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PRICE

POVERTY REDUCTION BY INCREASING
THE COMPETITIVENESS OF ENTERPRISES

Greater Harvest and Economic Returns from Shrimp (GHERS)

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EXECUTIVE SUMMARY

The Greater Harvest and Economic Returns from Shrimp (GHERS) is an initiative of Poverty Reduction by Increasing the Competitiveness of Enterprises (PRICE) project, funded by USAID. The objective of GHERS was to increase the productive capacity of existing farms and enhance quality of shrimp delivered to processors adding over \$ 45 million to current sales, \$ 10 million new investment and 14,000 new jobs. This final performance report presents the activities and achievements of the project since 2008.

GHERS worked in Bagerhat, Khulna and Satkhira districts and supported 26,105 shrimp farmers (1,853 female) and 20,480 ha of shrimp *ghers* (ponds) in collaboration with 33 shrimp depots. The depots employed 57 field staffers (Extension Facilitators) to conduct group training sessions and provide individual support to the farmers. A total of 991 farmers' groups were formed, with 15-30 farmers in each group, to conduct the training sessions. The Extension Facilitators (EFs) facilitated 7,928 training sessions for farmers against the targeted 7,360 sessions. On average, 93% of the GHERS farmers attended the sessions. Each of the farmer groups received eight to ten trainings on pond preparation, pre-stocking management, stocking, post-stocking management, fertilization and feeding, harvesting, post-harvesting handling, gender and environmental issues per year. Prior to starting the training sessions, several training materials such as flipcharts, training manuals and booklets were developed for staff and farmers, and training (ToT) and workshops were arranged for staffers, and learning visits to the PCR lab was held for depot owners.

The project conducted baseline, monthly performance and impact surveys with project shrimp farmers, depots, and the PCR lab during the project period. The field activities were monitored with regular visits. Farmers' cross visits to gain practical knowledge and farmers' field day to disseminate project activities were arranged as implementation strategies. During the last 4 years, 21 visitors were welcomed by the project as an opportunity to showcase its field activities.

A total of 153.58 million PCR tested virus-free shrimp PL were stocked by GHERS- associated farmers during the project period. The project assisted and facilitated the supply of screen PL through partner shrimp depots and field staffers.

A total of 35,786 jobs were generated by the farmers, depots and the PCR lab in 2012, which was a 38% increase from the baseline (25,922 jobs) as a result of project interventions. The project contributed to the generation of 9,864 new jobs against target of 14,000 new jobs (70% of target) in 2012.

Total sales of shrimp, prawn, white fish and vegetables worth \$148.39 million was achieved during last 4 years (2009-2012). The shrimp sales at farm level were increased by 52% from the baseline (USD90.05 million). This increased sales added about \$58.34 million to current sales against the target (\$45 million).

During the project period, \$ 95.24 million total investments (fixed costs plus variable costs) were made by farmers, depots and the PCR Lab, which includes an additional \$30.42 million

over the baseline (\$64.82 million). The farmers, depots and PCR lab increased their capital investment to \$17.10 million from \$14.99 million i.e., a \$2.11 million fixed capital investment was increased during four years of project period as a result of project intervention.

On a regular basis, the project submitted annual, quarterly and weekly reports to PRICE. A total of 101 news publications were published in different local and national newspapers during project period. The news mainly covered project activities, strategies and success over the last four years.

It was also planned to grow vegetables in saline zone of project areas in 2012. Fourteen baskets were made by bamboo or blue net bag were set. Bean and gourd type of vegetables have been planted in the baskets and they got lump sum amount of vegetables which contributed to home consumption.

1. INTRODUCTION

GHERS was as an initiative of USAID-funded Poverty Reduction by Increasing the Competitiveness of Enterprises (PRICE) project from 2008-2012. The broader goal of the work performed under the PRICE contract was to help develop Bangladesh's competitiveness in the global market while contributing to pro-poor economic growth. PRICE has been facilitating the increase of sales, jobs and investment in aquaculture, horticulture, and leather sector.

The PRICE project, being implemented by Chemonics International Inc., included the GHERS initiative to execute the aquaculture component through the WorldFish under a sub-contract (PRICE-00-08-WFC-05, September 10, 2008). The purpose of the sub-contract was to provide technical assistance to PRICE to increase yields of approximately 26,090 *Bagda* (tiger shrimp) and *Golda* (freshwater giant prawn) farms, principally working through partnership with shrimp depots. The shrimp depots were central to the GHERS value chain approach and lead entrepreneurs for implementing GHERS interventions.

1.1 Background

In 2010, shrimp was the second largest export item of Bangladesh after readymade garments with a share of about 3 percent in Bangladesh's total exports. A total of 50,368 MT shrimp was exported and valued at \$454.53 million in FY 2008-2009, which was \$534.07 million in 2007-2008; the production decreased in 2008-09 due to natural disaster *Sidr*. The share of shrimp export in total export income from fish and fishery products was almost 85 percent (2008-2009). More than two million people are engaged in backward and forward linkages of the shrimp value chain (e.g., harvesting, culture, processing, exporting and other ancillary activities). The European Union (EU), the United States of America (USA) and Japan are the major importers of shrimp from Bangladesh, accounting for more than 69 percent of total fish exports. The EU alone accounts for more than 50 percent of the total market which implies that any disruption in this market is bound to have severe and important implications for this export-oriented sector of the country, and negative multiplier impacts for the national economy.

The shrimp sector in Bangladesh currently faces several challenges which hinder growth, such as low farm yield, poor quality, and white spot syndrome virus (WSSV) incidence. Regardless of the high demand for this product, shrimp farming is still characterized as being traditional and having low productivity. The WorldFish has identified the gap between demand and supply of shrimp to processing factories as the root cause of many of the problems. The lack of availability of raw material has led shrimp factories to operate with only 20 percent of their capacity. This, coupled with a low quality product, provokes a reduction in the potential competitiveness of the shrimp industry in Bangladesh.

The broader aim of GHERS was to shorten the gap between demand and supply through increased farm productivity and integration of the value chain actors to comply with quality of shrimp product. The project has been built on the experiences of two previous projects, named Shrimp Seal of Quality (SSOQ) and Shrimp Quality Support Project (SQSP) and

promoted three technologies developed through those projects, namely Best Management Practices (BMP), Modified Traditional Technology (MTT) and Closed-System Technology (CST).

1.2 Objectives

The objective of the project was to increase the productive capacity of existing farms and enhance quality of shrimp delivered to processors adding over a) \$ 45 million to current sales, b) \$ 10 million in new investment and c) 14,000 new jobs.

1.3 Implementation Strategy

1.3.1 A Value Chain Approach

The project piloted a new approach/scheme to integrate the value chain actors to build greater consensus and demonstrating viability and effectiveness of the approach. Shrimp depots were developed as “entrepreneurs” and this played central role to the approach. GHERS directly supported the depots with technology and technical staff for building capacity to integrate the stakeholders, particularly transfer of technical knowledge and skills to the shrimp farmers organized into groups. The flow diagram (Figure 1) shows the approach. The major components of the implementing strategy are outlined below:

- Selecting partner depots, building their capacity to organize, operating farmers groups and providing extension services through Extension Facilitators (EFs)
- Selecting shrimp farmers, forming farmer groups, coordinating group activities and building farmers’ capacity on improve shrimp/prawn farming technologies. The project facilitated the entire process
- EFs and depots representatives’ capacity building on improved shrimp/prawn farming technologies, post-harvest handling, and various cross cutting issues e.g., gender, environment, and group dynamics in order to build their capacity to provide extension service to farmers
- Providing technical assistance to existing private Polymerase Chain Reaction (PCR) laboratory at Cox’s Bazaar for ensuring supply of virus free post larvae
- Facilitating linkage among the shrimp hatcheries at Cox’s Bazaar, the PCR lab at Cox’s Bazaar and farmer groups in Khulna region to allow access to quality screened shrimp post-larvae
- Paying special attention to environment and climate change, and women and youth as beneficiaries along the value chain

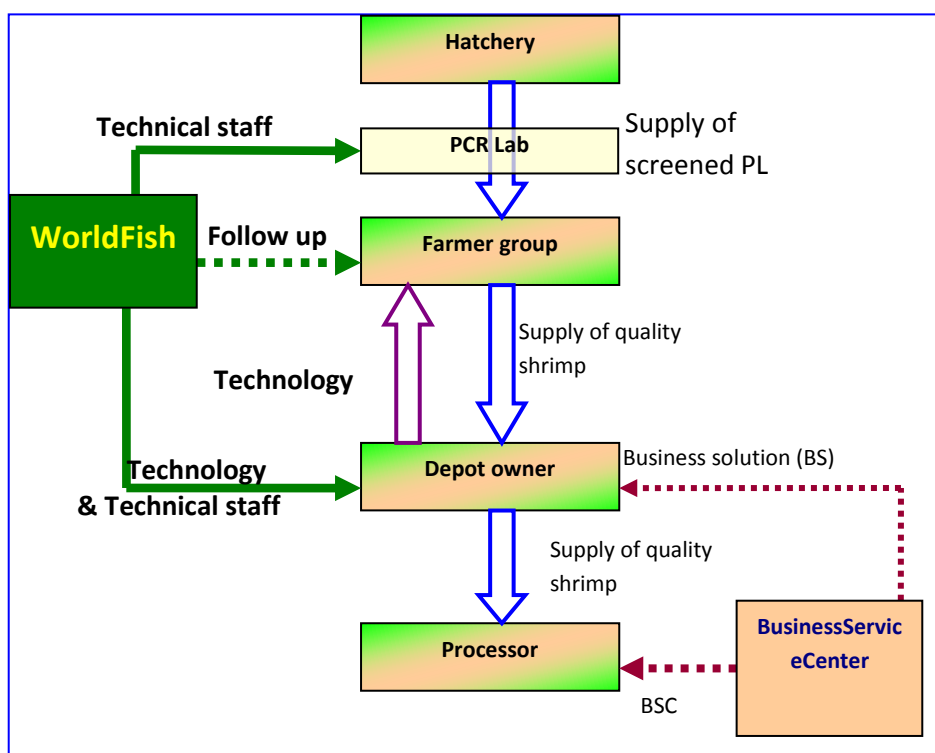


Figure 1: Flow diagram of GHERS implementation strategy

1.3.2 Provide improved shrimp farming technologies

One of the key strategies was to provide improved shrimp farming technologies to shrimp farmers which can help to increase shrimp production at farm level. The project introduced three technologies to the farmers, namely Best Management Practice (BMP), Modified Traditional Technology (MTT) and Closed System Technology (CST). The three degrees of technologies were introduced to the farmers as all types of farmers (poor, medium and rich) can follow these improved technologies according to their choice and economic capability. The basic differences amongst these three technologies are presented in Table 1.

Table 1: Basic differences of BMP, MTT and CST technologies

Key management features	BMP	MTT	CST
<i>Gherdike</i>	Low and insecure dike	Moderately raised	Dikes are cleaned and compacted to prevent entry of virus contaminated outside water
Fencing with net	No barrier	Barrier on nursery only	Barriers are established to prevent carriers entering the <i>gher</i>
Nursery	No	PLs are nursed for 15-20 days	PLs are nursed for 15-20 days
Nursery water treatment	N/A	Treated with bleaching powder	Treated with bleaching powder
Reservoir	No	No	Yes
Reservoir water treatment	N/A	N/A	Water disinfected using bleaching powder
Grow out water	Not treated	Not treated	Water disinfected using bleaching powder

Key management features	BMP	MTT	CST
Grow out <i>gher</i> water exchange	Water is exchanged when needed	Water is exchanged when needed	There is no exchange during production cycle
WSSV negative screened PLs stocking	No	Mixed of screen and non-screen PL	Yes
Stocking density	3-8 batches of PLs are released @ 0.8-1 PL/m ² per time	3-5 batches of PLs are released @ 0.8-1 PL/m ² per time	02 batches of PLs are released @ 6-8 PL/m ² /cycle
Supplementary feed use	No	Regularly and irregularly in nursery and grow out respectively	High quality pelleted commercial feeds are used both in nursery and grow out <i>gher</i>
Harvesting	Harvesting in several time	Harvesting in several time	Complete harvesting at the end of each cycle

2. IMPLEMENTATION METHODS AND ACTIVITIES

2.1 Organize Field Office

In order to improve coordination of field activities among the stakeholders, GHERS established its office in Khulna, which is situated between other two districts namely Bagerhat and Satkhira under the command area. The office required furnishing and was provided with the necessary equipment. The location of the office was: The GHERS Initiatives, WorldFish – Khulna, 33 Hazi Mohshin Road (1st floor), Khulna 9100. The office was then shifted to Nirala Residential area (House 225, Road 14, Nirala R/A, Khulna 9100).

2.2 Staff Recruitment and Posting

All the full-time staff planned for GHERS were recruited in time and started to work since October 2008. Four of them were based at Khulna area office and the other two were based at Bagerhat and Satkhira Districts. Along with the full time project staff, GHERS staffs were supported by WorldFish for senior level management and coordination. Support has also been provided by WorldFish HR, Admin and Accounts team. Alongside the World Fish's staff recruitment, the selected partner shrimp depots recruited their Extension Facilitators (EFs) to provide mainly training and technical supports to project farmers.

2.3 Selection of Working Area

The rural livelihoods of the South-western coastal region of Bangladesh are dominated by shrimp and prawn farming and marketing activities. The vast majority of the shrimp farms are situated in Bagerhat, Khulna and Satkhira districts. Therefore, these three districts were selected for implementation of GHERS initiatives. The implementing partner depots were selected where most shrimp farms are situated. Figure 2 indicates project working area.

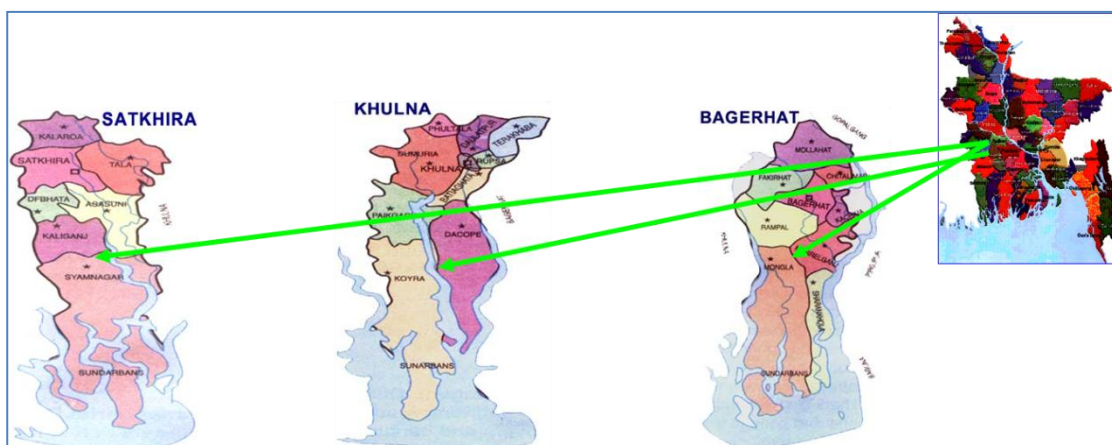


Figure 2: Project working areas

Over the project period, the project worked in 14 upazilas covering five upazilas in 2009 to 2011 and seven upazilas in 2012 (Table 2).

Table 2: Project working upazilas by year

Year	Satkhira district	Khulna district	Bagerhat district	Total no. of Upazila
2009	Kaliganj	Paikgaccha	Bagerhatsadar, Chitalmari, Kachua	5
2010	Debhata, Ashashuni	Koyra	Fakirhat, Mollarhat	5
2011	Shaymnagar , Tala	Dumuria	Rampal , Morelganj	5
2012	Debhata, Kaliganj, Shyamnagar	-	BagerhatSadar, Rampal, Kachua, Morelganj	7
Total	Debhata, Kaliganj, Shyamnagar, Tala, Ashashuni	Dumuria, Koyra, Paikgaccha	BagerhatSadar, Rampal, Kachua, Morelganj, Fakirhat, Chitalmari	14

2.4 Selection of Shrimp Depots and Signing MoA

The depots played the key role in implementing the GHERS initiatives at field level as entrepreneurs. A total of 37 depots were selected to develop as entrepreneurs from 2009 to 2012. Table 3 shows the numbers of depots selected to work over the years. The number of depots varied over the year as per the volume of numbers farmers were supported the project. Address and name of depots are shown details in Annex 1.

Table 3: Number of shrimp depots selected by year

Year	2009	2010	2011	2012
No. of Depot	6	17	33	7

The depots were selected from the command area where project were working. Firstly, the owners were informed about the objectives and approach of the initiatives in a Depot Owners Association meeting. Then, interested depots situated close to the cluster of farms

were surveyed for some basic and baseline information. The depots were identified according to the following criteria.

- Legal registration from Department of Fisheries (DoF) and other concerned authorities
- At least 5 years business experience and established business office
- Direct contact with at least 500 shrimp farmers (supply shrimp to respective depot)
- Annual turnover (biomass) of at least 300 metric tons of shrimp
- At least ten paid employees (part time and full time)
- Shrimp supply account (authorization) with at least three processing factories.
- Willingness to invest in shrimp quality and labor compliance
- Willingness to implement GHERS initiatives under a signed MoA
-

Linkage and responsibilities were formalized through signing the Memorandum of Agreement (MoA) between WorldFish and depots owners individually. Before signing the MoA depot owners were visited and the draft MoA was discussed. The MoA contains objectives, terms of reference, responsibilities for both parties, financial aspects, intellectual property rights and reporting agreements. According to the MoA, the depots were mainly responsible for organizing and operating shrimp farmer groups in order to adopt improved farming technologies, while WorldFish was responsible for building capacity of depots on technologies, farmer group mobilization and networking.

2.5 Recruitment of Field Staff (Extension Facilitators)

All the partner depots recruited required number of Extension Facilitators (EFs) based on the number of farmers they are supporting. A total of 57 EFs were recruited by the depots through formally interviewing interested candidates during the project period. The list of EFs by year has been attached in Annex 2. The number of EFs varied over the years accordingly the project worked with the volume of numbers of shrimp farmers (Table 4).

Table 4: Number of Extension Facilitators by year

Year	2009	2010	2011	2012
No. of EFs	12	35	57	14

2.6 Signing of Agreement between WorldFish and Pranti PCR lab

One of the main attributes of WorldFish innovated improved shrimp farming technologies is stocking of screened shrimp PLs (tested for white spot syndrome virus) to enhance protection against disease outbreak. *Pranti* is the only private PCR laboratory situated at Cox’s Bazar to screen the PLs if required by shrimp hatcheries. A Memorandum of Agreement (MoA) was signed between the WorldFish and *Pranti* in February 2009. The purpose of the MoA was to ensure screened PLs to the GHERS selected farmers, i.e. *Pranti* was to test the PLs at different stages of hatchery operations and certify the PLs as not virus

affected prior delivery to farmers. The *Pranti* supported to certify virus free shrimp PL over the project period (2009 - 2012).

According to the implementing strategy, depots coordinated the whole process to ensure screened PLs to farmers, which includes compiling order from farmers, placing order to hatcheries, screening by PCR laboratory, transportation and distribution of PLs to respective farmers on due dates, etc. In this regard, the WorldFish facilitated and mentored the coordination and integration among the key actors in that process. However, as per agreement, *Pranti* was provided with technical supports and technical staff by the project for carrying out the PCR tests.

2.7 Learning Visit to Shrimp Hatcheries and PCR Lab

A two day learning visit to hatcheries and PCR laboratory at Cox's Bazar was organized by GHERS for selected six depots in 2009. The purpose of the visit was to develop clear understanding of the participants on PCR testing and hatchery operation and to build consensus among hatcheries, PCR laboratory and depots in order to ensure screened shrimp PLs to farmers. Six depot owners or representatives, three hatchery owners and one PCR laboratory owner participated in the visit (Figure 3). The program consisted of open discussion, observation of hatchery operations and practical demonstration of PL screening.



Figure 3: Learning visits of depot owners to PCR Lab at Cox's Bazar

2.8 Selection of Farmers, Group Formation and Agreement Signing

The farmers' selection and group formation were done by depots, while WorldFish actively facilitated and mentored the process. The shrimp farming communities were identified according to the primary information provided by the depots considering: a) cluster of farmers in a village and, b) contact with the selected depots. Then, the following three step procedures were accomplished for selecting farmers from individual villages.

All *bagda* and *golda* farmers in a village were invited to a large group meeting to share the objectives, approaches and responsibilities of stakeholders of GHERS initiatives. Then small group meetings were organized to get individual impressions about participation in the activities. The interested farmers who satisfied most of the selection criteria were listed. Selection criteria are listed in Annex 3.

A farmer group meeting was organized for their opinion regarding their participation in the project and willingness to sign a written agreement (general agreement). Finally a total of 26,105 farmers (including 1,823 female farmers) were selected. It was a challenge of involving women in shrimp farming because of their insignificant participation in shrimp farming in general while religious norms do not also allow them to work outside of their house. The total numbers of farmers selected by the project were: 2,772 in 2009; 9,023 in 2010; 10,785 in 2011; and, 3,525 in 2012. The depots gave priority on small-scale farmers having small pond in the selection process. Therefore, the range of average pond size for selected farmers amongst years was 0.56 to 0.84 ha (Table 5). The farmer selection and group formation were done by depots, while WorldFish facilitated and mentored the process. As per GHERS implementing strategy, a total of 991 groups were formed from the selected farmers consisting of 15-30 farmers in each group. Among the groups, 773 were male groups (all are male participants) and 190 were mixed group (male and female participants). Each of the groups selected one group leader as well. The project took coverage of 20,480 ha of *ghers* under improved technologies; these were the total of 2,332 ha in 2009, 7,601 ha in 2010, 8,559 ha in 2011 and 1,989 ha in 2012.

Table 5: Number of farmers, farmers' group by sex and year and *ghers*' area coverage

Size of farmer, group and <i>gher</i>	Year 2009	Year 2010	Year 2011	Year 2012	Total
No. of female farmer	75	364	1,021	393	1,853
No. of male farmer	2,697	8,659	9,764	3,132	24,252
No. of total farmers	2,772	9,023	10,785	3,525	26,105
No. of female groups	0	5	19	4	28
No. of male groups	94	271	308	100	773
No. of mix group (male and female)	22	59	73	36	190
No. of total groups	116	335	400	140	991
Total <i>gher</i> area (ha)	2,332	7,601	8,559	1,989	20,480
Average <i>gher</i> size (ha)	0.84	0.84	0.79	0.56	0.78

2.9 Orientation Workshop for Field Staff (EF)

An orientation workshop was organized at *ShenaKalyan Shongstha*, Khulna in November 2008. The objective of the workshop was to provide EFs with the opportunity to be introduced to the GHERS and PRICE team and to orient them about the GHERS initiatives. The daylong workshop covered a briefing session and discussion on the objectives of GHERS,

targets, deliverables, responsibilities of EFs, administrative aspects and implementation approach and activities.

2.10 Training

2.10.1 Training materials development

The project developed different training materials such as farmer’s training guide book, manual, flip chart, and booklets as a guideline of training and assistance of EFs. Samples of training materials are shown in Figure 4.

Shrimp Farming Manual: A technical manual on shrimp farming and Training for Trainers (ToT) module were developed by the project for shrimp farmers and field extension workers (EFs) . The manual contains key technical messages for a production cycle with improved farming practices. The manual was distributed to project shrimp farmers and EFs.

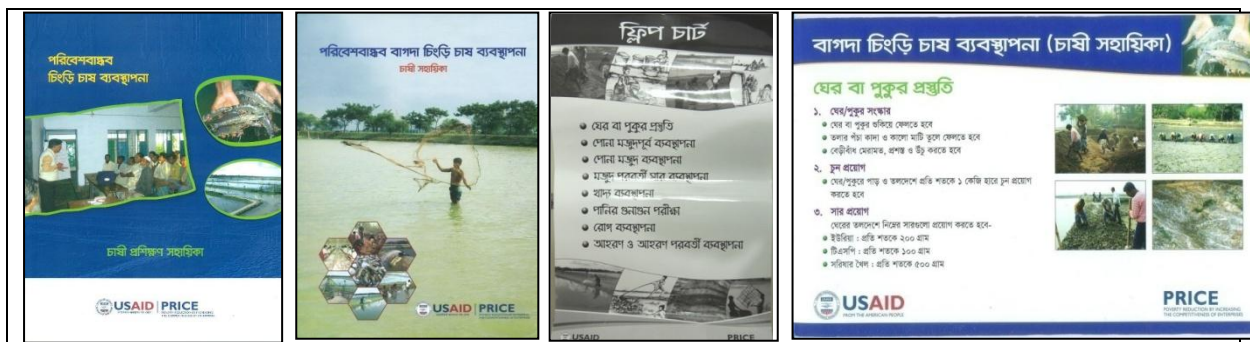


Figure 4: Some of the training materials developed by project

Project poster and brochure: In order to communicate to a wide range of audience about GHERS, one poster and a brochure have been drafted. The poster contains a brief of the initiative, approach and activities, whilst the brochure contains key technical messages along with the brief, approach and activities.

Flipchart: A training flipchart on eight sessions was developed and included sections on: i) pond preparation, ii) pre-stocking fertilization, iii) stocking, iv) feeding/post-stocking fertilization, v) water quality, vi) disease management, vii) harvesting and viii) marketing. The flipchart contains a brief of all sessions that cover a shrimp production cycle together with post-harvest handling. All the sessions were presented with photographs together with brief discussion.

Equipment: The EFs were provided different types of water quality testing equipment like thermometer, water pH meter, soil pH meter and refractometer in order to adopt improved monitoring systems of improved shrimp farming. After the end of the project the EFs can also continue their service for testing the water quality of shrimp pond in their respective areas.



Figure 5: Water and soil testing equipment provided to field staffs

2.10.2 Training for field staffs (EF)

The EFs worked under different depots and were the key player for operating the farmer groups and transferring the improved technologies to farmers. Therefore, it was important to build their capacity to a sufficient level, so that they can effectively communicate with farmers and transfer the messages as well as operate the farmer groups properly. According to the activity plan a training of trainers (ToT) module was developed for EFs by a hired consultant. The module contains eight sessions that cover a shrimp production cycle of a season. The sessions are i) pond preparation, ii) pre-stocking fertilization, iii) stocking, iv) feeding/post-stocking fertilization, v) water quality, vi) disease management, vii) harvesting, and viii) post-harvest handling and marketing. The sessions were planned to be delivered by the EFs at different suitable times relating to production cycle. The EFs were trained on the modules expected to deliver session to farmers. A five day long training on improved technologies and management were provided to EFs before start farmers training sessions at field level each year. Each of the years, the old EFs were provided one-day long refresher training by project. The Technical Specialists (TS) of WorldFish and resource persons from Department of Fisheries (DoF) provided ToT to the EFs.

2.10.3 Farmers' training

Facilitating farmers' group training sessions on improved shrimp farming technologies, which are the main means of transferring technical know-how to the GHERS farmers. The EFs were primarily responsible for organizing and facilitating *gher* side farmers' group training sessions on fortnightly basis for all groups they are associated with. The Technical Specialists assisted the EFs, by providing hands on training on how to deliver farmer group sessions (Figure 6). In addition, the monitoring and evaluation team randomly monitored the delivery of the sessions and provided feedback accordingly.



Figure 6: Field staff (EF) is providing training to shrimp farmers at *Gher's* side

A total of 7,928 group sessions were conducted during the project period at against the target of 7,360 (Table 6). Besides the formal training, 1 or 2 informal training sessions were also given to each of the farmer group and the sessions were mainly issues on gender and disaster management.

Table 6: Target and achievement of farmers' group and training sessions

Groups and sessions	Targeted	Achieved
No. of farmer group	920	991
No. of farmer training sessions conducted	7,360	7,928
% of farmers attended in each training	100	93

A regulation cum attendance note book was provided to each of the group in order to mentor and keep records of the group sessions. The group leaders with the help of EFs kept record of topics discussed, group decisions, recommendations and signature of farmers' attendance. The record book showed that on average 93 percent of the project farmers attended each session (Table 6). It is important to note that the group sessions were attended by some non-project interested farmers along with project farmers.

The eight aforementioned training topics on the improved shrimp farming were covered at the farmers' group sessions, while the CST farmers were supported directly and individually through visits and individual discussion by TSs. In addition to the delivery of schedule topics, problem solving discussions were taken place on problems raised in farm management.

2.10.4 Training to farmers' group leaders

The GHERS project worked with 26,105 farmers organized into 991 groups and each group was operated by a group leader selected by group members. The capacity building of the group leaders both on technology and group mobilization was a key element in the implementation strategy. As part of capacity building process, all group leaders were provided one-day training on "group dynamics". The training was also attended by all EFs and TSs of the respective areas. The training was conducted by specialist and focused on activity monitoring, practical group problem solving by group leaders and group sustainability.

2.10.5 Training on gender awareness for depot owners and Field staffs (EFs)

A one day training course on “gender awareness” was organized in two batches for the partner depot owners and staffs. The first batch of training on “gender awareness” was organized in August 2010, in which a total of 29 participants participated. Among the participants, 22 were EFs and seven were depot owners/contact persons. The second batch training included a total of 28 participants of which, 18 EFs and ten depot owners/contact persons participated. A resource person from DoF (Mr. Profulla Kumar Sarker, DFO, Khulna) was the main facilitator in the training program. The gender awareness course focused on gender concepts, male-female relationships in food consumption, resource utilization and control, child nutrition and role of woman, women in shrimp culture and Government of Bangladesh (GoB) and DoF gender policy.

2.10.6 Training on environmental management plan for depot owners and field staffs

A one day training course on “environmental management plan for shrimp culture” was organized in two batches for partner depot owners and staff in August 2010. A total of 29 participants attended in first batch training, including, 22 EFs and seven depot owners/contact persons. The second batch training included 28 participants of which 18 were EFs and ten were depot owners/contact persons. As main actor, a resource person from DoF (Mr. Profulla Kumar Sarker, DFO, Khulna) facilitated the training program (Figure 7). The course focused on the coastal environment and resources, coastal environmental issues and concerns, climate change, and actions needed for sustainable coastal aquaculture/environmental management plan.



Figure 7: Training on environmental management to depot owners and EF

2.11 Workshops

2.11.1 Launching workshop

GHERS formally commenced its initiatives and networking through a Launching Workshop in Khulna in November 2008. The objective of the workshop was to acquaint the attendees with the objectives, targets and implementing approach of GHERS to different level of stakeholders and to share experience. A total of 64 participants from the shrimp industry were present at the workshop. Leading persons from BFFEA, WorldFish, PRICE, universities,

DoF and Fish Inspection and Quality Control (FIQC) participated. The following suggestions from the workshop open discussion were made:

- Coordination among the organizations in order to avoid repetition of activities with same farmers in same areas and to share lessons.
- Provide credit to farmers.
- Domestication of broods to ensure quality PL.
- Feed issues need to incorporate technology development to enhance productivity and product quality.
- Building greater vertical coordination and consensus among the stakeholders for quality compliance and boost country image.

2.11.2 Lessons learned workshop

Three one-day lessons learned workshops were organized by GHERS in three different field venues in the project command area in October 2009. The objectives of the workshops were to explore and put together the lessons i.e., strengths, weaknesses and recommendations for implementing GHERS initiative (Table 7). The stakeholders of GHERS i.e. the selected farmers, farmer group leaders, depot staff and EFs, PCR lab staff, local NGOs and GHERS staff, and representative from PRICE project attended the workshop.

Table 7: List of lesson learning workshops

Date	Duration	Venue	No. of participants		Remarks
			Male	Female	
20.10.'09	1 Day	Upazilla Auditorium, Chitalmari	39	06	All level stakeholders of shrimp value chain
22.10.'09	1 Day	BFRI Auditorium, Paikgaccha	39	01	All level stakeholders of shrimp value chain
26.10.'09	1 Day	Upazilla Officers' Club Auditorium, Kaligonj	44	00	All level stakeholders of shrimp value chain

The learning sharing workshops made recommendations for the followings:

- Increase training facilities with writing board, mats, visual aids etc. and provide snacks to farmers
- Water quality (PH, salinity, DO etc.) testing kits for EFs, to ensure support
- Invite successful farmers in training sessions and cross visits for farmers
- Ensure screened PLs in time and at lower price
- Ensure premium price for farmers for quality shrimp and prawn
- More hands-on capacity building training for group leaders
- Reduce number of farmers per EF to 150 to allow to assist farmers more effectively
- Transport support of PLs, particularly at the beginning of the season as there is no transportation

- Link the program to selected processors to better and instant payment for better quality shrimp

2.11.3 Learning sharing and project closing workshop

A learning sharing workshop was held in December 2012 at in Khulna. A total of 117 personnel from DoF, Bangladesh Fisheries Research Institute (BFRI), universities, research organizations, non-government Organization (NGO), Bangladesh Frozen Food Exporters' Association (BFFEA), shrimp depot, media and project farmers were present in the workshop (Figure 8). Discussions were mainly concentrated on project activities, achievements, research technologies, sustainability, issues and challenges in shrimp industry in the South-western Bangladesh. Important recommendations for further initiatives were addressed and some key recommendations were followings:

- WorldFish can also introduce better, sustainable technologies through other WorldFish projects which will be in-between MTT and CST systems.
- More research can be on WSSV in shrimp farming, water depth, use of cowdung and phosphate, etc.
- There is need to initiative to improve *Golda* hatchery management practices because most of the hatcheries are not now in operation due to loss during last several years
- Strengthen cooperation between WorldFish and DoF and work together in technology dissemination and research
- Ensure supply of screen PL to all shrimp farmers at current market price
- Shrimp supply chain should be reduced to increase efficiency of supply
- Water exchange management in shrimp producing areas should be improved, concerned authority can help in this regard
- Processing factory can come forward to stop adulteration in shrimp product
- Improved and intensive shrimp production technology should be promoted to get higher production by using minimum land use
-



Figure 8: A part of learning sharing and closing workshop

2.12 Project Meeting

Different types of meetings were held during the whole project period for smooth running of the project implementation activities and coordination between all levels of the project staffs. This includes annual, monthly and field staff meetings mainly are described below.

2.12.1 Annual meeting

In order to review and to prepare next year plan of project activities, three annual meetings were held in Khulna. Mainly staff area selection plan, field staff performance, new staff requirement, financing, number of new farmers inclusion, new depots selection, support strategies for both existing and new farmers, training plan, annual plan and overall project managements were discussed.

2.12.2 Monthly coordination and senior management meeting

One monthly coordination meeting was held at the end of each month during the project period. At the coordination meeting, or senior management meeting, the project manager generally met with all TSs, M&E staff and others to share the progress and status of the project activities, discuss issues and plan for the subsequent monthly activities. Other recent important issues or project demand (e.g., contract survey, collection of mobile phone number of project farmers) which are out of project plan and related to project implementations were also discussed in the meeting.

2.12.3 Field staff meeting

In field staff meeting, the Technical Specialists generally shared the discussions and decisions to the field staffs (EFs) and depot owners coming from the senior management meeting. The meeting was held by TS each month, immediately after return from senior staff meeting. The field staffs also reported their last month activities in the meeting. Their management, field monitoring experiences and farmers' shrimp culture problems was also discussed. The TSs also shared technical information, supports and updated information to the field staffs.

2.13 Market Linkage

The project dealt with some of shrimp value chain actors (shrimp farmers and shrimp depots) during the project periods. A total of three workshops were organized in 2009 with participation of different value chain actors namely processing factories, shrimp depots, small traders, farmers, group leaders, government fisheries personnel. Fourteen field rallies were organized by the project to disseminate mainly the usefulness of PCR tested shrimp seed stocking in *ghers* which was helpful to increase access to virus free shrimp PLs. The project has significantly contributed in ensuring access to PCR tested virus free PLs among the project and non-project farmers. As a result of the project intervention a total of 153.58 million screened PLs were stocked by the farmers.

2.14 Cross Cutting Issues

2.14.1 Gender

As a common practice in rural shrimp farming areas, the participation of women in shrimp farming are almost nil. The project worked with a total of 26,105 farmers during 2009 to 2012. Among these total numbers of GHERS farmers, the project included 1,823 (7 percent) female farmers as project client and encouraged to present the group sessions which helped them to participate in family decision making process particularly to contribute to shrimp farming. Three field staffs were employed to work more closely with women farmers and increase their participation in group sessions. The project also organized training for 33 shrimp depots owners on aspects related to gender. .

2.14.2 Environmental compliances and climate change

The project included aspects related to environment and climate changes related to shrimp farming in coastal zone into the training guide book and shrimp farming operational manual. The field staff provided one special training session on environments and climate change to all of the project beneficiaries. *“Shrimp culture with friendly environment”* was the main slogan of the fourteen field rallies which were organized at 7 upazilas within project working areas during the project period. Some of the other shrimp value chain actors namely shrimp depots, processing factory owners and small traders also participated in the rallies.

2.15 Project Sustainability

Since the 1980's, shrimp farming has been widely supported by multi-lateral donors and governments. It has been declared a source of poverty alleviation and livelihood creation. However, the environmental and socio-economic effects of these initiatives have been detrimental to local communities. Even though the area under shrimp aquaculture is expanding suggest sustainable growth of this sector. The shrimp culture technologies promoted by the project are simple, widely accepted and adopted easily by the project and non-project farmers. The technologies promoted by the project were environment friendly and socially acceptable and most importantly profitable.

The project employed 57 field staff and all of the field staffs are from the same area where they have been working for the project. They will be staying in the community as resource person. They conducted farmers' group sessions and facilitated the process of virus free screened shrimp PL supply to farmers through shrimp depots in project working areas. Prior to conduct the group sessions, the project provided them ToT on improved shrimp farming technologies in each year from 2009 to 2012. The field staffs also visited farmers' shrimp *ghers* almost every day and shared their problems about shrimp culture which gave them a wider and practical knowledge. The famers are now called them *“Village shrimp doctor”* in locality. Three staff already left jobs and have started services to solve shrimp culture related problems and two of them have started shrimp inputs business in their local areas. After end of the project, most of the staffs will live in the working areas and they would continue their services on improved shrimp farming technologies to develop the shrimp sub-sector.

2.13 Monitoring and Evaluation (M&E)

2.13.1 Farmer selection survey

Following the farmer selection criteria (Annex 3), the EF made a list of shrimp farmers and held discussions with the farmers early each year to include or choose farmers as project beneficiaries. After finalizing the farmer as a project client, a survey was made each year including farmers' basic information such as identification, address, last year shrimp production, *gher's* ownership, *gher's* area, willingness to work with GHERS initiative etc. A prescribed format was developed by the project and this was used to conduct the survey (see format in Annex 4). After collection, data were inserted into MS Access software and made a complete list of farmers' database. During the survey, the EF also formed farmer groups in order to providing training to these farmers later on.

2.13.2 Baseline survey

The GHERS initiative mainly worked with three type of project clients (farmer, depot and PCR lab) and the 3 clients made contribution to achieve the project targets namely jobs, sales and investment. The initiative conducted baseline survey on these three clients at beginning of the project start to measure the existing situation and performance in shrimp farming. From the list of farmers, the sample farmers were chosen to conduct baseline survey. The sample size of farmers was determined following simple random sampling technique with the confidence of 95 percent level. Before starting works with project farmers, farmers' baseline surveys were completed. During project period, four baseline surveys were conducted from 2009 to 2012. Sample size of baseline survey is varied over different years as per volume of the numbers of new farmers included in the project (Table 8).

Table 8: No. of total farmers and sample size of baseline survey

Year	Total no. of farmer	Sample size
2009	2,772	382
2010	9,023	374
2011	10,785	407
2012	3,525	303
Total	26,105	1,466

The depots are mainly engaged in shrimp marketing. The baseline for depots was conducted on regular and monthly basis. Due to small size of population, all of project selected 34 depots were included in the baseline survey. The EFs collected data regularly on monthly basis from the depots. It may be noted that the depots were committed to provide project required data in time. Like depots, the PCR lab also provided project required data each month related to screened shrimp PL during project period.

2.13.3 Monthly performance monitoring survey

GHERS regularly tracked the impacts of the GHERS initiatives towards achieving the project targets through regular monitoring. Monthly monitoring on farming, depots and PCR Lab activities focusing on sales, jobs and investments started in January 2009. Separate precise, structured questionnaires (Annex 5, Annex 6 and Annex 7) were used for monitoring the sample farmers, depots and PCR Lab. Several meetings were organized between GHERS and PRICE monitoring teams to formulate the monitoring plan and to meet the requirement of PRICE in monitoring. Monthly monitoring data collected from sample farmers each month from project start to end. It is noted that a stratified random sampling procedure was followed to identify sample farmers. The same sample farmer used in baseline survey (Table 8) and was again monitored in monthly performance survey.

In 2009, data were collected each month from 382 sample farmers. In 2010, data were collected monthly basis from 756 sample famers, which included 382 sample famers of 2009. In the same way, data were collected from 1,163 sample famers, which included the sample farmers of 2009 and 2010. Due to resource constraints, sample size was reduced for monthly performance data collection in 2012. From cumulative lists of population of project farmers, simple random sampling procedures were followed to estimate representative sample size for 2012 which ultimately includes sample farmers from every of the last years during 2009 to 2012. Finally data were collected from 303 sample farmers in 2012. A detail of total numbers of project farmers and sample famers selected are presented in

Table 9.

Table 9: Total number of famers and sample size of monthly monitoring survey

Year	No. of farmers	Cumulative no. of farmers	Sample size	Cumulative sample size
2009	2,772	2,772	382	382
2010	9,023	11,795	374	756
2011	10,785	22,580	407	1,163
2012	3,525	26,105	303	303

2.13.4 Impact survey

With the aim to evaluate impact of project interventions, the impact survey was conducted in GHERS's final month (December 2012). The impact survey included socioeconomic indicators, livelihood indicators, jobs, sales, investment, production, project activities etc., to evaluate the project performance and famers' benefits over the years during project period (2009 to 2012). The structured questionnaire was used in impact survey. Data were collected from 548 sample farmers. From the list of total project farmers selected in different years, sample farmers were selected using simple random sample procedures. The impact survey was conducted by third party and report was submitted to PRICE and WorldFish in January 2013.

2.14 Stocking Screened Shrimp PL

The *Pranti* Trading PCR lab is a private laboratory supplied a total of 153.58 million virus free tested shrimp PL to project farmers. The partner depots and respective EFs played the key role in coordinating and delivering the PLs to the farmers, while GHERS mentored and facilitated the process by linking the depots with the *Pranti* Trading PCR lab. The project had the highest volume of famers in 2011 and this year the project facilitated to supply 83.44 million screen shrimp PL to the farmers (

Table 10). This supply of screen PL ensured virus free and disease free in *ghers* which ultimately helped to increase shrimp production at farm level.

Table 10: Number of virus free screen shrimp PL supply by year

Year	Number of screen PL supplied (Million)
2009	13.34
2010	41.33
2011	83.44
2012	15.47
4 years total	153.58

As per prior information, the depots collected money from interested farmers to supply screen PL. The depots made communication with PCR lab and supplied PL to the farmers (Figure 9).



Figure 9: Supply of PCR tested PL to the famers

2.15 Initiative for Vegetables Culture in Saline Zone

Farmers live in saline zone are asked the GHERS to introduce some green vegetables in their area. Then it was planned to start vegetables culture by project farmers in saline zone where it was not possible to cultivate vegetables before. As per plan, five baskets were set

at Bagerhat areas and nine baskets at Satkhira area in 2012. The farmers planted bean and gourd types of vegetables in the basket. Some of the baskets are made of bamboo and some are made of blue net bag. A total of 53 bottle gourds and 1.5kg bitter gourd were grown in 14 baskets of Satkhira and Bagerhat. Sample of vegetables production is shown in Figure 10.



Figure 10: Vegetables cultivation in *ghers* side in saline area

2.15 Farmers' Cross Visits

Two batches of 24 farmers (17 male and 7 female) made an exchange visits from Satkhira to Bagerhat to see and gain improved hands-on knowledge of improved shrimp farming. The farmers were very impressed to see improved shrimp technology and dyke crop in Bagerhat area (Figure 11).



Figure 11: Farmers made visits to gain practical knowledge

2.16 Farmers' Field Day

A total of 14 rallies on shrimp farming were organized to raise awareness of all stakeholders of shrimp industry on socially and environmentally responsible shrimp farming. The rallies were organized in 10 upazillas of Khulna, Bagerhat and Shatkhira districts during the project period. Participants from GOs, NGOs and farmers joined in the rallies to promote “stock virus free PLs and grow shrimp through environmentally friendly *gher* systems”. News on these rallies was broadcasted through several local and national newspapers and television. Some pictures of famer field days are shown in Figure 12.



Figure 12: A part of farmer field day held in project areas

2.17 Dignitary Visits to Areas under Project Activities

A total of 21 visits were made by different GOs and NGOs in the different project working areas to observe the activities during project period. The visits include both internal and external visits from home and abroad. The dignitary visits of the project activities are summarized and shows in Annex 8.

3. PROJECT OUTPUT

As project objectives, the project output mainly includes jobs, sales and investment in shrimp farming made by shrimp farmers, depot and PCR Lab. The data for 2009 includes performance of 2009 farmers, data for 2010 includes per performance of 2009 and 2010 farmers, data for 2011 farmers are sum of performance of 2009, 2010 and 2011 farmers, and finally data for 2010 are the total performance of all farmers (26,105) have been selected from project start to end.

3.1 Jobs

One of the main objectives of GHERS was to generate jobs in shrimp farms, shrimp depot and PCR Lab are key actors in shrimp value chain. The project contributed to the generation of 9,864 jobs in 2012 which includes all farmers, all depots and PCR lab selected from 2009 to 2012. The project target was to add 14,000 jobs to current numbers. To estimate the number of jobs, total man-day was divided by 150. The project ultimately achieved 70 percent of target in jobs creation in farms, depots and PCR lab (Table 11). New jobs have also been generated in last three years (2009 to 2011) mainly at the farm level.

Table 11: Number of job generated in shrimp gher, depot and PCR lab by year

Categories	2009		2010		2011		2012	
	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve
Farm	3,017	5,624	3,039	15,946	23,710	31,840	25,318	35,186
Depot	198	210	364	345	600	608	599	595
PCR lab	5	5	5	5	5	5	5	5
Total	3,220	5,839	13,408	16,296	24,315	32,453	25,922	35,786

As per depots opinion, the depots did not employ more labor in project period as their existing labor had been underutilized before start GHERS initiative, but after project intervention their sales increased and their existing laborers are being used at an optimum level. The PCR lab used same amount of labor over the years.



Figure 13: Male and female labors are working in shrimp ghers

3.2 Sales

One of the key targets of project was to increase sales by \$45 million over the project period. Due to use improved technologies and training, the famers were capable of increasing their shrimp production, which ultimately they sold to the depots. Due to increase of shrimp production volume during project period their sales also increased. The shrimp farmers increased sales and then the depot purchased a larger volume of shrimp which was sold to processors. Due to the introduction of improved technologies, sales of virus-tested screened shrimp PL were also increased at the PCR Lab. Farmers increased shrimp sales from \$90.05 million to \$148.39 million over the four year project period. This increased sales added about \$58.34 million to current sales against the target \$45 million. The PCR Lab increased their sales from \$0.50 million to \$1.04million over 4 years (Table 12).

Table 12: Sales (USD, millions) in shrimp farm, depot and PCR Lab

Categories	2009		2010		2011		2012		4 years total	
	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve
Farm	4.92	7.25	16.93	29.12	34.17	60.47	34.03	51.55	90.05	148.39
Depot	13.87	15.93	25.63	37.81	37.39	47.42	33.65	34.40	110.53	135.56
PCR lab	0.11	0.21	0.24	0.31	0.08	0.41	0.07	0.11	0.50	1.04
Total	18.90	23.39	42.80	67.24	71.63	108.30	67.75	86.06	201.08	284.99

Shrimp sales made by farmers were generally soldto processors through the depots. Due to contracts with project farmers, sales of depots also increased. Figure 14 shows sales in depot and iced shrimp sold to a processing factory.



Figure 14: Farmers selling shrimp in depot and shrimp with ice for sale to processors

3.3 Investment

Finally it was expected that due to an increase production and following improved shrimp production technologies the project farmers will increase their both capital and other investment in their farming business. A target was set of an additional \$10 million in new investment made by selected farmers, depots and PCR Lab. The farmers, depots and PCR Lab used more inputs and labor in their respective business due to project interventions, which is one kind of investment. If the inputs and labor are considered as investment, total investment was increased from \$64.82 million to \$95.24 million over the four year project period (

Table 13), exceeding the project target.

Table 13: Investment including inputs and labor made by farm, depot and PCR Lab

Categories	2009		2010		2011		2012		4 years total	
	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve
Farm	3.18	4.63	10.64	16.74	25.00	33.35	24.84	39.52	63.66	94.24
Depot	0.11	0.12	0.23	0.18	0.30	0.31	0.27	0.27	0.92	0.88
PCR lab	0.04	0.04	0.06	0.01	0.07	0.04	0.07	0.03	0.24	0.12
Total	3.33	4.79	10.93	16.93	25.38	33.70	25.18	39.82	64.82	95.24

If the capital items or fixed costs are considered, the capital investment was increased from \$14.99 million to \$17.10 million over the four year project period (Table 14). The project farms mainly contributed in this increase of capital items. The depots and PCR Lab did not make any contribution to increasing capital items.

Table 14: Investment excluding inputs and labor made by farm, depot and PCR Lab

Categories	2009	2010	2011	2012	4 years total
------------	------	------	------	------	---------------

	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve	Base	Achieve
Farm	0.59	0.76	3.31	3.35	5.13	6.11	5.69	6.78	14.72	17.00
Depot	0.016	0.013	0.009	0.01	0.08	0.04	0.07	0.03	0.18	0.10
PCR lab	0	0	0	0	0.05	0.00	0.04	0.00	0.09	0.00
Total	0.61	0.77	3.32	3.36	5.26	6.15	5.80	6.82	14.99	17.10

3.4 Reporting

The project submitted reports regularly to concerned authorities. The reports included annual, quarterly and weekly reports. Some of other reports were also prepared in order to formalize project implementation such as monitoring and evaluation report, field rally report, etc.

3.4.1 Annual report

At the end of each fiscal year, an annual report was prepared. The reports included the year's activities, progress, achievements and work plan for the following year. The reports were submitted to PRICE and WorldFish. After final completion of project in 2012, the annual report and moreover an impact survey report were prepared and submitted. This final report and the impact survey report included activities performed, progress, implementation strategies, success, limitations of implementations and recommendations covering whole project period from 2008 to 2012.

3.4.2 Quarterly report

As per demand PRICE, quarterly reports were submitted which included implementation strategies, issues and challenges, progress against targets and progress against baseline and next quarter's plan. Quarterly reports also included key project targets and achievements on the basis of jobs, sales and investment status of farms, depots and PCR Lab.

3.4.3 Weekly report

The EFs collected information on farmers training, virus-free PL stocking, visit of project activities by different organizations and representatives, harvesting information of *bagda*, *golda* and other fishes on a weekly basis and forwarded the report to the TSs. After compilation, the TS sent the report to the Project Manager. The Project Manager again compiled the report and submitted it to PRICE.

3.5 News Publication on GHERS Activities

A total of 98 news and reports on various activities of the project were published during the project period. Several local, regional and national newspapers covered the GHERS activities, training and visits by important government and non-government personnel. A list of news and articles published is documented in Annex 9.

3.6 Research on Project Activities

At the same time as project operations and activities at field, an initiative was also taken to do some research on shrimp farming related issues and problems. If necessary, the researchers are authorized to use data collected from working areas by project. Two research works were published in international journals and 11 research works are in progress (Table 15).

Table 15: Title of the research and present status

Research theme/title	Present status
Prevalence of White Spot Syndrome Virus in Brood stock, Nauplii and Post-larvae of Tiger shrimp (<i>Penaeus monodon Fabricius, 1798</i>) in Bangladesh	Published
Production Performance of White Fish in Two Different Culture Systems in Patuakhali.	Published
Comparative performance of black tiger shrimp (<i>Penaeus monodon</i>) brood collected from different depth zones in the Bay of Bengal	In press
Key inputs towards increased shrimp production and associated profitability in different production systems in south-western region of Bangladesh	Submitted
Adapting to change in the dynamic aquatic agricultural systems of Southern-Bangladesh	Drafted
Incidence of shrimp disease and economic loss and coping strategies by farmers	On going
Impact of salinity and technology on profit and productivity of shrimp farming in Bangladesh	On going
Impact of post larvae collected from different sources on productivity and profitability	On going
Seed survivability, viral disease and salinity in shrimp farming	On going
Change in farming practices of GHERS farmers	
Profit and technical efficiency of shrimp, prawn and fish farming in Bangladesh	Drafted
Comparative Study on Growth Performance of Bagda (<i>P. monodon, Fabricius, 1798</i>) in Traditional and Semi-intensive Culture Systems	On going

4. MAJOR ISSUES AND CHALLENGES

During the project period, implementation of the project activities as per schedule was sometimes hindered due to several climatic and socio-political reasons. The major challenges and issues were as follows:

- Decline in shrimp price both in international and local markets emerged as a critical issue for the whole industry. Shrimp prices drop about 35% in 2009 compared to the same time in 2007. In contrast, input costs have been on the rise over the years resulting in lowering profit margin for farmers. These issues demotivated shrimp farmers to make any additional investment for improved farming. However, the situation began to turn around after shrimp prices increased in 2010.
- The cyclone *Aila* severely damaged the livelihoods of people of the coastal region of Satkhira, Khulna and Bagerhat districts, particularly in aquaculture sector. The vast majority(80 percent) of GHERS farmers (2,752) were affected by *Aila* at various degrees of damages and losses. More than three quarters of the affected *ghers* (1,604) were over-flooded and shrimp and fin fishes caped from those *ghers*, while dyke vegetables

and crops were damaged by strong winds forest of the affected *ghers*. Half of the total shrimp *ghers* (1,366 selected *ghers*) were physically affected by *Aila*. The total value of damage and losses worth \$1.22 million.

- Due to under-load, cargo airbus stopped their transportation several times during the project period which created delays in the screened shrimp supply to farmers.

5. SUMMARY AND CONCLUSIONS

The project has made significant progress toward its implementation, strategies, targets and achievements. The project selected field staffs from working areas considered sustainability as most of the staffs will live in working areas after project end. This way, they can be able to provide their services to the farmers. The project selected 26,105 shrimp farmers and formed small groups of 15-30 farmers in order to provide training to the farmers in a structured way. The farmers were informed and gained knowledge on improved technologies of shrimp farming to increase shrimp production. By following improved shrimp farming technologies, the farmers increased their production and sales as well. The increased shrimp then went to depots and the sales of depots were also increased. As a part of improved technologies, the PCR Lab tested and supplied 153.58 million virus-free shrimp PL to the project farmers. The virus free shrimp PL supply ultimately increased farm level shrimp production over the project period. Due to the increase of shrimp production, the farmers employed more labor in their *ghers* to take intensive care and to get higher production. The depots used their existing labor at optimum level which was underutilized before project interventions. As a successful program, different local and national newspapers published 101 news articles on project activities and success stories during the four year period. Some major challenges such as cyclone *Aila*, floods, delays in PL transportation etc., were faced during project operation but the project achieved its targets successfully in most cases.

Annex 1: List of depots worked with project during project period

SL#	Name of associated depot	Upazila& District
1.	Renaissance Enterprise	Chitalmari, Bagerhat
2.	M/S Sarker Enterprise	Chtalmari, BagerhatSadar
3.	Khanjahan Ali Fish	BagerhatSadar, Bagerhat
4.	ChalteShekha Fish Traders	Kachua, Bagerhat
5.	Khanjahan Ali Fish	Dema, Bagerhatsadar, Bagerhat
6.	GMF Fish Traders.	Fakirhat, Bagerhat, Faltita Bazar
7.	Mithun Fish	Mollahat, Bagerhat
8.	Shrabone Enterprise	Signboard Bazar, Kachua, Bagerhat
9.	Joare Bangladesh	Amtala Bazar, Morelgonj, Bagerhat
10.	M/S. Mukherje Enterprise	Betkata, Rampal, Bagerhat
11.	Dipte Bangladesh	PuratonFerighat, Mollahat, Bagerhat
12.	Badhon Enterprise	Katakhal, Baruipara. Bagerhatsadar, Bagerhat
13.	Udayan Bangladesh Enterprise	Helatala, Kashimpur Bazar, Dema, Bagerhat
14.	Agradut Enterprise	Ransen, Rampal, Bagerhat
15.	M/S. Zaman Fish	Parulia, Debhata
16.	M/S VhaiVhai Fish	Debhata, Sathkira
17.	M/S. Rahaman Fish	Bishnopur, Kaligong
18.	National Fish	Mothureshpur, Kaligong
19.	M/S Khanjahan Fish	Kaliganj, Satkhira
20.	M/S Padma Fish	Kaliganj, Satkhira
21.	Shova Fish	Harivanga Bazar, Ashashuni
22.	M/S Salina Fish	Ashashuni, Satkhira
23.	M/S. Milon Fish	Nurnagar, Syamnagar
24.	Poly Fish Trading	Paikgaccha, Khulna
25.	M/S New Shibsia Fish	Paikgaccha, Khulna
26.	Janata Fish Traders	Paikgaccha, Khulna
27.	M/S Ziko Fish	Paikgaccha, Khulna
28.	M/S Habib Fish	Paikgaccha, Khulna
29.	M/S VhaiVhai Fish	Koyra, Khulna
30.	M/S Akota Fish	Kopilmuni, Paikgaccha
31.	M/S. Shapla Fish	ChingriBipononKendra, Paikgaccha
32.	M/S. Sakib Fish	Alamtola, Paikgacha, Khulna
33.	M/S. Razibullah Fish	Amadi Bazar, Koyra, Khulna

Annex 2: Name and contact of field staff (Extension Facilitator)

SL#	Name	Name of associated depot	Upazilla& District	Mobile No.
1	Prosanta Kumar Mondol	Renaissance Enterprise	Chitalmari, Bagerhat	01198-107328
2	BrojenMajumder	Renaissance Enterprise	Chitalmari, Bagerhat	01724-705862
3	NripendraNath Roy	Renaissance Enterprise	Chitalmari, Bagerhat	01915-892319
4	GitendranathBiswas	M/S Sarker Enterprise	Chtalmari, BagerhatSadar	01723-843267
5	Mr. NeharHalder	M/S Sarker Enterprise	Chtalmari, BagerhatSadar	01724-338242
6	NakibZillur Rahman	M/S Sarker Enterprise	Chitalmari, BagerhatSadar	01720-685770
7	Sultan Mahmmod	Khanjahan Ali Fish	BagerhatSadar, Bagerhat.	01196-042586
8	Md. Humayun Kabir	Khanjahan Ali Fish	BagerhatSadar, Bagerhat.	01715-548245
9	Md. Mostafa Kamal	Khanjahan Ali Fish	BagerhatSadar, Bagerhat.	01731-935270
10	Md. Abdul Kahhar	ChalteShekha Fish Traders	Kachua, Bagerhat	01735-157650
11	KamonashisHalder	ChalteShekha Fish Traders	Kachua, Bagerhat	01741-416258
12	Ashok Das	ChalteShekha Fish Traders	Kachua, Bagerhat	01726-260144
13	Taimur Rahman	Khanjahan Ali Fish	BagerhatSadar, Bagerhat	01924-383488
14	Shah AlamTarafdar	Khanjahan Ali Fish	BagerhatSadar, Bagerhat	01734-085008
15	Krishna Chandra Malakar	GMF Fish Traders	Fakirhat. Bagerhat	01728-671815
16	RamprashadMojumder	GMF Fish Traders	Fakirhat. Bagerhat	01729-972894
17	Bulu Roy	Mithun Fish.	Mollahat, Bagerhat	01721-975646
18	DebabrataBiswash	Mithun Fish.	Mollahat, Bagerhat	01734-099959
19	PritishKantiBiswas	Poly Fish Trading	Paikgaccha, Khulna	01914-546858
20	Asadul Islam	Poly Fish Trading	Paikgaccha, Khulna	01713-901948
21	NayonMondal	Poly Fish Trading	Paikgaccha, Khulna	01733-813857
22	Md. AkramulHaque	M/S New Shibsa Fish	Paikgaccha, Khulna	01711-018628
23	SK. Shahajahan Hossain	M/S New Shibsa Fish	Paikgaccha, Khulna	01718-868564
24	M. M. Israfil Ahmed	M/S New Shibsa Fish	Paikgaccha, Khulna	01925-325465
25	Md. Alamgir Kabir	M/S Habib Fish	Paikgaccha, Khulna	01816-157554
26	G.M Babor Ali	M/S Habib Fish	Paikgaccha, Khulna	01922-481522
27	Md. Salim Hosen	M/S Habib Fish	Paikgaccha, Khulna	01735-345922
28	Md. Shahidul Islam	M/S VhaiVhai Fish	Koyra, Khulna	01913-992397
29	Md. Kamal Hossain	M/S VhaiVhai Fish	Koyra, Khulna	01925-323526
30	GM. Abdul Gani	M/S Ziko Fish	Paikgaccha, Khulna	01190-674142
31	Md. Obaidul Islam	Janata Fish Traders	Paikgaccha, Khulna	01728-950015
32	SK. Monerul Islam	M/S Padma Fish	Kaliganj, Satkhira	01734-338866
33	Md. Abdul Motin	M/S Khanjahan Fish	Kaliganj, Satkhira	01911-582254
34	Md. Abdul Alim	M/S Khanjahan Fish	Kaliganj, Satkhira	01745-449435
35	Md. Ruhul Amin	M/S Khanjahan Fish	Kaliganj, Satkhira	01721-806114
36	Md. Mizanur Rahman	M/S VhaiVhai Fish	Debhata, Sathkira	01723-815645
37	Mr. UttamChakroborty	M/S VhaiVhai Fish	Debhata, Sathkira	01717-146289
38	Md. Sakhawat Hossain	M/S VhaiVhai Fish	Debhata, Sathkira	01916-489822
39	Md. Rokonuzzam	M/S Salina Fish	Ashashuni, Satkhira	01751-554252
40	Md. Iqbal Islam	M/S Salina Fish	Ashashuni, Satkhira	01719-392919

Annex 3: Farmer selection criteria

- a) Interested to participate in the project activities and willing to sign an agreement with the entrepreneur depots.
- b) Primary income source of the farmer is shrimp farming and priority is given to poor and marginal farmers.
- c) Residing in the close proximity to neighboring farmers and associated depots.
- d) Keenness to accept technical advice suggested by the project and adopt farming practices accordingly
- e) Willingness to stock PCR lab tested and healthy post larvae in ponds

Annex 4: Farmer selection form

Greater Harvest & Economic Returns from Shrimp (GHERS)

The WorldFish, Bangladesh

Name of Depot:

Address:

Name of the Group:

Village: Union: Upazilla: District:

GHERS Farmers Selection List

SL	Farmer's name	Father/husband's name	Village	Sex (M/F)	Main Occupation	Started shrimp farming (Year)	Total Gher Water Area (Dec)	Total Yield (Kg) in 2008.			Source (name) of PLs in 2008*			Culture Method*	Used screen PL (Yes/No)	Willing in improved farming (Yes/No)	Willing to use screen PL (Yes/No)	Received credit from depot (Yes/No)	Received shrimp farming training (Yes/No)	Interested to work with WFC (Yes/No)	
								Bagda	Golda	White Fish	Bagda	Golda	White fish								

Note: * Code list: A. Culture method: 1=Intensive, 2=Improved, 3= Traditional. B. Source of PL: 1 = Depot, 2= Faria, 3= Local Market, 4=Hatchery Dealer, 5= Nursery 6 = Natural

Name of Extension Facilitator:

Signature of Depot owner:

Signature & Date:

Date:

Annex 5: Monthly farmer performance monitoring form

Monthly monitoring data collection sheet

GHERS initiative of PRICE, The WorldFish

Farmer's name:

Farmer's ID:

Area of Gher:

A. Investment in project selected *gher* last month

Items	Number	Total present value/cost (Tk)	Durability (year)	% used for selected <i>gher</i>	Source of fund*
<i>Gher</i> lease value					
Bamboo/wood/rope					
Shallow tubewell/pump					
Kodal/spade/cycle etc					
Drum/box/fishing trap					
Boat/tube					
Net/blue net					
<i>Gher</i> house					

* source of money: Self/NGO/Bank/Dadan/Others

1. B. Shrimp PL and fish fingerlings cost last month (including transport cost)

Items	Number	Cost (Tk)	Fund source
<i>Bagda</i> PLs			
<i>Golda</i> PLs			
White fish fingerlings			

1. C. Operational costs of the **project *gher*** last month (including transport cost)

Items	Cost (Tk)	Fund source	Items	Cost (Tk)	Fund source
Tools repairing (housing, net, pump)			Fish meal (dryfish)		
Costs for dyke crops (excluding labor)			Packet/Pillet feed		
Fuel and other cost for water pump			Lime		
Urea			Snail		
TSP			Bleaching powder		
Home maid feed (oilcake, wheat bran, rice bran, bone bran etc)			Gas tablet/rotenan/depterace		
Cowdung/compost			Others		

1. D. Labor worked in project *gher* last month (*gher* management, transportation for PL/fingerling, input purchase and sales of shrimp, fish and crops.)

Labor type	Total no. of labor	Working hours/day	Wage rate (Tk/man-day)		Fund source
			Cash (Taka)	Food (Taka)	
Permanent male/female staff					
Hired	Male casual labor				
	Female casual labor				
Family	Male labor				
	Female labor				

2. Harvesting from project selected *gher* last month

Name of crops	Consumption and gift		Sold	
	Amount (Kg)	Tk	Amount (Kg)	Tk
<i>Bagda</i>				
<i>Golda</i>				
<i>White fish</i>				
<i>Harina / chali shrimp</i>				
Dyke crops (vegetables & fruits)				
Rice				
Others (Crab,)				

Salinity: ppt, Water depth feet, Affected by virus? Yes / No, if yes, approximate loss Tk

Name of enumerator:

month:

Annex 6: Monthly depot monitoring form

GHERS Initiatives of PRICE Project, WorldFish

Depot Monthly Monitoring Form

Month:

Year:

Name of the Depot:

Number of **project farmers** supplied shrimp to depots:

Number of *farias* supplied shrimp to the depot:

Volume and value of shrimp transacted

Product	Biomass (kg)	Sales Value (Tk)	Wastage ¹ (kg)	Fund source ²	Remarks
Bagda					
Golda					
Fish					
Harina and Chali					

Staff employed:

Staff Category	No. of labor		No. of days worked		Fund source	Remarks
	Female	Male	Female	Male		
Full time paid staff						
Part time paid staff						
Others						

New investment in the reporting month (in):

Item	Number	Value (Taka)	Fund source	Remarks
Infrastructure facilities				
Sorting tables				
Cooling boxes/				
Storage				
Plastic drums				
Plastic basket / tray				
(Others)				

Information collected by:

Date:

¹Wastage like Lost, theft, etc.

² Sources of fund: NGOs, Bank, Friends or relatives, Others

Annex 7: Monthly PCR Lab monitoring form

GHERS Initiatives of PRICE Project, WorldFish PCR Lab - Monthly Monitoring Form

Month:

Year:

1. Name of the PCR Lab:

2. Status of screened PL production last month:

(If one company placed more than one order in a month, please, mention separately in separate rows)

Sl	Name of company placed order	No. of PLs ordered	No. of screened PLs delivered	Value of PLs (Tk/1000 PLs)	PCR testing fee (Tk/1000 PLs)
1					
2					
3					

3. Number of PL batches tested for virus from your PCR lab last month:

A. No. of total batches	
B. No. of batches delivered to company	
C. No. of batches was not delivered due to found virus positive	
D. No. of batches was not delivered due to other causes (specify)	
E. Total cost of test of virus (Tk)	

4. Status of working staff on last month at your PCR lab

Staff Category	No. of labor		No. of days worked		Total paid (Tk)	Fund source (own/bank/NGO /Dadan/others*)
	Female	Male	Female	Male		
Monthly salaried staff						
Daily basis staff/labor						
Contract basis staff/labor						
Family members (including owner)						

Note: * In the case of other, please specify name of others

5. New tools and equipment cost invested at PCR lab last month

Cost items	Number	Value (Taka)	Fund source (own/bank/NGO/Dadan/others)	Remarks
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Infrastructural facilities

**

Note: ** Please include any other costs of investment

6. Maintenance cost (House rent, Electricity Bill, Mobile Bill, others): Tk...

7. Sample collection cost: Tk.....

Information collected by:.....

Date:

Annex 8: Summary of dignitary visits to observe project activities

Sl. No.	Date	Visitor	Organization	Location
	04.11.09	William J. Collis	WorldFish	Visited Khulna Office, Shrimp farms in Bagerhat
	03.05.10	Mr. Tanvir Islam Mr. Ahsraf Uddin	PRICE	Visited <i>golda</i> hatchery at Bagerhat
	02.06.10	Mr. Aniruddha Hom Roy Ms. Farzana Yasmeen	USAID/B	Visited shrimp farms and depots in Bagerhat
		Dr. Abul Hossain Mr. Bani Amin Ms. Shafinaj Rahman Mr. Tanvir Islam	PRICE	
	05/06.07.10	William J. Collis Dr. Manjurul Karim	WorldFish	Khulna and Satkhira
		Mr. Enamul Haque	CIMMYT	
	18.09.12	(Deputy Secretary, Ministry of fisheries and livestock Govt. of Bangladesh) Dr. Nittananda Das Mr. A.K.M. Shafiquzzaman Mr. Nitty Ranjan Biswas	MoFL, DoF, Govt. of Bangladesh	Visited GHERS field activities at Debhata, Satkhira
	28.09.12	Mr. Jules Lampell	PRICE	Visited different field level activities at Chitalmari, Bagerhat
		Mr. Aniruddha Roy	USAID	
	29.09.10	Ms. Ertharin Cousin	UN	Visited Closed System Technology (CST) shrimp pond in Bagerhat
		A. Rollins Jo Lesser-Oltheten Patricia Hill Anar Khalilov Aniruddha Roy Mahin Rashid	OFDHA USAID/B	

		Marina Yasmin		
		A media team included Mr. Leonel Antonio Diaz Zecena (Guatemala), Mr. Meghdeep Bhattacharyya (India), Ms. Agnes Dumisani Mizere (Malawi), Mr. Jean Paul Ntezimana (Rwanda), Mr. Francis Kagolo (Uganda), Mr. Christopher Y. Kakunta (Zambia), Mr. Golamftekhar, Mahmud (Bangladesh), Mr. Kamram Reza Chowdhury (Bangladesh), Mr. Kamal Pasha (Bangladesh).		
	23.10.10	Meghan W.T.Nalbo Wasif Hasan Mr. Mamun	USAID/B	Visited GHERS activities at Chitalmari, Bagerhat
		Mr.Tanvir Islam	PRICE	
	26.10.10	Dr. Abul Hossain Mr. Tanvir Islam	PRICE	Visited GHERS activities including 5 CST ponds at KoyraUpazilla, Khulna
	08.11.10	Meghan W.T.Nalbo Mr. Mamun	USAID-Bangladesh	Visited GHERS activities at Bilkul and Moshni under Kachua, Bagerhat
		Mr.Tanvir Islam	PRICE	
	13.11.10	Mr. Carlos Perez del Castillo	CGIAR)	Visited GHERS-PRICE activities at Moshni, Bagerhat
		Dr. Patrick Dugan Mr. William J Collis Dr. Manjurul Karim	WorldFish	
		Mr. Mark Visocky, Deputy	USAID/B	
		MohammedZainulAbedin,	IRRI	
		Md. Khalequzzaman A. Chowdhury,	BARC	
		Dr. Jahangir Alam	BFRI	

	27/28.11.10	Dr. Charles Crissman	The WorldFish-Malaysia	Visited GHERS-PRICE activities, partner depot, CST pond, nursery pond & processing factory in Satkhira and Bagerhat
		Dr. Ben Belton	WorldFish-Bangladesh	
	28.12.10	Three member team including Mr. Mahin Rashid	USAID-Bangladesh	Visited GHERS activities at Moshni, Kachua, Bagerhat
		Mr. Tanvir Islam	PRICE	
	27.01.11	Mr. James F. Moriarty	USAID	Visited GHERS activities at Moshni village, Kachua, Bagerhat
		Ms. Denise Rollins		
		Mr. Jules Lampell	PRICE	
		Dr. Abul Hossain		
	19.06.11	Professor Nazmul Ahasan Professor Rakibuddin	Khulna University	Visited GHERS field activities under Kaliganj, Satkhira
	21/22.06.11	William J. Collis	WorldFish-Bangladesh	Visited the GHERS activities in Khulna
	03.08.11	A team led by Dr. Michael Phillips	WorldFish HQ	Visited GHERS activities in Satkhira and Bagerhat districts
	24.08.11	Richard Green	USAID-Bangladesh	Visited GHERS field activities at Pinguria village, Bagerhat
		Ramona El Hamzaoui		
		David Yanggen		
		Dina Esposito		
		Paul Novick		
		Amy Sink		
		Ananta Hans Cook		
		Aysha-Liaison		
		Aniruddha Roy		
		EG. Jules Lampell	PRICE	
		Dr. Abul Hossain		

		Dr. Manjurul Karim	WorldFish	
	16.11.11	The WorldFish's Board of Trustee members and the Director General Dr. Steven Hall	WorldFish	Visited GHERS activities at Chitalmari and Jatrapur, Bagerhat
	19.11.12	Mr. Patrick Dugan	WorldFish	Visited GHERS activities at Jatrapur, Bagerhat
		Mr. Nurul Islam MrMannan Maksudur Rahman	PRICE	
		Dr. Craig Meisner Dr. Manjurul Karim Md. Mocarrom Hossain	WorldFish	Visited different Project areas of Bagerhat

Annex 9: List of articles on GHERS published in newspapers

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
1.	The Daily Dristipat	Local	Daily	Shrimp culture activity visit and discussion at Ashashuni	13/7/2010
2.	The Daily AlorParosh	Local	Daily	Bill Collis, Director, WFC, visit shrimp culture activity at Ashashuni	13/7/2010
3.	The Daily Kafela	Local	Daily	Bill Collis, Director, WFC, visit shrimp culture activity at Ashashuni	14/7/2010
4.	The Daily VorerKagos	National	Daily	Bill, director WFC sharing with Ashashuni shrimp farmer	15/7/2010
5.	The Daily AlorParosh	Local	Daily	Aquaculture training activity starts in Debhata	22/7/2010
6.	The Daily AlorParosh	Local	Daily	Deputy Secretary, Ministry Fishery & livestock visit Mahi Fish Farm under PRICE project	19/9/2010
7.	The Daily Purbanchal	Local	Daily	Deputy Secretary, Fishery & livestock visit Mahi Fish Farm under PRICE project	19/9/2010
8.	The Daily JugerBarta	Local	Daily	Deputy Secretary, Fishery & livestock visit Mahi Fish Farm under PRICE project	20/9/2010
9.	The Daily Kafela	Local	Daily	SonavanBibi, a self-confident woman of Ashashuni	28/9/2010
10.	The Daily Dristipat	Local	Daily	Problem and prospect of shrimp and nursery	29/9/2010
11.	The Daily AlorParosh	Local	Daily	Nursery management for success shrimp culture (Written by TS AzharulHaque)	1/10/2010
12.	The Daily JugerBarta	Local	Daily	Widow Moinadede is self-sufficient by the help of PRICE project	3/10/2010
13.	The Daily Tathya	Local	Daily	Shrimp Farmers' fate has been changed through planned and environment friendly shrimp farming	19/10/2010
14.	The Daily Jugerbarta	Local	Daily	Environment Friendly Shrimp Culture training held with the initiative of WorldFish	20/10/2010
15.	The Daily Patradoot	Local	Daily	Environment Friendly shrimp culture management training	21/10/2010
16.	The Daily Patradoot	Local	Daily	Success in Environment friendly Shrimp Culture at Paikgaccha	21/10/2010
17.	The Daily Jugerbarta	Local	Daily	Farmers of Ashashuni are self-confident by receiving training and shrimp fry	22/10/2010
18.	The Daily AlorParosh	Local	Daily	Farmers of Debhata are getting	22/10/2010

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				involve with environment friendly shrimp culture technology	
19.	The Daily Patradoot	Local	Daily	Mizanur from Paikgaccha becomes self-reliant by shrimp cultivation	22/10/2010
20.	The Daily Kafela	Local	Daily	Shrimp Farmers are being benefited having training support from PRICE at Paikgaccha	29/10/2010
21.	The Daily Spandan	Local	Daily	Farmers from Paikgaccha are more benefited in shrimp culture with modern technology.	29/10/2010
22.	The Daily Tathya	Local	Daily	WorldFish Bangladesh gher representative team inspected Gher	30/10/2010
23.	The Daily Samajer Katha	Local	Daily	Shrimp Gher visit of the Representative Team of WorldFish at Paikgaccha	01/11/2010
24.	The Daily AlorParosh	Local	Daily	Training on Environment Friendly Shrimp Culture took place	02/11/2010
25.	The Daily Samajer Katha	Local	Daily	A WorldFish Team visited Environment friendly Shrimp Culture activities	02/11/2010
26.	The Daily Tathya	Local	Daily	A High level team of Ghers Initiative visited Khiroil village at Koyra	02/11/2010
27.	The Daily Kafela	Local	Daily	WorldFish representative team visited Environment friendly Shrimp Culture	02/11/2010
28.	The Daily Drishtipat	Local	Daily	Farmer's Technical Training in Paikgaccha	03/11/2010
29.	The Daily Drishtipat	Local	Daily	Environment Friendly Shrimp Culture Management training	04/11/2010

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				held at Kaliganj	
30.	The Khulnar Bani	Local	Daily	Shrimp Farmer's Training	07/11/2010
31.	The Daily Kafela	Local	Daily	The small shrimp farmers of Godaipur, Boyarzhapa and Soladana of PaikgacchaUpazilla has been gaining from the training of PRICE	14/11/2010
32.	The Daily Janmobhumi	Local	Daily	CGIAR's Main Objective is Development in Agriculture field CGIAR chief Carlos	14/11/2010
33.	The Daily Probaha	Local	Daily	Paikgaccha Sangbad	25/11/2010
34.	The Daily Anirvan	Local	Daily	Shrimp Farmer's cultivation management training of Gher project completed successfully	25/11/2010
35.	The Daily Samajer Katha	Local	Daily	Shrimp Farmer's Training at Paikgaccha	25/11/2010
36.	The Daily Prabartan	Local	Daily	Training activities on Environment friendly Shrimp culture management at Paikgaccha	26/11/2010
37.	The Daily Probaha	Local	Daily	Up to the Expectation production in Modern Process Shrimp Culture at Paikgaccha	02/12/2010
38.	The Daily AlorParosh	Local	Daily	A Shrimp farmer of Lota being success in Planned and Environment friendly Shrimp farming	03/12/2010
39.	The Daily Anirvan	Local	Daily	A shrimp Farmer of Lota succeeded in Planned and Environment Friendly Shrimp Culture	03/12/2010
40.	The Daily Prabartan	Local	Daily	Md IliusMorol has able to produce expected amount of Shrimp in the current year by cultivating Shrimp in M.T.T.	03/12/2010

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				process	
41.	The Daily ShomoyerKhorobor	Local	Daily	Farmers' fate has opened in Environment friendly shrimp culture at Paikgaccha	03/12/2010
42.	The Daily Spandan	Local	Daily	Farmer Sankar succeeded in Environment Friendly Shrimp Culture at Paikgaccha	04/12/2010
43.	The Daily Samajer Katha	Local	Daily	Farmers of Paikgaccha succeed in planned and environment friendly shrimp culture	04/12/2010
44.	The Daily Anirvan	Local	Daily	Expected Shrimp production of Shrimp Farmer at Paikgaccha	04/12/2010
45.	The Daily AlorParosh	Local	Daily	Fish rally and discussion meeting held at Debhat organized by PRICE project	14/12/2010
46.	The Daily Kafela	Local	Daily	Fish rally and discussion meeting held at Debhat organized by PRICE project	14/12/2010
47.	The Daily ShomoyerKhorobor	Local	Daily	Rally on shrimp farming issues	21/12/2010
48.	The Daily AlorParosh	Local	Daily	Rally of GHERS Initiative on shrimp farming issues	21/12/2010
49.	The Daily Kafela	Local	Daily	Rally and discussion meeting on environment friendly shrimp farming at Paikgaccha	21/12/2010
50.	The Daily Janmobhumi	Local	Daily	Discussion meeting on environment friendly shrimp farming at Paikgaccha	22/12/2010
51.	The Daily Anirvan	Local	Daily	Environment friendly shrimp farming project has created enthusiasm among shrimp farmers of Kopilmuni	22/12/2010
52.	The Daily GramerKagoj	Local	Daily	Environment friendly shrimp farming project has created enthusiasm among shrimp farmers of Kopilmuni	22/12/2010
53.	The Daily Probbhatfary	Local	Daily	"Environment friendly shrimp farming" has created	23/12/2010

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				enthusiasm among shrimp farmers of Kopilmuni	
54.	The Daily Spandan	Local	Daily	Discussion meeting on environment friendly shrimp farming at Paikgaccha	24/12/2010
55.	The Daily SamajerKagoj	Local	Daily	Environment friendly shrimp farming project has created enthusiasm among shrimp farmers of Kopilmuni	24/12/2010
56.	The daily somajerkagoj	Local	Daily	Farmers of Putimari at Paikgaccha have been succeeded through modern and environment-friendly shrimp farming	03/10/ 2011
57.	The daily gramerkantho	Local	Daily	Farmers of Putimari at Paikgaccha have been succeeded through modern and environment-friendly shrimp farming	04/10/ 2011
58.	The daily janmobhumi	Local	Daily	Farmers of Putimari at Paikgaccha have been succeeded through modern and environment-friendly shrimp farming	04/10/ 2011
59.	The daily anirvan	Local	Daily	MTT is an important means for bumper production of shrimp	05/10/ 2011
60.	The daily janmobhumi	Local	Daily	Modern Farm Management of GHERS Project: Story of a successful farmer	06/10/ 2011
61.	The daily tathya	Local	Daily	Modern way of shrimp farming: Story of a beneficiary farmer	06/10/ 2011
62.	The daily somajerkagoj	Local	Daily	Modern way of shrimp farming: Success story of a beneficiary farmer	07/10/ 2011
63.	The daily spandan	Local	Daily	AsirUdddin is capable of producing much through modern way of shrimp farming	07/10/ 2011
64.	The daily janmobhumi	Local	Daily	Joar Bangladesh has taken initiative of shrimp farm	07/10/ 2011

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				implementation	
65.	The daily purbanchal	Regional	Daily	Training on Environment Friendly Shrimp Farming at Morelgonj	08/10/ 2011
66.	The daily gramerkagoj	Local	Daily	Joar Bangladesh has taken initiative of implementing shrimp farming at Morelgonj	11/10/ 2011
67.	The daily somajerkagoj	Local	Daily	Modern Shrimp farming of GHERS Project has come forward in developing fate of shrimp farmers of Paikgaccha	13/10/ 2011
68.	The daily janmobhumi	Local	Daily	Modern Shrimp farming of GHERS Project has come forward in developing fate of shrimp farmers of Paikgaccha	13/10/ 2011
69.	The daily tathya	Local	Daily	Modern Shrimp farming of GHERS Project has come forward in developing fate of shrimp farmers of Paikgaccha	13/10/ 2011
70.	The daily spandan	Local	Daily	Modern Shrimp farming of GHERS Project has come forward in developing fate of shrimp farmers of Paikgaccha	14/10/ 2011
71.	The daily tathya	Local	Daily	Training on environment friendly shrimp farming at Bagerhat	17/10/ 2011
72.	The daily janmobhumi	Local	Daily	Badhon has been implementing the program of GHERS Project successfully at Fakirhat	17/10/ 2011
73.	The daily probaha	Local	Daily	Training on environment friendly shrimp farming at Bagerhat community	18/10/ 2011
74.	The daily spandan	Local	Daily	Training on shrimp farming has been stated in Rampal	28/10/ 2011
75.	The daily Drishtipat	Local	Daily	Training on shrimp farming in Nowapara	07/04/ 2012
76.	The daily Kafela	Local	Daily	Training on shrimp farming in Debhata	07/04/ 2012

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
77.	The daily SomoyerKhabor	Local	Daily	Training held on shrimp farming in Debhata	14/04/ 2012
78.	The daily Purbanchal	Local	Daily	Training held on shrimp farming in Debhata	14/04/ 2012
79.	The daily Jugarbarta	Local	Daily	Training held on shrimp farming in Debhata	14/04/ 2012
80.	The daily Kafela	Local	Daily	Training held on shrimp farming in Debhata	14/04/ 2012
81.	The daily Patradoot	Local	Daily	Training on shrimp farming in Debhata	07/05/ 2012
82.	The daily Jugarbarta	Local	Daily	Training on shrimp farming in Kaliganj	18/05/ 2012
83.	The daily Purbanchal	Local	Daily	Training	19/05/2012
84.	The daily Jugarbarta	Local	Daily	Training on shrimp farming in Kaliganj	29/05/ 2012
85.	The daily Purbanchal	Local	Daily	Rally and Somabesh of WorldFish at Bagerhat	23/10/2012
86.	The daily Alorparosh	Local	Daily	Shrimp farmers rally in Debhata	09/12/ 2011
87.	The daily Patradoot	Local	Daily	Shrimp farmers rally in Shyamnagar	09/12/ 2011
88.	The daily Kafela	Local	Daily	Shrimp farmers rally in Debhata	09/12/ 2011
89.	The daily Purbanchal	Local	Daily	Shrimp farmers rally in Shyamnagar	11/12/ 2011
90.	The daily Kafela	Local	Daily	Shrimp farmers rally in Shyamnagar	11/12/ 2011
91.	The daily Jugarbarta	Local	Daily	Shrimp farmers rally in Shyamnagar	11/12/ 2011
92.	The daily Ittefaq	National	Daily	WorldFish workshop held in Khulna	18/12/2012
93.	The daily Tribune	Local	Daily	Workshop on shrimp culture	19/12/2012
94.	The daily Purbanchal	Local	Daily	Improved shrimp culture will enhance country develop	19/12/2012
95.	The daily Inqilab	National	Daily	Workshop on shrimp culture in	21/12/2012

Sl. No	Name of the newspaper	Type of newspaper	Circulation type	News headline	Publication date
				Khulna	
96.	The daily Tathya	Local	Daily	Improved shrimp culture will enhance country develop	19/12/2012
97.	The daily Arthonity	National	Daily	Workshop on shrimp culture in Khulna	21/12/2012
98.	The daily Probaha	Local	Daily	Planned shrimp culture training continues at Bagerhat	14/05/2012
99.	The daily Tathya	Local	Daily	Supply of virus free PL to 500 farmers at Bagerhat	17/05/2012
100.	The daily Probaha	Local	Daily	Supply of virus free PL to farmers at Bagerhat	17/05/2012
101.	Weekly Kolahal	Local	Weekly	Environment friendly shrimp culture program	03/06/2012