f`o; 4= Av`Bw`RG GKwUv`f`U`m, 5=
- L.3 Avcib wK g`tb Kti`b GB cK`i`i gva`tg` mgv`Ri w`b`w` wKQZ`j` v`Ki Ae`vi Dbw`Z n`q`q`? 1= nür, 2= bv/
- L.4 hw` nürnq; Zvntj Kv`i`i? 1= grm` Pvl`x, 2= `wi` `a`Rb`t`Mv`o`x; 3= bvi`x, 4= Avor`vi; 5= i Bwb`Kvi`K, 6= Ab`ib`
- L.5 Avcib wK g`tb Kti`b DOF mn`v`h` Qvov Own Plant Quality Check কার্যক্রম পরিচালনা করতে পারবেন?
1= nür, 2= bv/
- L.6 hw` bv nq; Zvntj tKb? 1= Ach`b` c`k`y`Y; 2= Ach`b` mn`thwMZv; 3= `y`Zvi Afve; 4= cZ`ovbK `e`P` Kv`v`
- L.7 Avcib wK g`tb Kti`b GB cK`i wU g`nj` v`i Kg`is`ib m`p` Kti`q? 1= nür, 2= bv/

Annex-1: Data Collection Instruments

L.8 হারি বি নগ; Zvntj ঝ Kvi Y?

1= যি Zvi Afie; 2= বিx কigK ঝbhtj³ AbvMh; 3= KivRi cwi tētki Afie, 4= cya¹ i Zj²bvq Kg Drcl³ byg; 5= me, tj v, 6= Ab⁴vb⁵----|

L.9 Avclb ঝ K gtb Ktib GB cK¹i U AvZK²g³is⁴ vb G f⁵gKv⁶ ti tL⁷Q?

1= nūr; 2= bv|

L.10 হারি নিু নগ; Zvntj ঝ Kfirte?

১= মৎস্য উৎপাদন, ২= মৎস্য প্রক্রিয়াকরণ, ৩= বাজারজাতকরণ, ৪= রপ্তানিকরণ, ৫= বরফ উৎপাদন, ৬= গুদামজাতকরণ, 7= me, tj v, 8= Ab⁴vb⁵----|

L.11 Avclb ঝ K gtb Ktib GB cK¹i i dtj cwi tētki Dci t²bvZevPK c³fiē c⁴to⁵Q?

1= nūr; 2= bv|

L.12 হারি নিু নগ; Zvntj ঝ Kfirte?

1= j e²v³তা বৃদ্ধি; ২= উপজাত দ্রব্যের পরিবেশ বান্ধব প্রক্রিয়াকরণ না করা ৩= ফসলি জমি নিধন, ৪= জলাবদ্ধতা; 5= e⁶y⁷ vbab, 6= Ab⁴vb⁵-----|

L.13 Avclb ঝ K gtb Ktib G cK¹i U i dtj grm² R³meKvi m⁴v⁵ m⁶ú³ tj vK⁷i i KivRi Dbz⁸ t⁹ m¹⁰g¹¹ cwi tēk m¹²o¹³ ntq¹⁴Q?

1= nūr; 2= bv|

L.14 Avclb ঝ K gtb Ktib G cK¹i U i dtj grm² P³swoi DcRvZ⁴ t⁵e⁶i cwi tēk e⁷Ue e⁸en⁹vi vb¹⁰o¹¹Z¹² ntq¹³Q?

1= nūr; 2= bv|

L.15 cK¹i i dtj grm²RvZ³ t⁴e⁵i c⁶o⁷Zv⁸ ঝ mnRj f⁹ ntq¹⁰Q?

1= nūr; 2= bv|

L.16 FIQC cixy¹M²t³i i dtj Consignment Rejection ঝ cwi gvb Ktg⁴Q?

2005

2012



Name of Enumerator's: Date:

Address: District: Upazila:

Catchment Area/Union/Village:

Supervisor's Signature:

**Annex-1: Data Collection Instruments
FGD Guidelines**

মিষ্টিভাতী উদ্ভিদ বিক্রয়

- *Dēi`vZvi AbgūZ PvBtZ nte|*
- *Dēi`vZvtK RvbtZ nte th Zvi t`lqv Z_` ,tjv tMvcb ivLv nte|*
- *mgxyvi Dt`k` eYv KiZ nte|*

†Rjv tKw: **DctRjv tKw:** **AvBw baf:**

‘j vfiEK Avtj vPbvi vbt` kDv

Øgrm` cY` cwi` kD I gvubqšY কার্যক্রম tRvi`viKiY cKí (2q chq)Ø

FGD cwiPjv bvi`tb : -----/

A.0	grm` cwi` kD I gvubqšY cixyMvi সংক্রান্ত তথ্যাদি
A.1	<i>AĀ cKt`ri Aaxtb vbugZ cixyMti i ,bMZ gvub tKgb:</i> 1. -----/
	2. -----/
A.2	<i>AĀ cKt`ri Aaxtb vbugZ Avdm I cixyMti eZvub Ae`v tKgb:</i> 1. -----/
	2. -----/
A.3	<i>cixyMvi tgi vZ I iyYteyY KvR ntq`vK Zvntj`K K KvR ntq`vK Dtj`L Kiab:</i> 1. -----/
	2. -----/
B.0	cixyMti যন্ত্রপাতি ও রাসায়নিক দ্রব্যাদি সংক্রান্ত তথ্যাদি
B.1	<i>AĀ cixyMti mieivnKZ.hšcwZi eZvub Ae`v tKgb:</i> 1. -----/
	2. -----/
B.2	<i>grm`/vPsvoi gvub vqšt`bi Rb` mivari YZ i vmiqubK`te`i cBZv I ,bv ,b m`vU ej t:</i> 1. -----/
	2. -----/
C.0	প্রক্রিয়াজাত cZv`bi gvub সংক্রান্ত তথ্যাদি
C.1	<i>Avcbvi cZv`bi পরিচালনা, পরিবহন, প্রক্রিয়াকরণ, সংরক্ষণ, পরিষ্কার-cwi`Obv`v I`-Y gy`KiY Ges eR`AcmiY ইত্যাদি কার্যক্রম চেক ইন প্ল্যান্ট imt`÷tg cwi`PmZ nq`Kbv, Dtj`L Kiab:</i> 1. -----/
	2. -----/
C.2	<i>Avcbvi cZv`biU grm`/vPsvoi cwi`kD I gvub vqšt`bi Rb` eZv`tb KvKv`Kbv, Dtj`L Kiab:</i> 1. -----/
	2. -----/

**Annex-1: Data Collection Instruments
FGD Guidelines**

D.0	মুদ্রাফর্ম/ DcKvi t fll সংক্রান্ত তথ্যাদি																		
D.1	<p>Avcbvi cixyMvi e`envi Kvi x/mpeav t f i MKvi xKvi v, D t j L Ki ab:</p> <p>1. -----/</p> <p>2. -----/</p>																		
D.2	<p>Avcbvi cixyMvi e`envi Kivi Rb` e`envi Kvi x` i t K t Kvb Avu R e`q enb Ki t Z nq uK? <input type="checkbox"/></p> <p>n`u=1, bv=2</p>																		
D.3	<p>hw` DEi n`unq, Zvntj uK cwi gvb/nvti LiP enb Ki t Z nq? D t j L Ki ab:</p> <p>1. -----/</p> <p>2. -----/</p>																		
D.4	<p>hw` LiP enb Kti _vK t j, Zv uK f v te cwi t kva Ki t Z nq? D t j L Ki ab:</p> <p>1. -----/</p> <p>2. -----/</p>																		
E.0	Kgms` t bi Dci c f iet																		
E.1	<p>Avcbvi c i Z o t b Kg P Z ÷ v d t` i m s L` v K Z R b, D t j L Ki ab:</p> <table border="0" style="width:100%"> <tr> <td></td> <td align="center">e Z g b m s L` v</td> <td align="center">m s` t i i c t e P m s L` v</td> </tr> <tr> <td>1. c j a d</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>2. g m j v</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>3. u k i (h w` _ v t K)</td> <td align="center">:</td> <td align="center">:</td> </tr> </table>		e Z g b m s L` v	m s` t i i c t e P m s L` v	1. c j a d	:	:	2. g m j v	:	:	3. u k i (h w` _ v t K)	:	:						
	e Z g b m s L` v	m s` t i i c t e P m s L` v																	
1. c j a d	:	:																	
2. g m j v	:	:																	
3. u k i (h w` _ v t K)	:	:																	
F.0	g r m` / P s i o D r c v` b G e s` t e` i e u g L K i t Y i D c i c f i e t																		
F.1	<p>A T` c i x y M v i u m s` t i i d t j g r m` / P s i o D r c v` b G e s` t e` i e u g L K i Y t e t o t Q u K? D t j L Ki ab:</p> <table border="0" style="width:100%"> <tr> <td></td> <td align="center">2012 m t j D r c v` b (t g : U b)</td> <td align="center">2011 m t j D r c v` b (t g : U b)</td> </tr> <tr> <td>1. g v Q</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>2. u P s i o</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>3. i` U u K g v Q</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>4. j e b r` 3 g v Q</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>5. A b` v b` (h w` _ v t K)</td> <td align="center">:</td> <td align="center">:</td> </tr> </table>		2012 m t j D r c v` b (t g : U b)	2011 m t j D r c v` b (t g : U b)	1. g v Q	:	:	2. u P s i o	:	:	3. i` U u K g v Q	:	:	4. j e b r` 3 g v Q	:	:	5. A b` v b` (h w` _ v t K)	:	:
	2012 m t j D r c v` b (t g : U b)	2011 m t j D r c v` b (t g : U b)																	
1. g v Q	:	:																	
2. u P s i o	:	:																	
3. i` U u K g v Q	:	:																	
4. j e b r` 3 g v Q	:	:																	
5. A b` v b` (h w` _ v t K)	:	:																	
G.0	% t` u k K g y` A R t b i D c i c f i e t																		
G.1	<p>A T` c i x y M v i u m s` t i i d t j g r m` / P s i o M Z` B e r m i i B v b x I % t` u k K g y` A R t b i D c i u K c f i e c t o t Q e t j g t b K t i b? D t j L Ki ab:</p> <table border="0" style="width:100%"> <tr> <td></td> <td align="center">2011 m j</td> <td align="center">2012 m j</td> </tr> <tr> <td>1. i B m b i c w i g v b (t g : U b)</td> <td align="center">:</td> <td align="center">:</td> </tr> <tr> <td>2. % t` u k K g y` A R t b (j` y` U v K v)</td> <td align="center">:</td> <td align="center">:</td> </tr> </table>		2011 m j	2012 m j	1. i B m b i c w i g v b (t g : U b)	:	:	2. % t` u k K g y` A R t b (j` y` U v K v)	:	:									
	2011 m j	2012 m j																	
1. i B m b i c w i g v b (t g : U b)	:	:																	
2. % t` u k K g y` A R t b (j` y` U v K v)	:	:																	
H.0	` w i` Z v` i K i t Y i D c i c f i e t																		
H.1	<p>A T` c k i e v` l v q t b` w i` Z v` i K i t Y u K u K c f i e c t o t Q e t j g t b K t i b, D t j L Ki ab:</p> <p>1. -----/</p> <p>2. -----/</p>																		
H.2	<p>Avcbvi cixyMvti grm` ` e` cwi` k b Ges gvb ubqsp I ubu Z K i t Y e` e` v c b v I c i x y M v i m n K v i x` i u K u K D b u Z n t q t Q e t j g t b K t i b, D t j L Ki ab:</p> <p>1. -----/</p> <p>2. -----/</p>																		
I.0	c i Z o t b i` y` Z i q c f i e t																		
I.1	Avcbvi cixyMvti i` y` Z v m` u t K` e j b y:																		

**Annex-1: Data Collection Instruments
FGD Guidelines**

	1. cŁZiŕ b KZiU bglv cwi Ÿv Kiv nq? : 2. cŁZiU bglv ciŸv KiŕZ KZ mgq eŕq nq? : 3. bglv cŁZ LiP KZ? : 4. bglv, tŸv Kiv v mslMh Kŕi _vŕKb? :
I.2	Avcbvi cŁZŕtŕb KZRb ÷vd cŁkŸb cŁB? :
I.3	hŕi ŕKvb cŁkŸbcŁB ÷vd bv t_ŕK _vŕK, ZvntŸ Zvi Kvi Y ŕK? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.4	Avcbvi GŸvKvi Mixe grmŕ/ŕPswŕ Pŕlŕŕ i Drcŕb ও প্রক্রিয়াকরণ সম্পর্কিত দক্ষতা ও জ্ঞান cKgb? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.5	Avcbvi GŸvKvi grmŕ/ŕPswŕ Pŕlŕi v ŕKŕŕŕe grmŕ `eŕ cwi enb Kŕi _vŕKb? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.6	Avcbvi GŸvKvi grmŕ/ŕPswŕ Pŕlŕi v ŕK Dcŕŕq cŁZŕŕNi cŁZ Kŕi _vŕKb? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.7	Avcbvi GŸvKvi grmŕ/ŕPswŕ Pŕlŕi v gŕŕQi Lveŕi ŕntŕŕe ŕK ŕK `eŕ ŕŕi eŕenŕi Kŕi b? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.8	Avcbvi GŸvKvi grmŕ/ŕPswŕ Pŕlŕi v mBŕŕn KZevi gŕŕQi Lveŕi cŁvb Kŕi _vŕKb? DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.9	GB cŁŕi Aŕ GŸvKvq bŕi xi ŸgZvŕtŕb ŕK ŕK ŕŕgKŕi vLŕŕ, DŕtŸ L Ki ab: 1. -----/ 2. -----/
I.10	eŕsŸŕŕŕŕk grmŕ/চিহ্ন পরিদর্শন, প্রক্রিয়াকরণ, মান নিয়ন্ত্রণ ও নিশ্চিতকরণ প্রক্রিয়াকে আরো উন্নততর করার জন্য Avcbŕŕ i ciŕgkŕvKŕŕ DŕtŸ L Ki ab: 1. -----/ 2. -----/

FGD cwi PŸj bŕKvi xi bŕg t -----/ |

FGD cwi PŸj bŕKvi xi ŕŕŸi t -----/ |

Zwi L t -----/ |

mgq t ŕiæ: ----- ŕkl : -----/ |

Annex-1: Data Collection Instruments
Capacity and Skills Assessment Questionnaire

grm" Am`Bi KZR ev`euqZ grm" cY" cwi`k` I gubibqšY কার্যক্রম rvi`vi KiY cki
(2q chq) kxlR cfi ve gj`iqb mgxv
ev`euq cwi exY I gj`iqb ue fll
cwi Ki bv gšbj q
MYcRvšY esj q` k mi Kvi

t mygZv Ges`yZv gj`iqtbi ckej x t

A.1 bvg t-----|

A.2 c`i bvg t-----|

A.3 Avclm/ e`emvqx cZôrtbi bvg t-----|

A.4 e`emvi ckiZ:

1= iBmbKvi K; 2= thMib`vZv; 3= Avoblar; 8= মধ্যসত্ত্বভোগী; ৫= বিজেতা; ৬ = অন্যান্য (উল্লেখ করুন -----)|

A.5 eqm (cb`ermi)t

A.6 tKv`uvbxtZ Avcbri Ae`vb ik?

1= gmj K; 2= PkizRwe; 3= Ab`vb` (Dj`L Kiab-----)|

A.7 eZ`vb tc`j`j |

A.8 ik`y`MZ thM`Zvt

1= ibi`yi; 2= Aog tkb; 3= Gm.Gm.um 4=GBP.Gm.um 5=llt`cgv; 6=meZK; 7=meZK`i vi; 8= Ab`vb` (Dj`L Kiab----)|

A.9 Avf`AZv: K) GB cZôrtb KZ w`b ati AvtOb? 1= 1-5 eQi; 2= 6-10 eQi; 3= 7-15 eQi; 4= 16 Gi Avak |
 L) Ab` cZôrtb KZ w`b utj b? 1= 1-5 eQi; 2= 6-10 eQi; 3= 7-15 eQi; 4= 16 Gi Avak |

--	--

A.10 gvQ/vPsv Prtl`btgê tKvibUtZ Avcbri Avf`AZv AvtO? (GKwaK tKw)|

--	--	--	--

1= Drcv`b; 2= msl`bieZv e`vcbv; 3=প্রক্রিয়াজুকib; 4= taSZKib; 5= cwi`vi Kiv; 6= exvB Kiv;
 7= tgvok Kiv; 8= cixyv Ges cwi exyb Kiv 9= me,`tj v; 10= Ab`vb` (Dj`L Kiab-----)|

A.11 Kiv`uDUvi cwi Pj bvg`btgê tKvib`cMtg Avcbri`yZv AvtO?

--	--	--	--

1= GgGml qll; 2= Gg Gm Gt`j ; 3= GgGmGKtm; 4= GgGmclv qv c`tqU; 5= me,`tj v; 6= Ab`vb` (Dj`L Kiab----)|

A.12 Avcbri Kiv`uDUvi cwi Pj bvi`yZv Ae`vb Dj`L Kiab?

1=Lg`fij ; 2=fij ; 3 = tgvUtgvU; 4=tgšj K ik`y;

A.13 Avclb ik`gtb Ktib GB cki`i cki`yY/ ik`y`v সফর দ্বারা আপনার বর্তমান কার্যক্রমে কিব Dbuz`nqtO? 1= nur; 2= bv |

A.14`vqZ; cvj b Kitz`lltg Avclb ik` tKvib mgm`iq cto`Ob? 1= nur; 2= bv |

A.15 Avcbri Dci`KgRZ` c`ex ik?

-----|

A.16 Avcbri Aaxb`KgRZ` c`ex ik?

-----|

Annex-1: Data Collection Instruments
Capacity and Skills Assessment Questionnaire

A.17 *Avcib KZ, tj v wefM/ cŁZŌtbi mvt_ thMthM i yv Ki tQb?*

1= FIOC Lab; 2= iBmbKviK, ৩= পরিবেশক; ৪= আড়দার; ৫= সরবরাহকারী; ৬= প্রক্রিয়াকারী; ৭= e'emvqx; ৮= ,`vg gmvj K;
10= eid cŁZŌtbi cŁZŌtbi gmvj K|

A.18 *gvO/ŲSŲO cY" iBmbtZ Avcvii gj- figKv iK?*

১= উৎপাদন; ২= সংরক্ষণ; ৩=প্রক্রিয়াজাতকরণ; ৪= আহরণ, ৫= পরীক্ষা এবং পরিবীক্ষন করা, ৬= বাজারজাত করণ, ৭= অন্যান্য (উল্লেখ করুন-----)/

A.19 *Avcib cŁkŷtYi mgq iK iK Kiv iktLtQb?*

১= উৎপাদন; ২= সংগ্রহ পরবর্তী ব্যবস্থাপনা; ৩=প্রক্রিয়াজাতকরণ; ৪= শৌচকরণ; ৫= পরিষ্কার করা; ৬= বাছাই করা; ৭= মোড়ক করা;
8= cixyv Ges cmieryb Kiv 9= me,tj v; 10= Ab'ib" (Dtj L Kib-----)/

A.20 *Avcib HACCP I ibivc` Lr" `ibwŌZ Kiti Rb" tKiv cŁkŷY ibtqtQb iK?* 1= nür; 2= bv

A.21 *hiv` nünq; Zintj iK aiti cŁkŷY ibtqtQb?*

1= প্রক্রিয়াকরণ; 2= chiqKiY; ৪= tgvOKRiZKiY; 3= Drcv` tbi gib chfeyY cxiZ; 4= HACCP Abjgwi Z Drcv` b Kiti mst% GKTiKiY;
5= grm" Ges grmRiZ `e" chfj iPbv Kivi Rb" c`u` tRb UMBij tgvU, tciomvBU iimwDm, GwUevtqumUKm, ni tgvb BZ"iw"; 6= Kivrgitj i
weixZv; 7= Riix AeZib tK)`, tj v, eid tK)`, tj v Ges ,`vg, tj vi `Hb gy Kiv; 8= wei x cmb mi ein I b` giv e'e`v DbZ Kti|

A.22 *Avcib AskMhY KitiQb Ggb tckwifEK cŁkŷtYi we`hvi Z eYbv w` b? (f` kix Ges %e` iK)|*

1= cixyMri cŁkŷY; 2= HACCP I ibivc` Lr"`, 3 = HACCP I mvgyK Lr" `i fji e`enwi ibwŌZ KiY, 4= মান নিয়ন্ত্রণ ও অনুকরণ কার্যক্রম;
5= `e` Dbqb; 6= gib mshZ e'e`vcbv কার্যক্রম; 7= WID ও শ্রমিক আইন সম্পর্কিত কার্যক্রম; 8= Ab'ib" (Dtj L Kib-----)/

A.23 *Avcib iK TraceabilityGes gvV chfj ibivc` Lr" `e`vYv mshK tKiv cŁkŷY ibtqtQb?* 1= nür; 2= bv|

A.24 *hiv` nünq; Zintj TraceabilityAbjkiY cxiZ we`hvi Z Rivv AvtQ iK?* 1= nür; 2= bv|

A.25 *Avcib iK gtb Ktib GB cŁZŌtbi grm" Ges grmRiZ `e" cmierytYi ht_ó ygv AvtQ?* 1= nür; 2= bv|

A.26 *Avcib iK gtb Ktib Avcvii cŁZŌtbi cbgf`vqb Ges wektY imtóg AvSRmZK i Bmb gib mshZ* 1= nür; 2= bv|

A.27 *Avcib iK gtb Ktib HACCP mvgAm`cbgvO/ŲSŲO cY" iBmbtZ Avcvii `yZv tetaQ?* 1= nür; 2= bv|

A.28 *cŁkŷtYi dtj ŲSŲO/grm" Drcv` b I `e` iK K gy Avq eix tctqtQ iK?* 1= nür; 2= bv|

A.29 *hiv` nünq; Zintj kZKiv KZ fM eix tctqtQ?* Drcv` b Avq

A.30 *Avcib iK grm" DcRiZ `e" (eiv tcvw±) Gi cŁZŌtbi bmbv ব্যবহার সংক্রান্ত প্রশিক্ষণ cctqtQb?* 1= nür; 2= bv|

cui Pj bqt
tWtj ctgU tUKwbK'vj Kbmve`tUUm cŁt ijt
j kvb-1; Xiv|



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