



Ecopond and Empowerment of Women Project (Ecopond II Project)

Final Report



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Ecopond and Empowerment of Women (Ecopond II Project)

I Introduction

Ecopond and Empowerment of Women (Ecopond II Project) was developed for scaling-out of fish production in small perennial ponds by women using ecosystem based management approach in order to get increased fish production, diversity in fish production, increased household fish consumption and sale of fish for cash income. The project was implemented by WorldFish in collaboration with the members of the executive team of the Water Management Groups (WMGs) supported by women lead farmers and funded by the innovation fund of the Blue Gold program during 16 June, 2016 to 15 June, 2017. There were two major objectives of the project; (i) To scale-out and scale-up the Ecopond approach to more women in communities with small homestead ponds in the polders in southern region of Bangladesh and (ii) To empower women involved in fish production in their small homestead ponds through their active involvement in fish production, the leadership role they play in promotion of the technologies among other women farmers within and in nearby communities using the Ecopond approach.

The Ecopond II project was developed based on the initial success of the Ecopond 1 Project implemented by the WorldFish in collaboration with BRAC during April 2014 - June 2015 funded by the BG program. Initially, 60 women each with small homestead ponds located in four communities in polders 29 and 30 in Botiaghata and Dumuria Upazila in Khulna Districts were involved. Ponds with four different combinations of habitats and without habitats as treatments each with 12 replicates, stocked with fourteen species of fish (rohu, catla and mrigal, tilapia, shing, magur, koi, taki, mola, chela, punti, darkina, chngri and kholisa) at optimum densities were used. The results showed that women used habitats in their ponds achieved significantly higher fish production than those without habitats. The activities those ensured the active participation of women to bring success in fish production in their small ponds were: (i) formation of women group in each community (ii) establishment of learning centers (LCs) (iii) building advanced women farmers as Lead Farmers (LFs) (iv) development and use of training manual in Bangla (v) training of women over the period using session plans based at LCs and (vi) use of participatory action learning (PAL) tools and participatory action research (PAR) method. The results of the project brought success in secondary adoption within the communities. In the following year from 60 women with 60 ponds in the communities, total 165 women with 265 ponds engaged in fish production in their small ponds using Ecopond approach with their own initiatives and received benefits.

Ecopond II is one of the unique projects where 3377 women actively involved in fish production in their 3500 small homestead ponds. The project developed 324 women from 42 communities as LFs with increased ability to involve actively in fish production in their own ponds, supporting other fellow women by providing training and by providing mentoring support to follow the Ecopond approach. The results on fish production, diversity in species of fish produce, household fish consumption, income and employment not yet completed. The major activities on selection of women, ponds, training, setting of habitats in ponds and stocking of fish were completed by June 2017. Women started the harvest of fish from their pond normally from August-September with a peak harvest during December – May 2018. In order to collect the information to know about the results and the impact after complementation of the BG WorldFish with its own funding is continuing the activities. The collection of data, analysis, and development of communication products is continuing. Therefore, in order to complete the process of scaling-out effectively and to develop a model for its promotion in a sustainable way considering its importance WorldFish is continuing the activities in 2018.

The primary results of few women with Ecoponds showed that due to use of improve management practices fish production increased several-folds from 500kg/ha/year to even up to 4-5 metric tons/ha/year. With these increased fish production even with small ponds (around 6-7 decimal) in addition to household fish consumption women earned significant amount of cash income by selling of fish. Due to increase in fish production and cash income the confidence of the women farmers increased so high that even most of the adult members of the households (husband, mother-in-law, and father-in-law) were highly motivated and actively involved in production of fish in their own or from the pond they rented for from neighbors. In some cases in addition to their involvement in fish production, the men members of the households started to involve in value chain activities such as; collection and selling of fish fingerlings.

II Strategies Used for Scaling-out of Ecopond

2.1 Involvement of Existing Institutions and Leaders

One of the important strategies used for scaling-out the Ecopond approach for implementation of fish production with large numbers of women in ponds within shortest possible time with minimum numbers of project staff with limited budget was the identification of existing institutions and leaders from the communities to get their contribution in the implementation process. It was important to establish strong linkages of individual women or groups with institutions and most importantly with local service providers. In the Ecopond II project in order to implement the activities with success total 3377 women

with 3500 small ponds were brought under 110 Groups at the beginning of the project started to work with the Water Management Groups (WMGs) in the polders.

Water Management Groups (WMGs): The project started its work with support from Water Management Groups (WMGs) in selecting women of households with small perennial ponds (members and non-members of WMGs) to involve in fish production. The staff of the project at the beginning visited, met with leaders of the WMGs and explained about the objectives of the project. With their support the temporarily recruited enumerators worked in the project collected primary information about the households and ponds. Women from most of the households with small homestead ponds with perennial waters showed interest to involve in fish production using the Ecopond approach. The project staff discussed with leaders of the WMGs and selected the educated, advanced and more interested women in each of the communities as Lead Farmers (LFs). Considering the importance to aware at about the approach to women and to cover women the LFs of 42 WMGs with support from the WMG Leaders the project staff organized awareness meetings and explained about the Ecopond approach to the LFs. The awareness meeting holds in eight sites based at LCs in which LFs of 42 WMGs along with the Leaders of WMGs participated.

Women Lead Farmers: Building advanced women farmers as Lead Farmers (LFs) were given much importance as they were the major player in providing support to women fellow farmers involved in Ecoponds in their groups. Further initiative were taken to mark 8-10 fellow farmers under each LF to provide mentoring support to them during the period of implementation - by demonstrating their own works to other and also follow-up the other members to what extent they are following in practically they had learned during the training program. Under each LF the neighboring farmers were chosen as their fellow farmers for effective monitoring and mentoring. In most cases due to their presence closer to each other one observed the activities and the results during the process of implementation of the activities. The project had given much emphasis about this method to bring success as it is always useful to learn by observation and by practicing than only by listening. In the project in order to manage and to run the training sessions and for mentoring the fellow farmers from the advanced women total 324 LFs were selected for this project. In order to ensure that the LFs follow the approach correctly and to share with others all the LFs participated in ToT programs run by the experts and researchers working in the project. To the LFs the training manual in Bangla with detail session plans and explanation about the content of the sessions with photographs had been provided.

Ecopond Service Providers (ESPs): In order to ensure scaling-out the Ecopond II activities effectively 20 people mostly women LFs from the communities involved in Ecoponds those with higher educational background (e.g. Master Degree and Graduation or up to HSC) were selected and involved them as 'Ecopond Service Providers (ESPs)'. In addition to play their role as LFs in own communities, the ESPs worked with LFs of other communities to ensure that they were playing their role effectively. The project provided some honorarium to each ESP for carrying out these additional activities of the project. Together with the LFs, the ESPs ensured that all the women with ponds apply the practices; used suitable habitats in their ponds, motivated the women to stock suitable species of fish at optimum density, managed the habitats in ponds and conserved suitable species of fish already available in their ponds. They also ensured that the fish in the ponds were getting proper shelter and food to breed and to grow well. They ESPs provided necessary information and updated directly about the field activities to three research assistants working in the Ecopond II Project.

2.2 Establishment of Learning Centers

Learning Centers (LCs) were established within each community where women learned about the technologies and women empowerment issues through participation in training sessions over the period. Like formal institutions the LCs used as an important place in building up the leadership of women through improving their understanding about use of Ecopond approach for fish production in their small homestead ponds. In implementation of the Ecopond II project the establishments of LCs were considered useful for building up knowledge through process of continued learning largely following adult learning process which includes both theoretical and practical sessions. It was carried out through establishment of 62 LCs located in 42 water management groups. Considering the effective learning in the sessions and more interactions among the members most cases each LCs comprised of two groups of women each with around 25-30 women.

2.3 Empowerment of Women

Women involved in fish production in their small homestead ponds through their active involvement in management of ponds for fish production. Women as LFs played role in promotion of the technologies among other women farmers within and in nearby communities using the Ecopond approach. Only women were selected to involve in fish production for Ecopond - it created opportunities to show that women could actively take part in fish production using the update information about the technologies they learnt through their participation in the training program based at the learning centers with success. Women developed as trainers to train the other fellow women members in the communities, in most cases the LFs play role in monitoring and mentoring the activities of the fellow farmers located

close to their households. It builds up the leadership capacity of the women. Among the ESPs majority of them were women selected from the LFs taking into accounts their ability of playing leadership roles to support the implementation of the activities of fish production in small ponds.

III Follow-up Activities of the Ecopond II Project

As follow up activities of the project WorldFish is continuing the process of building up the capacity of the LFs to deliver their roles in the communities for others, use the ESPs for collection of information with proper recording about the fish production, fish consumption, sale, expenditure, income, diversity in production of fish species along with the information on empowerment of women using proper format and guidelines on regular basis by engaging them in the activities. Few of them ESPs with higher education level and higher ability will be selected to work as data enumerator to work more closely with women farmers selected for the purpose as sample farmers. As follow up activities of the Ecopond II Project WorldFish is working on:

- Strengthening linkages with institutions and more importantly with local support providers (LSPs) such as; fish seed traders, hatchery and nursery owners, feed dealers and food fish traders
- Involvement of LFs, ESPs and build up them as LSPs building up linkages with them with the existing LSPs, work to involve the other members of the households as LSPs, development of LSPs linked to the production and supply of fish such as; small fish, local catfish and others normally not available in the hatcheries. The involvement of household members as LSPs not only useful for the household but also useful to get support directly by other members of the household involved in fish production in small ponds to improve their production.
- Building linkages with institutional stakeholders – DoF, the NGOs working on promotion of fish production in the areas, the actors involved DoF projects (Union Level Project, NATP Project and others)
- Working with DoF more closely right from the beginning on use of innovative technologies for fish production in the waterlogged areas in Polder 2 under the BG program, will use the outcomes of the workshop held at Khulna and the follow up meeting with the BG program, the development of a CN by WorldFish in collaboration with DoF is under process.
- Development of communication products such as; poster, factsheet, training manuals, journal articles and policy briefs, video documentary are useful for scaling out and scaling up of the Ecopond approach. For this collection necessary information using strong monitoring evaluation and learning (MEL); continuously learn and adapt, learn in partnership, inform the decisions with multiple inputs, cultivate the curiosity of learning and share learning to amplify impact is

important which is yet to establish in the communities – will be major works in the upcoming months to be carried out the project with support from the WorldFish Fish CRP program.

- Value chain development – the project continued working on VCD, as the activities found to be important for sustainable scaling out the approach to the farmers and useful for development of opportunities for generation of employment.
- Major emphasis will be given so that women involved in the Ecopond activities will be empowered significantly – the activities will be carried out and necessary information will be collected to measure WEAI by end of fish production season. The Gender Specialist Dr. Rita Sen is continuing to provide her support in this regard. Dr. Sen works will focus on five domains connected to empowerment of women which include; access to resources, knowledge, building capacity, leadership development, and control over income and time use by women.

Considering the importance WorldFish funding from own sources and by involving the staff of the project and the members of the communication team is carry out the activities for completion of the scaling-out process along with the development of communication products..

IV Challenges, Lessons Learnt and Things Do Differently

4.1 Making Availability of Tilapia Fry and Fingerlings

In order to get increased fish production and diversity of fish species it is suggested to stock around 14 different species of fish in small ponds. However, for many species of fish fry/fingerlings are not available to farmers for stocking. To overcome the challenge for production and supply of fry/fingerlings of tilapia – the fish which made the major contribution in fish production in Ecoponds, the following initiatives have been undertaken by WorldFish to meet up the challenges: (i) Identified one hatchery (e.g. Nawapara Tilapia Hatchery, Nowapara, Jessore) involved in seed production of tilapia using improved GIFT from TBN. (ii) Select 30 women from communities with suitable ponds interested to involve in nursing of tilapia swim-up fry to produce large size fry/fingerlings. Six communities Gangarampur, Senpara and Mail Mara in Khulna; Uttar Gojkhali, Purba Sakaria and Dakhin Attharogachia in Barguna Districts have been chosen (iii) As part of business the hatchery will provide support to the women the necessary tools to be used for nursing such as; *hapa*, cages, swim-up fry, and feed. Also provide human resource support - 2 field level staff to be engaged in monitoring of the activities. Women nursery operators will play role as outreach producer of the hatchery. Through this process both the hatchery owner and the women nursery operators will be benefited. (iv) In order to implement the process of business development between the hatchery and the nursery operators a formal contract will be made explaining about the modalities of operations and benefit sharing (v) Develop network with existing local level service providers (e.g. fry/fingerlings traders, feed millers) in

addition to the farmers involved in grow-out fish production as part of marketing of seed. (vi) It is expected that each women will produce around 150,000 -200,000 fry/fingerlings over the season (by using multiple stocking and harvest of fry fingerlings) and earns a net profit BDT 20,000-25,000. That is total 4.5 million to 6.0 million fry/fingerlings in 2018. In addition to make the production and income from own resources this will open an opportunity for the tilapia hatchery to get more income through selling of fry/fingerlings. In order to get success in development of the seed production at local level as a business and to develop the nursery operators as business entrepreneurs WorldFish will provide technological and support for market development by providing information about the demand of fish seeds.

4.2 Making Availability of Mola Broodstock

There is non-availability of mola broodstock or seed in existing hatcheries, mola is difficult to keep alive unless proper methods of hardening are done and proper care is taken during transportation. Most cases the fish produce as the byproduct of other fish production from ponds, normally farmers do not take equal measure for their feeding and other necessary management. As a result the fish produce from ponds become weak, of different size and difficult to get sufficient amount at a time as live for stocking. Although, the fish (especially the graded large size mola) have high price in the urban market in most cases small mixed size mola are often sold at low price at local level. Therefore, for making availability of mola broodstock as live for stocking in ponds and also later on marketing of mola at fare price is important in the promotion of mola in Ecoponds. In order to overcome the challenge the following initiatives have been undertaken: (i) Select communities with pond having mola broodstock - around 10 ponds from 4 communities one from each polder of Khulna and Barguna District (ii) Like the hatchery for tilapia here the major actor will be the existing fry/fingerling traders – total 4 fingerling traders will be selected one from each polder (iii) Capacity building and business oriented support will be provided to 10 ponds owners with mola and the four traders regarding the technology on production of mola, harvesting, sale as live for stocking. (iv) Stocking of mola in ponds will be carried out as part of the process of promotion largely by Lead Farmers in which along with the tilapia the Learning Centers could be used as a center for message sharing. WorldFish will facilitate the process. (v) It is expected that with this involvement each pond owner able to sale at least 100kg of mola (live) worth BDT 20000. The total production of mola from 10 ponds will be around 1000kg and income BDT 200000 which will be stocked by around 1000 farmers. Each trader will sell 250kg mola and from each kg BDT 20/kg total BDT 5000 which will be add as extra income in his usual trading business. In 2018, WorldFish will complete the necessary activities in order to meet the above challenges in a systematic way. For this in

addition our Research Assistant Dr. Golam Faruque, Value chain and market development expert is providing necessary support.

4.3 Conservation of Self-recruiting Fish in Ponds

Of 14 species of fish suggested for stocking in Ecopond except rohu, catla, mrigal, majority of the other fish such as; tilapia, shing, magur, koi, taki, mola, punti, chela, darkina, choto chingri and kholisa breed in ponds if the necessary facilities for breeding is provided. In most cases farmers made complete harvest of the fish or do not take measures to keep the necessary stock and do not create facilities useful to support breeding of the fish in ponds to get higher fish production without further stocking in the following years. This is largely related to motivation of the farmers about the benefits of conservation of fish in their ponds and the application of demonstration method in most cases found to be very useful.

In order to meet up the challenge in 2018 major initiative will be undertaken to establish demonstration ponds by 30 households where mola and other fish; tilapia shing, koi, punti, choto chingri, darkina will be stocked initially to get higher fish production and later take measures to conserve the fish in sufficient quantity to get production in the following years without further stocking.

4.4 Develop Ecoponds as Nutrition-sensitive Production System

One of the major agenda in food system is the mitigation of the problem of malnutrition which is prevailing among large numbers of people especially for pregnant women, lactating mother and minor children of poor households. The FAO made 10 recommendations for Improving Nutrition Through Agriculture and Food Systems noted that agricultural programs and investments can strengthens impact on nutrition if they (1) Incorporate explicit nutrition objectives and indicators in their design (2) Assess the context of the local level, to design appropriate activities to address the types and causes of malnutrition (3) Target the vulnerable and improve equity (4) Collaborate and coordinate with other sectors (5) Maintain or improve the natural resource base (6) Empower women (7) Facilitate production diversification, and increase production of nutrient-dense crops and small-scale livestock (8) Improve processing, storage and preservation (9) Expand market and market access for vulnerable groups, particularly for marketing nutritious foods and (10) Incorporate nutrition promotion and education.

The Ecopond approach developed for fish production in small homestead ponds by women covers most of these recommendations. In 2018 further initiative will be undertaken so that the Ecopond approach will completely represent as a model of nutrition-sensitive production system.

4.5 Establish System for Continued Support to Ecopond Farmers

For effective implementation of the activities of the Ecoponds to get the benefits and its further improvement over the years continued support from service providers is necessary. In order to do this a sustainable system comprised of functional learning centers, women lead farmers, ESPs and from formal institutions (DoF, NGOs, and WMGs) will be needed. The major challenge here is to find out how the system and the actors involved will continue the support even beyond the project/programs.

Based on the earlier experiences in working on the small fish and nutrition project, the decentralised fish seed and the community based fish culture in floodplain projects it came out that the system found to be sustainable if the farmers/fishers adopt the approach received significant amount of benefit, a business model developed where actors provide support as part of their business to get benefits. Finally, the system is well connected with the other service providers including formal institutions (e.g. DoF, NGOs, CBOs) found it as one the noble tasks to support the farmers as part of their usual responsibilities. The activities initiated for making availability of tilapia fry/fingerlings, mola broodfish, establishment of demonstration ponds and the nutrition-sensitive production system by involving women all would be supportive to overcome the challenges of getting continued support for Ecoponds.

4.6 Out-scaling and Up-scaling of Ecopond Approach

In most cases out-scaling of the approach takes place laterally through farmer to farmer and other actors to farmers within limited area. However in order to out-scale the activities to large numbers of farmers in different areas of the country and abroad it is also important to scale-up the approach among policy makers, donors, scientists, practitioners and extension workers. In order to do this effectively the development and dissemination of different communication products such as; video documentary, posters, fact sheet, executive summary and publication of papers in peer reviewed journals are useful. Organizing of visits, demonstration and sharing of outputs/outcomes with visitors from country and abroad found to be useful. In the Ecopond II Project activities and results demonstrated to visitors. BWDB, BG Program, DoF, and visitors from overseas made visits on different occasions in communities with Ecoponds.

In order to develop the communication products and publication perfectly it will need to get right kinds of information, time and efforts to complete the documents. It will also require necessary measures to share the information to others such as; organizing workshop, presentation in seminars/symposium. Considering the importance WorldFish has taken measures for carrying out these important above mentioned activities for completion in 2018 with funding from Fish CRP.

4.7 Challenges to Involve Women and Ways to Overcome

In Bangladesh the participation of women is less than men in fish production due to social and cultural factors, lack of access to resources and knowledge for fish culture, less mobility and poor linkages with support providers. Also, due their major engagement in household based reproductive works. In order to involve large numbers of women in the communities actively in fish production the engagement of women staff, local women as LFs, ESPs, research enumerators and the women members of the WMGs - all are important.

To attract women to involve in fish production and to sustain, the production system need to be both economically viable and useful to meet up the demand of household fish consumption. In order to get continued support from the service providers especially from private sectors those who provide support need to get income from their service. For example women those involved in the nursing of tilapia fry/fingerling will provide support to others as they may get significant amount of income from selling of fry fingerlings to others, those involved as ESPs will get support from project/programs or even hatchery owners because of their service useful to generate income for their business. They would like to support to continue the LCs to function as the center would be used as a good place not only to provide training to farmers rather this place will be used as a center for sharing information about their seed they produce and the necessary market information.

V Details on Activities of Ecopond II Project

The details of all the activities and results obtained over the project period (16 June 2016 to 15 July 2017) for a period of one year, many of those reported in the earlier progress reports are described in the following sections.

5.1 Orientation of Staff

At the initiation of the Ecopond and Empowerment of Women (Ecopond II) Project an orientation meeting was organized at WorldFish for the staff. The three Research Assistants (RAs), Gender Specialist and other experts of WorldFish to be involved and work in the Ecopond II project participated. The project leader made a presentation and discussed about the objectives and activities of the project to be implemented during 16 June 2016 to 15 June 2017.

A second daylong orientation of six Research Enumerators (REs) involved in the survey for selection of households and ponds from the communities of selected polders was organized at WorldFish, Dhaka. The three RAs conducted the orientation for the Research Enumerators on selection of households and ponds. In order to facilitate the selection of the women with small ponds necessary information about the maps of the polders, the list of the Water Management Groups (WMGs) located within the polders, information about the field staff of the BG Program; the COs, FOs and PFs, the Leaders of the WMGs and a brief questionnaire to collect primary information about the households, ponds and more specific information about small ponds with perennial waters suitable for selection of Ecopond were provided,

5.2 Collection of list of WMGs and Polders

In order to select the sites; the polders, Water Management Groups (WMGs) for dissemination of Ecopond approach to 3000 households with 5000 ponds different initiatives were undertaken. For this the WorldFish team visited to the Blue Gold office at Potuakhali and Khulna and also in the fields on several occasions. During the visits in both areas the members of team met and discussed with relevant officials of the BG program to collect necessary information about the polders and the WMGs to be suitable for selection (taking into account availability of small ponds with perennial waters) of households and ponds. The BG experts provided the necessary documents (e.g. Map of the polders with location of WMGs), the list of WMGs, the information with contact details about the field staff (CO, PF) of BG program. The WorldFish staff made contact with the Cos, FOs and PFs of BG during visit in the fields and collected further information from them the specific about the WMGs, the Leaders (President, General Secretary, Joint Secretary and Cashier) of the WMGs. From them they collected the basic information about the availability of households with small ponds with perennial waters suitable for selection to establish as Ecopond. Of the polders of BG program two polders from Amtoli Upazila, Barguna Districts with greater availability of small ponds; polder 43/1A with 14 WMGs and polder 43/2F with 27 WMGs were selected (**Fig. 1 & 2**). Similarly, of the polders of BG program from Dumuria and Botiaghata Upazila of Khulna two polders polder 29 with 16 WMGs and polder 30 with 15 WMGs were selected (**Fig. 3 & 4**).

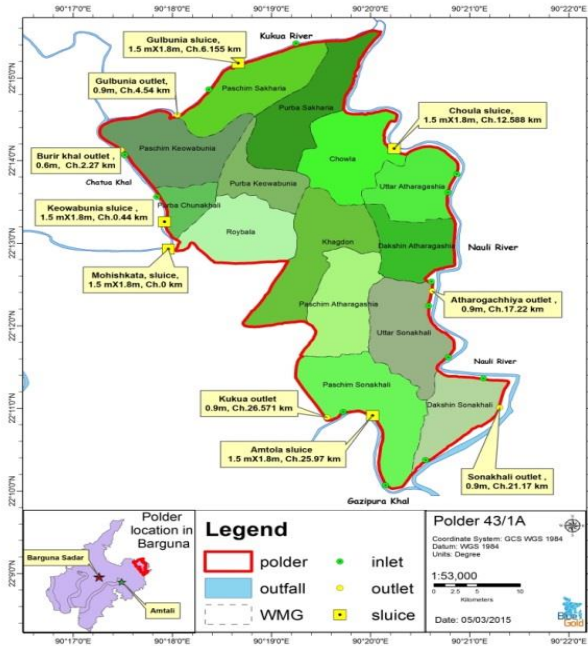


Figure 1. Polder 43/1A

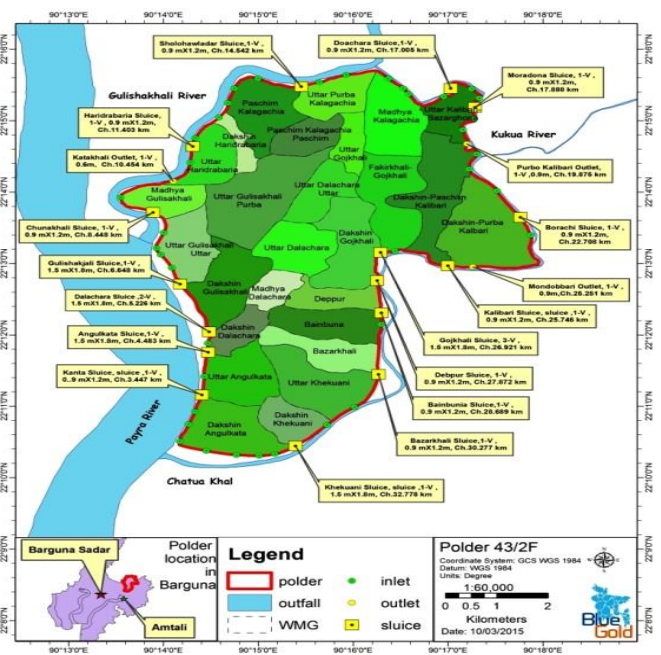


Figure 2. Polder 43/2F

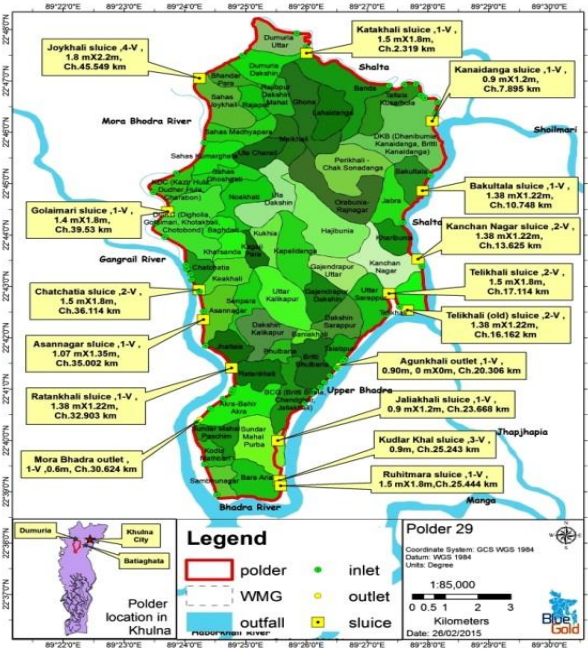


Figure 3. Polder 29

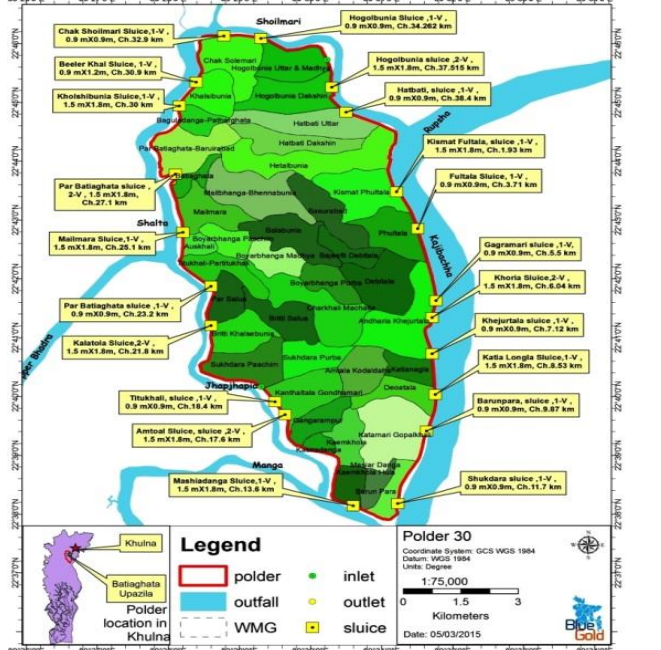


Figure 4. Polder 30.

Using information of the polders, the WMGs and contact details of the Leaders six members' field team of Research Enumerators who received orientation from the Research Assistants of the project visited to the sites based at WMGs in polders 29 and 30 for around 10 days. They collected the list of

households with small ponds, conducted the survey of households with small ponds suitable to include under the Ecopond approach.

5.3 Identification of Water Management Groups and Leaders

In order to disseminate the Ecopond II approach to households with small ponds in BG Program the WMGs were chosen as one of the major entity for implementation of field activities. For this from the beginning the lists of the WMGs and the leaders as contact persons were collected from the office of the BG Program in Khulna and Potuakhali Districts. The field staffs of BG Program of respective areas provided necessary support. The WMG leaders those included as contact persons were; the President, General Secretary and Cashier of the Executive Committees (EC). In few cases the General Members of the EC were also included as contact persons. .

The leaders of the WMG were working for long years in the polders. They had long experiences about households, resources, resource management and technologies to benefits their members in the polders. They build up their leadership capacity through involving in activities implemented under different projects and programs over the years. In the BG program they were working on Farmer Field School (FFS), business development of agricultural activities. Considering the experiences of the leaders and taking into accounts the small homestead ponds as an integral part of the water resources management and their presence within in the communities the Ecopond II project had given utmost importance. Within a short period the project staffs completed those important activities with support from the WMG leaders: the primary survey of households and ponds useful to select household with women and ponds, selection of the locations suitable for establishment of Learning Centers (LCs) taking into accounts the advantages of women to participate actively in the training sessions, recommended in the selection of women lead farmers (LFs) for each LCs with having leadership capacity and interest to support the fellow members, support to organize a day long awareness meeting of the LFs held in selected LCs in each polders and supported to identify input-output value chain actors such as; fish seed traders and other support providers.



Photo 1. WMG Leaders: Mr. Abdul Wahab Mia, Chairman WMA and Mr. Md. Monirul Islam, Dhakkin Angulkatata, polder 43/2F in Barguna. **Photo 2.** WMG Leaders: Md. Khairul Hossain (Gojendrapur Dakshin), Md. Habibur Rahman, Gojendrapur Uttor and Md. Kamruzzaman Shekh , Kapalidanga) in Polder 29, Dumuria, Khulna.

5.4 Selection of Households and Ponds

Women members of households with small ponds were selected based on outputs of survey. Before making the list final it was discussed further with the leaders of WMGs and based on their suggestions made some minor changes. The final list included 3200 women which further extended over the period total 3337 women with small pond were finally selected. The ponds selected were with following characteristics:

- Ponds with available water throughout the year at a level useful to conserve fish even during dry months. Such ponds were effective for establishing fish production using ecosystem based management approach. In some of those ponds there were presence of aquatic weeds, plants, branches of trees or bamboos as habitats supporting production of natural feed, shelter, breeding with the self-recruitment of natural fish. In the Ecopond project the strategy was the management of the habitats, shelter, natural feed and breeding of un-stocked fish for all ponds with a purpose to achieve significant increase in fish production with minimum cost.
- Ponds selected were located in homestead areas with advantages for women to involve actively in management without hampering regular household works. In most cases due to presence in homestead areas even small, water of these ponds were used for multiple purposes of the households such as; washing, bathing, cleaning, source of water for vegetable production, duck rearing and others in addition to fish production. In the Ecopond II project the activities to increase in fish production were carried out without undermining the other uses, rather it ensured by creating better environment in bringing the pond under fish production.

- Small size ponds with or without shade were chosen. Preferences were given to select ponds already with habitats and there were presences of both stocked and un-stocked fish. The new idea to increase in fish production from ponds with presence of natural habitats through conservation, facilitation in breeding and recruitment of fish in their small ponds largely used for household consumption were welcomed by all the households. As it not required major changes in conditions of ponds and less investment and women liked the idea to involve in fish production in their ponds using both stocked and un-stoked fish.
- Households with women those interested to involve in fish production in small homestead ponds using Ecopond approach, showed interested to participate in training session to be held at Learning Centers (LCs) located within their communities were selected.



Photos 3 & 4. Small homestead ponds of households selected for fish production using Ecopond approach.

5.5 Selection of Learning Centers (LCs)

The Learning Centers (LCs) were the places located within the communities where women involve in fish production in their small homestead ponds using Ecopond approach participated in training sessions to learn about the technologies, empowerment of women and value chain development. The LCs was also used as the place to share about the methods and sharing of the outputs of the activities among their fellow members. The establishment of LCs one in each communities (Para) and organizing of training of 20-25 women in one group found to be very effective. In the Ecopond II project in addition to ensure participation of women initiative was taken to meet at least 2-3 occasions to have meeting with the men members and explained about the what their women members were doing in

implementation of the activities. Around 50 women selected under each LC which was divided into two groups each comprised of around 25 women for carryout training session in an effective way. Using the final list of women and ponds through discussion with the leaders in respective WMGs to cover all the total 62 LCs were selected. Women included under the LCs based on the following points; easy to arrive, .located within their communities and close to the home areas. The places for the LCs also chosen with having sitting arrangements and there is no problem of women participate. The places chosen include: temple, cyclone center, club, courtyard of individual household, NGOs school.



Photo 5 & 6. Learning Center at WMG ‘Kapalidanga’ in Dumuria and WMG ‘Gangrampur’ in Botighata under polder 29 and 30 located at Khulna District.



Photos 7 & 8. Learning Centers at ‘Dakkhin Atharogasia’ and ‘Purba Gulshakhali’ in Barguna Upazila at polder 43/1A and 43/2F located at Potuakhali District.

5.6 Selection of Lead Farmers (LFs)

Considering the importance of dissemination of the Ecopond approach to large numbers of women in the rural areas, the remoteness of some of the areas in the polders initiatives were taken to select Lead Farmers (LFs) in each of the LCs. The purposes of the selection of LFs were; to develop them as model farmers and also build up them as the trainers and mentors within the LCs. For this formal training as Training of Trainers (ToT) were organized for them. In the ToT like other technical staff they learned about the theory as well as participate in the practical sessions. For this purpose total 10 session plans with materials were developed in Bangla on technologies on management of ponds using Ecopond approach. There were seven sessions developed on leadership development linked to women empowerment in agriculture.

In the process of learning on Ecopond and empowerment of women the major emphasis was given on continued learning and sharing based at the LCs. In each LCs the lead farmers played major role in conducting the sessions held weekly or bi-monthly where the field staff of the Ecopond II and the Ecopond Service Providers (ESPs) facilitated. In addition to play role as trainers the lead farmers supported in mentoring and monitoring of the activities of their fellow women involved in the activities (for one LF women there were 10 women in their locality). In total 62 LCs selected in four polders. The distribution of the LFs were: Polder 29: Dumuria, Khulna 17 LCs and 91 LFs; polder 30: Botiaghata, Khulna 15 LCs and 80 LFs, polder 43/1A, Barguna, 17LCs and 63 LFs; polder 43/2F, Barguna, 13 LCs and 61 LFs. Overall figure 62 LCs and 295 LFs. The number further increased in which the total number of LFs was 324.

5.7 Awareness Meeting of Lead Farmers

A day long awareness Meeting on Ecopond II project activities was organized based at 8 LCs selected a focal sites for the women LFs in all the four polders during October 2017. The location of the focal sites for organizing the training was selected through discussion with the LFs as well as the WMG leaders (**Photos 9-11**).



Photos. 9–11. Participants of the awareness training organized at the LCs for the lead farmers in polders in the Ecopond II project areas.

In the awareness meeting the project staff mainly explained about the purpose and objectives of the Ecopond II project and briefly explained about the different technologies to be used in establishing system for fish production in their small homestead ponds using ecological approach. In addition to discussions, practical sessions were organized. The participants felt lot of interest to listen, to interact and to take part in the practical session of the training. They built habitats with bamboo frames using locally available bamboo and its branches; get understanding about how these structures when emerged in ponds useful for production of natural feed (e.g. periphyton) and work as the shelter for the fish in their ponds.

5.8 Identification of Value Chain Actors

Considering the supply of fish seed to large number of women in the Ecopond II project and taking into account the different types of fish much importance was given to identify the value chain actors. This chain actors identified were: fish hatcheries located in the areas, the nursery operators, fish seed traders, the netting team harvest fish including natural fish (mola, puti and others) from ponds. This was carried out with support from the WMG leaders and LFs. The value chain actors identified were invited in the ToT sessions of the Lead Farmers. Initiatives were taken so that through the value chain actors the women farmers got the opportunity to receive the supply of improve quality seed of tilapia and others fish. The Ecopond II project tried to build up the linkages of value chain actors with the women Ecopond farmers in traders will get interest in supplying of required number of fish to the farmers. The strategies of the linkage development with the value chain actors will be continued during the upcoming months after further discussion and sharing with the LFs and WMG leaders as well as with DoF and other institutions over the period.

VI Analysis of the Outcomes of Survey of Households and Ponds

6.1 Information of Households

The analysis of the of the randomly chosen 310 households from different WMGs out of total 3200 households with women members involved in Ecopond II had been made. Of the households women with small ponds selected for the Ecopond II project 58% of them are members of the WMGs and the rest 32% are non-members of WMGs. Of the women 17% of them are illiterate and can sign, the rest 83% are educated at different levels; primary 41%, secondary 34%, higher secondary and above 8%. The professions of the majority (91%) of the women are household works which includes lot of activities related to maintenance of all the household activities include reproductive roles, rearing of minor livestock such as; chicken, ducks, goats and taking care of large livestock e.g. cows, post-harvest works for crop production and vegetable production in homestead areas. The rest 9% includes day labor, shop keeper, service, tailoring and teaching. The profession of the men members – majority of them is agriculture including fish culture 59%, day labor 16%, small business 8% and rest 17% related to several professions such as; teacher, service, driving, village doctor, carpenter. Majority of the households (72%) are grouped under low level income (\leq BDT100000) category, 24% of them have income \leq BDT 200000 and rest (4%) income is $>$ BDT200000. On average there are 5 members per household. So, for majority of the households the per capita income is <1 US per day

6.2 Information of Ponds

The mean size of the small homestead ponds are almost similar in all the polders and covered total area of around 96 ha. The cumulative figure is larger than any of the large size commercial farm area in Bangladesh. So it always true that being small in size in most cases although these ponds are normally not considered as important it has also much value in adding total fish production. Further the most important is that there is huge distribution effect of fish production in such small ponds in the areas. It has lot of implications in providing regular supply of fish for household consumption in addition provides opportunity get fish by poor consumers in the communities. Of total 310 ponds except one pond all (almost 100%) ponds are under single ownership. The outcome is very useful in order to bring these ponds under improve management using ecological approach. For large size ponds there are problem of multiple ownerships hampering the proper management. However, in recent years even for large multiple ownership ponds people have developed strategies (by giving authority to one of the owner or a group) to manage the ponds useful to get higher production and income. All these small homestead ponds of women rest are all with own ponds. Small size single ownership, homestead raise purpose the ponds, this is positive in terms of management (less investment, can use the pond for harvest based on

their needs, also good for monitoring). The ponds of 19% of the households were connected to outside sources such as; canals, open rice fields, floodplains and beels during the wet months. The availability of ponds connected to outside sources were more available in the polders 43/1A and 43/2F of Barguna District. The main purpose for such connectivity was related to use of water and introduce natural fish from the sources. However, of the ponds not connected to the outside sources large proportion (70%) of them also harvested both stocked fish and un-stocked natural fish from their ponds. Of them even closed 8% of them harvest only the un-stocked natural fish. The un-stocked natural fish harvested were; koi, shing, magur, mola, chela, puti, chingri, tengra, bele, baim, kholisha, shoal, taki, meni in their ponds. The presences of the un-stocked natural fish in ponds were due to presence of this fish in the ponds, the breeding and self-recruitment within the ponds. In addition, during wet months in most cases due to low dikes those fish entered from the nearby outside sources as well. Further, during the dry months some households those harvested large numbers of fish including small fish from natural sources and bring it alive and stock in their ponds. Thus, it showed that the presence of the un-stocked natural fish in these small ponds was not new to them, the important issue here was how those activities effectively and purposely carried out through application of the improved management practices to get higher level of fish production and greater diversity of fish from those ponds through active participation of the women members of the households.

Of the pond 68% of received water from drainage, runways of homestead areas and from drainage of tube wells throughout the year. The major importance of receiver of such drainage water was that it brought lot of nutrients along with huge organic matters. In addition to these the presence of such ponds when located in the homestead areas also receive lot of leaves of trees and organic contents from other sources (livestock shade and others). As a result these ponds were normally organically rich; due to presence of lot of decomposed matters the dissolved oxygen content became low. Considering the positive views of the high nutrient contents and disadvantages of low dissolved oxygen fish suitable to grow such as; tilapia, magur, shing, other catfish, koi (air breathing fish) are chosen in the Ecopond II for getting higher survival with increase productivity.

Table 1. Women with small homestead ponds in four polders of BG program included under the Ecopond II project

Number/Location of Polder	Number women	Number of Ponds	Size of Pond (decimal)	Total Area (Decimal)	Total Area (ha)
29: Dumuria, Khulna	863	914	6.3±2.9	5712	23.13
30: Botiaghata, Khulna	808	873	7.6± 4.2	6615	26.78
43/IA, Barguna, Potuakhali	893	944	7.0 ±3.8	6613	26.77
43/2F, Barguna, Potuakhali	636	734	6.5±3.2	4758	19.26
Total	3200	3465	6.9±3.6	23697	95.94

6.3 Fish production in Ponds

The data on fish production of total 193 ponds in year 2015 were analyzed to get an understanding about the current level of fish production. The results showed that overall there was low level of fish production from the ponds; $4.14 \pm 3.05 \text{ kg/decimal}$ ($1023 \pm 753 \text{ kg/ha}$) with having large variations among the ponds. The specific analysis of fish production of the ponds with very high productivity compared to other ponds showed that those ponds were largely used as trap ponds. In these ponds the major harvest was mainly from the natural fish entered into the ponds from nearby sources as it kept open during the period. Farmers harvested all the fish entered in to the pond and again look forward for getting to be entered in next years without conserving any natural fish as broodstock in their ponds.

In the Ecopond II project necessary measures were undertaken train the farmers about the benefits of conserving some proportion of these natural fish in order to get continued production of higher amount of fish over the years. Under the CRS supported Ecopond Project implementing at Barisal WorldFish suggested Caritas –Bangladesh to set up such system for working in several ponds in 2016 and increased fish production were already recorded. In most cases fish were harvested from small homestead ponds to use for own household consumption. The farmer harvest fish almost daily, the small indigenous fish entered in their ponds to use for household consumption. It is noted that 52% of the women harvested fish from their ponds directly with the help of their children. They reported that as the pond not used for commercial fish production, the men folk do not bother about the production of fish and use of the fish harvested form the pond.

Table 2. Fish production from ponds of households in 20-15 production season under different polders of BG program in the Ecopond II project.

Polder	Number of farmer	Fish production (kg/decimal)	Fish production (kg/ha)	Range (kg/ha)
29	65	3.07±1.58	758±390	154-1729
30	54	4.23±2.64	1045±652	346-3690
43/IA	22	4.00±2.22	988±548	247-2470
43/2F	52	5.45±4.40	1347±1087	99-7136
Total	193	4.14±3.05	1023±753	99-7136

Out of the total farmers who answered the question, 37% use the harvested fish only for their household consumption, 41% used fish for their household consumption as well as gifting their neighbors and relatives. 21% gift the fish to others. Only few women (9%) mentioned about the earning of income by selling of fish from their small homestead ponds. The low level of sale and cash income from fish was related to the low level of fish production from these small ponds and also with preferences to use fish from ponds for regular household consumption. In the Ecopond I project similar outcomes were found but in the following years it came out majority of the farmers in addition to household consumption sold their fish for cash income especially for those with high valued species of fish such as; koi, shing, magur produce in their ponds. Those women who earned income from selling of fish in most cases they used the income for meeting up the expenses of the education of their children and also invest for rearing of chicken.

6.4 Involvement of Women in Fish Production

The results showed that only 7% of the women were involved actively in fish production activities in their ponds such as; cleaning of dikes and ponds, repair of dikes, feeding of fish. The rest of women only involved in management of the ponds during wet months when the areas were submerged under the flood water and different natural fish entered to these small ponds. They took care of the repair the dike and sometimes feed the fish so that the fish cannot out from the pond and they harvested the fish regularly from their ponds for household consumption purpose.

Of the women with small homestead ponds 55% of them were involved with the organizations like credit group, FFS, WMGs and other NGO groups. Of them 31% women involved in both credit

organization and WMGs and 24% are involved with only WMGs. It showed that there was good representation of women in the organizations although in the Executive Committees WMGs in most cases were limited to general membership position. Normally women do not go out from their household premises. However, for poor households the involvement of women with credit organizations and other social organization had increased their movements. They needed to move for micro-credit, to participate in meeting, seminar and, training. Besides, some of them also move up to the local market for selling of agricultural products and for shopping. Of the respondents, 60% of them move outside from their homestead area for micro-credit, participation in meeting and training programs.

VII Training Manual and Training Program

7.1. Development of Training Manual with Session Plans in Bangla

The Ecopond Training Manual developed in Bangla used as a complete training guide for the Ecopond Service Providers (ESPs) and the Lead Farmers (LFs). The Manual included; session plan with title of the session, target participants, purpose and objectives of the session, the contents of the session with schedule, the materials needed to run the session, notes for the trainers to run the session and detail contents about the subject useful for the trainers for taking preparation for the session and to dig more into the subject matter.

The Training Manual was developed by experts of WorldFish initially comprised of 5 technical sessions which includes; (i) Habitat and its uses in pond (ii) Species of fish suitable for Ecopond (iii) Natural Feeds in Ponds and (iv) Food and feeding habit of fish in Ecopond (v) Harvesting of fish from pond by women. It included five sessions on empowerment of women developed by Gender Experts Dr. Rita Sen and Dr. Benoy Barman. The five sessions were; (vi) Participation of women in fish culture, the contribution of women for their participation and in decision-making (vii) Access to resources, ownership and control by women (viii) Control of Women in Income Generating Activities (ix) Leadership and Women (x) Women Empowerment Agricultural Index (WEAI), the collection of information to measure WEAI. The Training Manual included another important session on value chain and market system development for the Ecopond/

7.2 Training of Trainers (ToT)

The training of trainers (ToT) program for the ESPs and the LFs from different WMGs carried out during 12-28 January 2017. The LFs from WMGs located close to the venue were participated in the 2-days long training program together with the respective ESPs of the area. The training sessions were carried out by the Master Trainers: Ms. Saima Sharif Nilla, Ms. Zohura Khatun Meera and Ms. Lutfa Parvin - the three Research Assistants, Dr. Rita Sen, the expert on Ecopond & Empowerment of women and Dr. Golam Faruque, the expert of value chain and market system development working in the Ecopond II project. Total 179 LFs & ESPs in polder 29 and 30 in Khulna and 150 LFs & ESPs in polder 43/1A and polder 43/2F in Amtoli, Barguna participated in the training program. The specific information about the schedule, the WMGs where from the trainers participated, the venue used for the training and the Master Trainers conducted the program.

7.3 Training of Fellow Farmers

The training of the Fellow Farmers (FFs) under each community initially covered five sessions on technologies was carried out at LCs by the LFs with facilitation from the project staff. The training sessions were conducted for a group of fellow farmers. In most cases in each LCs it needed to accommodate two groups each with around 25-30 participants useful for delivery of effective training. Unlike the ToT program the training program for the FFs carried out for longer duration with 1-2 sessions per day. The schedule of the training program (date, schedule) set up mainly based on the advantages of the participants considering their usual busy schedule for completion of household works, their more engagement during the bazar days, festivals and other social and religious events. Total 3377 women involved in the fish production in their small ponds involved in the training program conducted in total 62 LCs located in different WMGs.

Women involved in the implementation of Ecopond participated in the training programs showed lot of interest about the training they received through their active participation in the LCs along with others women members of the communities. It is not only the contents of the sessions they found interesting in addition, they able to share with others and for those who were educated able to recognize the uses and importance of their education in their life and livelihoods. Immediately after getting the training most of the women who received training applied their knowledge practically in management of ponds what they could able to apply with their own efforts. Most of them set up different types of habitats; structure made of bamboo, bamboo braches, bamboo tubes, water hyacinth cage, aquatic vegetable cages and dry leaves of coconuts. They like the idea of putting these shelters to meet up two major purposes for fish; shelter and natural feed production useful for them to get higher production of fish. During the

visits of the households and ponds it found that many of the ponds have different species of natural fish and also tilapia as well other species of fish, the farmers like the idea of use of all these species of fish in order to get higher fish production using largely on natural feeds of their ponds. From the training program the knowledge they received made them confidence in use of the different species of fish they like to keep in their ponds by using suitable and effective methods such as putting of habitats, management of habitats and use of better management practices in their ponds. Although, for some farmers it needed them more time to adopt some of the activities such as; getting of suitable species of fish to stock in their ponds. From the earlier Ecopond Project it came out the over the period most of the farmers able to adopt the technologies and in most cases majority of them stocked in their ponds with multiple species of fish of desired species and conserve those fish for reuse in the following seasons without much problem.

One of the major purposes of the Ecopond is the empowerment of women developed through their participation in fish production. In the Ecopond I project the promotion of fish production in small ponds not only useful to increase fish production from ponds and increased household fish consumption, it brought positive changes in women empowerment. The outcomes have been measure by using Women Empowerment Agricultural Index (WEAI). As strategies of women empowerment same as technologies the initiatives have been undertaken include; selection of only women to involve in fish production in small ponds, development of women as Lead Farmers and Ecosystem Service Providers (ESPs) – playing important role as leaders through building up their capacities on technologies, value chain and market development and as mentors. The activities also augmented due to the presence of the three women researchers, the Research Assistants of WorldFish working in the field under the Ecopond II project.

For this the five session plans have been developed have distributed to the ESPs and the LFs, organized the ToT for them during May 2017. The training of the fellow farmers on the sessions have been carried out for fellow farmers based at the LCs by the ESPs with facilitation from the project staff on May 2017 as well. As upcoming activities several initiatives will be undertaken to ensure Women Empowerment such as; (1) to ensure active participation of women in the activities of fish production through building up their knowledge about the technologies they received from the training and getting experience through working practically in their ponds. Such participation and contributions are useful to make decisions in the activities on fish production by themselves or with other members of the household (2) to increase the women access to resources, increase role in decision making in use of resources – the active participation of women, the improvement in fish production due to their

participation as well their increase in leadership role due to increase knowledge support women to get access to resources and in decision-making (3) to improve the decision-making role of women in income earning activities (4) to support in development of leadership among women - learn about the qualities of leader and build up their capacity to develop themselves as leaders, by this time in the Ecopond II Project the LFs and the ESPs are already playing important roles as leaders in addition to their own activities as farmers and (5) collection of information for measurement of women empowerment for measuring Women Empowerment Agricultural Index (WEAI).

7.4 Training of FFs on Value Chain Development

For increased fish production, income, household fish consumption and employment opportunities the identification of the value chain actors and development of linkages with the women involved in Ecopond was considered important for sustainability of the approach to have major impacts. Considering the importance the value chain & market system development the expert of the project Dr. Golam Faruque conducted ToT for the ESPs and the LFs on value chain development. It focused on supply of quality inputs, particularly fish seed, other input and selling of fish from ponds for fair prices of fish.

VIII Ecopond Service Providers (ESPs)

Total 20 ESPs were selected who worked for scaling-out of the activities of Ecopond II project following similar process covering different WMGs, LFs, LCs and Groups under four BG polders in Khulna and Barguna Districts. In most cases the ESPs were women and most of them were Lead Farmers. They not only playing major role to develop themselves as a model Ecopond farmers because of their abilities they also playing major role in sustainable development of Ecopond approach. It had been explained in the earlier reports that the selection of the LCs and allocation of Women Groups under each LCs was done considering the advantage of the farmers to participate in the training sessions. Also, the number of participants maintained in each group was around 25-30 (mean 29), the number was fixed considering the effective learning by individual farmers participated in the training program from each group. ESP supports the following activities of the project from 1 January 2017. The activities carried out by ESPs in the project were:

- Participated in training of trainers program (ToT) together with the LFs on technologies, value chain & market development and women empowerment. The training sessions were conducted by the Master Trainers; the three Research Assistants, the Value Chain and Market Expert (Dr, Golam Faruque) and the Gender Expert, Dr. Rita Sen working in the Ecopond II Project.

- Supported the LFs in selection of fellow farmers, discussed with them about their role as mentors of fellow farmers (for each lead farmer there are around 10 fellow farmers) on fish production from the small ponds using ecosystem based approach.
- Provided support to LFs in conducting training sessions of their fellow farmers held at the LCs as groups on different occasions initially on technologies, followed by value chain & market development and women empowerment
- Monitor activities of LFs supporting their fellow farmers in setting of habitats, stocking of fish, management of habitats, harvest of fish, sale of fish over the season to achieve increase fish production, income and household fish consumption
- Identified fish seed traders, feed dealers and other local service providers linking them with sources of improved quality fish seed getting information from the researchers and value chain and market expert of the project useful to ensure supply fish seed and other input to farmers
- Provided support to organize visits of the officials of Blue Gold Program, Bangladesh Water Development Board and others

In the follow up activities of the Ecopond II project during July–December 2017, considering the importance of effective implementation in the on-going season it is decided to involve some of the selected ESPs to work. The ESPs will continue their roles (as mentioned above) and it is expected that with support from field researchers of WorldFish in collaboration with the LFs, they could able to play their role more effectively than earlier. For this the project staff has developed specific terms of references for the ESPs. In the upcoming days initiative will be also undertaken to find out ways and means to build up the ESPs including their household members as local service providers so that they could able to continue their role in a sustainable way as part of their business.

IX Visits of the Activities of Ecopond II Project

A four members Blue Gold team led by Mr. Boudewijn Sterk visited to seed early impacts of Ecopond I and extension of the approach by the farmers. They also visited the WMGs with Ecopond Phase II activities. Ms. Lara Sinha and Ms. Anna Warrington of Forum for the Future visited the field at Gangarampur on 11 January 2017 to see the impacts on farmers and women empowerment and impressed about the activities of women involved in fish production in small ponds using the ecosystem based approach. They also like the ideas of women empowerment in terms of active involvement of women and their leadership in the carrying out the activities. They visited the LCs and observed the on-going training session of women run by the LFs with facilitation from ESPs.

Mr. Amirul Hossain, Project Coordinating Director (PCD), Blue Gold Program and Dr. Rahamat Ali, BWDB made a visit to Gangarampur on 01 April 2017 and observed the on-going activities of the Ecopond II project. Dr. Shamsul Huda of BG program present during the visit. Mr. Hossain very much impressed about the achievement of Rima Mondal and other women farmers carrying out fish production using the ecosystem management approach as well using the best management practices to get higher fish production, income, household fish consumption and employment generation. He also visited the LC and observed the on-going training session of fellow farmers. The PCD suggested for organizing exchange visits of farmers of other WMGs to see the success of the use of Ecopond approach for its adoption to get benefits.

On 19 April, Mr. Boudewijn and Dr. Shamsul Huda of BG program made a visit to WMGs Amtali, Barguna. During the visits the ponds of women involved in fish production in their small ponds using the Ecopond approach. They set up habitats in their ponds, learn about the conservation of the fish in ponds (e.g. mola, taki, puti, magur, shing and tilapia) those are available as stock from the previous year. They conserve the fish as they know that the fish are now going to ready for breeding in the pond when there will be rains during May-June. The farmers informed the visitors that they learned from the training the presence of habitats in ponds and the conservation of these indigenous fish are useful to get higher production, income and more for household consumption. During the visit the visitors observed the on-going training session on 'value chain and market system development' run at the Learning Center.

On 3 May a team of high officials from WorldFish accompanied by Dr. Rohana Subasinghe, Dr. Shakuntala Thilsted with a visitor from Bill and Melinda Gates Foundation (BMGF) Dr. Sam made a visit at Gangarampur WMG. The team members observed all the activities implemented under the Ecopond Project very much impressed about the achievements.

X WorldFish-Blue Gold Program Workshop

A workshop on "Diversified Aquaculture Options for the Southern Polder Zone: Challenges and Potentials" has been organized on 24 May 2017 at CSS AVA Center, Khulna on 24 May 2017. In the workshop representatives from BG program, WorldFish, Department of Fisheries (DoF), Bangladesh Fisheries Research Institute (BFRI), Khulna University, BRAC, Leader Farmers, Local Service Providers participated. Of the participants there were; Mr. Rajit Kumar Paul , Deputy Director, DoF Khulna, Mr. Guy Jones, Team Leader, Blue Gold Program and Dr. Mike Phillips, Director, Aquaculture

and Fisheries Sciences, Penang, Malaysia. The workshop started at 9:00 and continued until 2:30 pm with presentations by three presenters covering three important areas in each case followed by Q & A session. It provided an opportunity to share and learn about the aquaculture and fisheries activities implemented in the polders in the southern region by WorldFish, the BG program in collaboration with DoF and others over the years.

The workshop covered three major areas: (a) Review current knowledge and experience with aquaculture in the southern polder zone (b) Identify the opportunities and strategies for expansion of aquaculture in suitable locations, with a major focus on waterlogged areas and (3) Harmonize the role of Water Management Groups (WMGs) in the activities of WorldFish. Mr. Guy Jones, Team Leader, BG program mentioned that the workshop provided lot of insights and rightly meet up the objectives covering the three areas. Mr. Ranjit Kumar Paul the Deputy Director, Department of Fisheries, Khulna Division pointed expressed his full cooperation in implementation of the Blue Gold Program in collaboration with WorldFish. Dr. Mike Phillips, Director, WorldFish expressed his thanks to all the participants for their contribution in the workshop. Mr. Guy Jones invited WorldFish to make a dialogue to develop a concept notes for potential collaboration together with DoF with a focus on promotion of aquaculture and fisheries in the water logged areas in Polder 2 in Satkhira District.

Appendix 1

Table 1. Information of Learning Centers (LCs) selected under different WMGs under polder 29: Dumuria and Polder 30: Botiaghata in Khulna District southern Bangladesh.

ID	Number of Learning center	Polder/Learning Center (LC)	Brand Name	Place and location of Learning Center (to be used to carryout learning sessions and sharing)	Number of Lead Farmer (LF)	Total Number of Households
Polder 29						
1		Asan Nagar	Rui	FFS school	3	54
2		Sen Para	Catla	Afroza Begum's courtyard	7	74
3		Jhaltata	Mrigal	Kamala Mandal's courtyard	3	67
4		Baniakhali	Tilapia	Mojaffor Gazi's courtyard	6	49
5		Britti Bhulbaria	Mola	Britti Bhulbaria Primary School	6	64
6		Bhulbaria	Darkina	Abdul Kalam's courtyard	5	57
7		Dakshin Kalikapur	Koi	Temple courtyard	7	65
8		Uttor Kalikapur	Shing	Saiqul Islam's courtyard	5	50
9		Uttor Kalikapur	Magur	BRAC womens' school	4	43
10		Gojendrapur Uttar	Puti	Community club	5	65
11		Gojendrapur Uttar	Chela	Habibur Rahman's Farm house	5	64
12		Gojendrapur Dakshin	Chingri	Khairul Hossain Golder's courtyard	7	74
13		Kharibunia	Taki	FFS school	5	55
14		Kapalidanga	Rui	Primary school	6	50
15		Kapalidanga	Catla	Kamruzzaman Sheikh's courtyard	6	48
16		Ratan Khali	Mrigal	Temple courtyard	5	31
17		Taibpur	Tilapia	Amzad Sharder's courtyard	7	41
Polder 30						
18		Gongarampur	Rui	Mahidul Islam's courtyard	6	60
19		Gongarampur	Catla	Doctor/Teacher's courtyard	3	38
20		Kaemkhola	Mrigal	FFS school	6	58
21		Gondhamari Kanthaltata	Tilapia	Gono Shajjo School	6	67
22		Britti Khalshibunia	Mola	Dulal Mahalder's courtyard	5	46

23	Britti Khalshibunia	Darkina	Shibpodo Torofder's courtyard	4	46
24	Maitvanga vennabunia	Koi	IPM club house	8	56
25	Maitvanga vennabunia	Shing	Bidhan Chandra's courtyard	5	39
26	Mailmara	Magur	Temple courtyard	5	55
27	Batiaghata	Puti	Temple courtyard	4	50
28	Charkhali machalia	Chela	Temple courtyard	6	50
29	Balabunia	Chingri	Cyclone Shelter	8	73
30	Sukhdara	Taki	Gono Shahajjo School	5	55
31	Sukhdara	Rui	Temple courtyard	5	48
32	Sukhdara	Catla	Jesmin Begum's courtyard	6	68
33	Britti Solua	Mrigal	Need To be Discuss		

Table 2. Information of Learning Centers (LCs) selected under different WMGs under polder 43/1A and 43/2F in Barguna, Potuakhali District southern Bangladesh.

ID Number of Learning center	Polder/Learning Center (LC)	Brand Name	Place and location of Learning Center (to be used to carryout learning sessions and sharing)	Number of Lead Farmer (LF)	Total Number of Households
Polder 43/1					
34	Dakshin Atharogachia	Tilapia	Old High School Room	5	51
35	Uttar Atharogachia	Mola	Cyclone Shelter	6	61
36	Uttar Atharogachia	Darkina	Momotaz Begum's courtyard	4	36
37	Paschim atharogachia	Koi	Shah alam sikder's courtyard	4	57
38	Paschim atharogachia	Shing	Aziz Hawlader's courtyard	4	52
39	Dakshin Sonakhali	Magur	Motab Sikder's courtyard	6	72
40	Paschim Sonakhali	Puti	Sieuli Rani's courtyard	3	37
41	Paschim Sonakhali	Chela	Main Uddin courtyard	7	65

42	Paschim Sonakhali	Chingri	Rina Begum's courtyard	3	37
43	Paschim Kewabunia	Taki	Hosna Ara Begum's courtyard	6	62
44	Paschim Kewabunia	Rui	Cyclone Center	5	60
45	Purba Kewabunia	Catla	Vaccination Center	4	53
46	Purba Kewabunia	Mrigal	Delwar Hawlader's courtyard	3	33
47	Paschim Sakharia	Tilapia	Peyara Begum's courtyard	5	66
48	Purba Sakharia	Mola	Nasir Uddin's courtyard	3	34
49	Purba Sakharia	Darkina	FFS School	5	51
50	Purba Sakharia	Koi	Adult School	5	46
Polder 43/2F					
51	Dakkhin Angulkata	Shing	Courtyard Biswas Bari	5	56
52	Dakkhin Angulkata	Magur	Cyclone shelter	4	50
53	Uttar Angulkata	Puti	Courtyard Abdul Wahab	5	59
54	Uttar Khekuani	Chela	Courtyard Altaf Hossain	5	54
55	Dakkhin Khekuani	Chingri	Cyclone shelter	6	56
56	Dakkhin Khekuani	Taki	Cooperative Club	5	56
57	Fakirkhali Gojkhali	Rui	Cyclone shelter	3	47
58	Uttar Gojkhali	Catla	Cyclone shelter	5	53
59	Uttar Gojkhali	Mrigal	Hafijia Madrasha	6	67
60	Dakkhin Gulishakhali	Tilapia	Courtyard Abdul Khaleque Hawlader	5	56
61	Dakkhin Gulishakhali	Mola	Courtyard of Jahangir Ghorami	5	45
62	Uttar Gulishakhali	Darkina	Courtyard of Abdus Sobhan	5	50
63	Purba Goulishakhali	Koi	Courtyard of Monirul Islam	5	50

Appendix II

Table 1. Information of the Learning Centers and Lead Farmers selected under the polder 29 and 30 in Dumuria and Botiaghata in Khulna District

Polder 29: Dumuria, Khulna		Polder 30: Botiaghata, Khulna	
LC 1: Asan Nagar		LC 18 & LC19: Gangarampur	
Lead Farmer	Husband	Lead Farmer	Husband
1. Aparna Mandol	Narayan Chandara Modal	1. Binodini Roy	Provash Chandra Roy
2. Srilekha Roy	Nitty Ranjan Roy	2. Jharna Roy	Debbindu Roy
3. Kanak Lata Sarder	Sushanta Sarder	3. Khuku Rani Adihkary	Akhil Adhikary
LC 2: Senpara		4. Rani Shil	Goutam Shil
4. Shahnara Begum	Abdul Halim Gazi	5. Santi Shil	Mahadeb Shil
5. Marium Begum	Ashraf Khan	6. Sima roy	Tapan Roy
6. Dipti Moni Mandal	Debdash Mondal	7. Usha Roy	Dhirendra Nath roy
7. Josna Kunda	Sunil Kunda	8. Monguli Kabiraz	Dinesh kahiraj
8. Abeda Begum	Safiqul Moral	9. Kallani Mondal	Ananda Mondal
9. Nazma Begum	Tariqul Biswas	LC 20: Kaem Khola	
10. Afroza Begum	Majibor Shekh	10. Dalia Begum	Rahman Gazi
LC3: Jhaltola		11. Promila Roy	Sib dash Sarker
11. Kamla Mondal	Sunial Mondal	12. Siuli Mojumder	Suman Mondal
12. Silpi Gain	Ranjit Gain	13. Konika Roy	Bijoy Krishna Roy
13. Sipra Sarker	Amarendra Nath Sarker	14. Morium Begum	Nur Islam Fakir
LC 4: Baniakhali		15. Noor Jahan Begum	Hafizur Rahman
14. Laki Begum	Hosssain shekth	Gondhamari Kanthaltala LC 21	
15. Chaina Begum	Gaffar Gazi	16. Kanchan Roy	Pronab Roy
16. Abeda Begum	Quddus Gazi	17. Lipika Mahalder	Jaydeb Mahalder
17. Asma Begum	Mizanur Rahman	18. Bandana Roy	Satten Roy
18. Sabina Begum	Sharif Uddin Gazi	19. Subhankai Mondal	Samaresh Mondal
19. Sahanara Begum	Maqbul Khan	20. Majeda Begum	Latif Khan
LC 5: Brithi Bhulbaria		21. Kuku Rani Halder	Swapan Halder
20. Morium Begum	Salam khan		
21. Hira Begum	Amir Fakir	LC 22 & LC23: Britti Khalshibunia	
22. Firoja Begum	Mostfa Gazi	22. Kalanni Roy	Rabindara Nath Roy
23. Kona Begum	Nazrul Islam	23. Biva Sarker	Vivekanada Tarafder

24. Sabnur Begum	Azhar Uddin Molla	24. Helen Mahalder	Dulal Mahalder
25. Liza Begum	Hannan Molla	25. Sarasati Golder	Samores Ch Roy
LC 6: Bhulbaria		26. Gita Tarafder	Swapan Tarafder
26. Taslima Begum	Quder Gazi	27. Debala Roy	Bipul Roy
27. Hasina Begum	Atatur Kha	28. Saraswati Roy	Nirmal roy
28. Tahmina Begum	Enayet Kha	29. Laxmi Rani Roy	Shymol Roy
29. Sahana Begum	Abul Kalam Molla	30. Uma Sader	Ramprashad Sarder
30. Johuran Begum	Sattar Shekh		
LC 7: Dakhin Kalikapur		LC 24 & LC25: Maitvanga Vannabunia	
31. Lili Das	Goutam Das	31. Piya Mondal	Father – Animesh Mandol
32. Nupur Rani Das	Bishu Priyo Das	32. Usha Mallick	Sujit Mallick
33. Sathi Das	Patha Protim Das	33. Saysree Joader	Tufan Joader
34. Mamata Das	Ashim Das	34. Manju Bairagi	Shohag Mondol
35. Urmila Das	Tripti Das	35. Nandita Mondal	Bipul Mondal
36. Minakhhi Das	Uday Das	36. Menoka Mondal	Sanjay Mondal
37. Chandana Das	Sujit Das	37. Lipika Joarder	Swapan Jorder
LC 8 & LC9: Uttar Kalikapur		38. Priya Bairagi	Saroj Bairagi
38. Rikhta Begum	Iqbal Molla	39. Sima Mondal	Milon Sarker
39. Asma Khatum	Mokkam Gazi	40. Sushama Mondal	Paritosh Mondal
40. Piya Begum	Ataur Rahman	41. Madhuri Mishtri	Sattyen Mistrii
41. Sabina Begum	Al Amin Moral	42. Aprana Mondal	Rabidra Nath Mondal
42. Maleka Begum	Khalil Shekh	43. Rakhi Mondal	Chinmoy Mondal
43. Josna Begum	Rabibul Moral		
44. Aklima Khatun	Khurshed Moral	LC 26: Mailmara	
45. Khaleda Begum	Julu Mia	44. Alamoti Mondal	Ammulla Mondal
46. Sakhina Begum	Enayet Ali	45. Nipa Mondal	Anup Mondal
LC 10 & 11: Gajendrapur Uttar		46. Sima Bairagii	Ajoy Bairagii
47. Yasmin Begum	Jamanur Islam Shekh	47. Niharika Roy	Gopal Roy
48. Josna begum	Sarwar Master	48. Pritilata Mistri	Nihar Ranjan Mistrii
49. Jahanara Begum	Ali Asgar Khan	Batiaghata LC 27	
50. Ranjida begum	Rafiqul Molla	49. Sarbani Fouzder	Dipok Fouzder
51. Nahar Begum	Habibur Rahman Gazi	50. Alta Sarker	Profulla Sarker

52. Nasrin begum	Jamal Fakir	51. Sharmila Sarker	Achinta Sarker
53. Morjina Begum	Hanif Akanda	52. Rinku Sarker	Debproshanna Sarker
54. Rahela Begum	Khaled Khan	LC 28: Charkhali Machalia	
55. Rashida Begum	Gafur Shekh	53. Rahima Begum	Father Kashem Mollah
56. Hira Begum	Habibur Rahman	54. Shiuly Mondol	Ronjon Mondol
LC 12: Gajendrapur Dakhin		55. Shompa Mondol	Indrojit Mondol
57. Elora Begum	Khairul Hossain Golder	56. Sufia Begum	Mojnu Kha
58. Suriya Begum	Manjurul Gazi	57. Ronjita Boiragi	Bidhan Chandra Boiragi
59. Mafuja Akhter Happy	Arifur Jaman Golder	58. Amita Boiragi	Ratan Boiragi
60. Anjura Begum	Eunus Gazi	LC 29: Balabunia	
61. Siuli Begum	Musa Ahmed	59. Minu Biswas	Pritish Biswas
62. Sharmin Begum	Ahadul Gazi	60. Biplobi Mondol	Taposh Mondol
63. Dilruba Yasmin	Surutjaman Gazi	61. Momota Biswas	Debdash Boiragi
LC 13: Kharibunia		62. Shoroshowati Boiragi	Shekhor Boiragi
64. Karuna Roy	Dipak Chandra Roy	63. Protima Mondol	Milton Mondol
65. Siuli roy	Debashish Roy	64. Beauty Biswas	Bishwajit Biswas
66. Laki Rani roy	Milon Roy	65. Archana Sarker	Ronjit Sarker
67. Arati Mondal	Ram Prashad Roy	66. Etika Mondol	Diponkor Biswas
68. Shilpi Roy	Gouranga roy	LC 30, LC31 & LC32: Sukhdara	
LC 14 & LC15: Kaplidanga		67. Shoroshwati Torofder	Arun Torofder
69. Jhaarna Begum	Jonab Ali	68. Basonti Roy	Nirod Roy
70. Rojina Akhter	Rashid Shekh	69. Bondona Roy	Diponkor Roy
71. Rita Rani Dhaali	Simul Dhali	70. Parvin Begum	Ajad Rahman
72. Siuli Biswas	Nitta Nanda Biswas	71. Parul Adhikari	Gopal Adhikari
73. Rubina Begum	Aliuzzman Shekh	72. Horidashi Shil	Gour Shil
74. Shahnara Begum	Afzal Moral	73. Lucky Mondol	Milon Mondol
75. Ayesha Begum	Mintu Shekh	74. Provati Sarker	Shomir Sarker
76. Nargis Begum	Amanor Sana	75. Kolpona Roptan	Krishnopodo Roftan
77. Morium Begum	Habibur Rahman	76. Shikha Mondol	Prodip Mondol
78. Keya Begum	Sattar Sana	77. Tondra Roy	Nikhil Roy
79. Shila Golder	Bijan Goder	78. Mridula Chakraborti	Subrata Roy
80. Promilla Shil	Milon Shil	79. Ratna Roy	Proshen Roy

LC 16: Ratankhali		80. Antora Mondol	Romesh Mondol
81. Jyonti Rani	Sukhdeb Roy	81. Aporna Sarker	Gobindo Sharker
82. Rekha Rani	Tushar Roy	82. Koruna Mondol	Provash Mondol
83. Usha Rani	Goura Roy	LC 33: Britti Solua: 22 households, LFs will be selected	
84. Astomy Roy	Kumaresh Roy		
85. Mitta roy	Sandip Roy		
LC 17: Taiwabpur			
86. Sheena Begum	Amjad Sarder		
87. Mamata Dey	Biswajit Biswas		
88. Taslima Khatun	Anwer Sarder		
89. Sahida Begum	Rafiqul Islam		
90. Qusum Begum	Jinnat Gazi		
91. Sheuli Begul	Late Gaffar Fakir		
92. Zulekha Begum	Sattar Molla		

Table 2. Information of the Learning Centers and Lead Farmers selected under the polder 43/1A and 43/2F in Barguna, Potuakhali District

Polder 43/1A: Amtali, Barguna		Polder 43/2F: Amtali, Barguna	
LC 34: Dakhin Atharogacia		LC 51 & LC 52: Dakkhin Angulkata	
1. Saleha Begum	Jalal Hawlader	1. Mukul Begum	Idris Hawlader
2. Laily Begum	Soleman Hawlader	2. Selina Begum	Ripon Akon
3. Umme Hani	Late Ashraf Ali Khan	3. Hasina Begum	Abdus Sattar Fakir
4. Shirina Begum	Saiful Dhali	4. Hojiton Begum	Khalil Hawlader
5. Pakhi Begum	Anwar Gazi	5. Minara Begum	Dulal Ghorami
LC 35: Dakhin Sonakhali		6. Laizu Begum	Kamal Biswas
6. Ferdousi Begum	Mozaffor Peyada	7. Jahanara	Rustom Mistri
7. Nipa Begum	Nizamuddin	8. Halima Begum	Jamal Biswas
8. Beauty Begum	Abdur Rob Mridha	9. Tania Akhter	Johirul Islam
9. Tanzina	Jamal Peyada	LC 53: Uttar Angulkata	
10. Minara Begum	Abdul Berek Peyada	10. Nargis Begum	Fazlul Biswas
11. Monowara	Anwar Mridha	11. Halima Begum	Abdul Kader Talukder
LC 36, LC 37 & LC 38: Paschim Sonakhali		12. Rina Begum	Yousuf Akon
12. Momotaz Begum	Dulal Akon	13. Minara Begum	Shanu Shikder

13. Shefali Mitro	Abinash Mitro	14. Sajrda Begum	Harun Gazi
14. Shiuli Rani Paik	Basudeb Paik	LC 54: Uttar Khekuani	
15. Jahanara Begum	Jalil Shikder	15. Aleya Begum	Anwar Gazi
16. Nargis Begum	Jahangir Hawlader	16. Parul Begum	Jalil Hawlader
17. Parul Begum	Adom Ali	17. Shefali Parvin	Harun Cazi
18. Minara Begum	Mojibor Rahman	18. Shefali Begum	Altaf Hossain
19. Shuchitra Rani	Son Himangshu Bepari	19. Golenur Begum	Shahanur Alam
20. Kakoly Begum	Nasiruddin	LC 55 & 56: Dakkhin Khekuani	
21. Reba Begum	Monirul Islam	20. Laizu Begum	Abu Musa
22. Najnin Akhter Mala	Mainuddin Akon	21. Mahbuba	Sattar Gazi
23. Rina Begum	Milon Chowkider	22. Khadeza Begum	Mostofa Gazi
24. Reba Rani Shil	Shudhir Chandra Shil	23. Rahima Begum	Yousuf Gazi
		24. Taslima Begum	Monirul Islam Matbor
LC 39 & LC 40: Paschim Kewabunia		25. Laizu Begum	Harun Mollah
25. Salma Begum	Khokon	26. Meruna Begum	Faruk Akon
26. Asma Begum	Bashar Hawlader	27. Nasrin Begum	Mizanur Rahman Munshi
27. Alenur Begum	Jashim Khan	28. Rani Begum	Badol Hawlader
28. Nazma Begum	Forkan Sikder	29. Halima Begum	Rustom Ali Peyada
29. Hosneara Begum	Shah Alam Peyada	30. Lalboru Begum	Harun Hawlader
30. Hena Begum	Shahabuddin	LC57: Fakirkahli Gojkhali	
31. Khadeza Begum	Rubel Khan	31. Jakia Begum	Amjad Akon
32. Shahinur Begum	Awal Peyada	32. Kakoly Begum	Sohrab Akon
33. Rina Begum	Abdul Haque	33. Sabita Rani	Shankor Mitro
34. Rabeya Begum	Nazrul Gazi	LC 58 & LC 59: Uttar Gojkhali	
35. Minara Begum	Ismail Khan	34. Aklima Begum	Monirul Mollah
LC 41 & LC42: Purba Kewabunia		35. Shahanaj Begum	Rafiqul Islam Ratan
36. Selina Begum	Selim Hawlader	36. Ruma Bagum	Shefaz Mridha
37. Shahenur Begum	Nasir Uddin Hawlader	37. Shahanaj Begum	Mizan Matbor
38. Kohinur Bibi	Moksed Gazi	38. Aklima Begum	Monirul Islam
39. Nasima Begum	Khalil Bepari	39. Jahanara Begum	Ayub Ali Khan
LC 43 & LC44: Uttar Attarogachia		40. Nur Nahar Begum	Khobir Hawlader
40. Jahanara Begum	Dulal Talukder	41. Laily Begum	Shahajan Kholifa
41. Mukul Begum	Dulal Hawlader	42. Shahida Begum Lata	Firoz Hawlader
42. Nilufa Begum	Idris Peyada	43. Sabina Begum	Khokon Khan

43. Amena Begum	Abdul Jalil Talukder	44. Rina Begum	Babul Gazi
44. Momotaz Begum	Forkan Khan		
45. Tara Banu	Milon Mia	LC 60 & LC 61: Dakkhin Gulishakhali	
46. Nazma Begum	Shah Alam	45. Nehar Begum	Hossen Hung
47. Mukta Begum	Tofazzol	46. Nargis Begum	Kalam Gazi
48. Fahima Begum	Nazrul Talukder	47. Nazma Begum	Delwar Gazi
49. Shahinur Begum	Liton Talukder	48. Amena Begum	Sobhan Hawlader
LC 45 & LC 46: Paschim Attarogachia		49. Taslima Begum	Siddique Ghorami
50. Rina Begum	Shirajul Haque Mollah	50. Rashida Begum	Abduk Khalek
51. Nur Banu	Abdul Lotif	51. Nur Jahan Begum	Sultan Doctor
52. Khadeja Begum	Father Sultan Mollah	52. Nasima Begum	Jahangir Boyati
53. Sokina Begum	Abdul Aziz Hawlader	53. Safia Begum	Amjad Fakir
54. Ranu Begum	Shahid Khan	54. Rehana Begum	Shahajahan
55. Samsunnahar Begum	Nurul Haque Gazi	LC 62: Uttar Gulishakhali	
56. Laily Begum	Yunus Chowkider	55. Nasima Begum	Nur Hossen Mollah
57. Minara Begum	Delowar Malaker	56. Nasrin Begum	Abdul Jalil Fakir
LC 47: Paschim Sakharia		57. Nasrin Begum	Sohel Musolli
58. Peyara Begum	Jobbar Peyada	58. Salma Begum	Kobir Hossain
59. Nipa Akhter	Atiqur Rahman	59. Khaleda Begum	Dulal Peyada
60. Kamrunnaha	r Fazlul Haque	LC 63: Purba Gulishakhali	
61. Julia Akhter	Mehrab Hawlader	61. Sukorno Rani	Biren Chondro Roy
62. Rashida Begum	Khalil Peyada	62. Jahanara Begum	Son Monirul Islam
LC 48, LC49 & LC 50: Purba Sakharia		63. Moriom Begum	Sobhan Hawlader
63. Salma Jahan	Abdul Kuddus	64. Parveen Begum	Tofayel Chowkider
64. Asma Begum	Manju Hawlader	65. Shahana Begum	Mijanur Ghorami
65. Sopura Begum	Nasir Hawlader		
66. Aki Akhter	La Habibur Rahman		
67. Moyna Begum	Yusuf Mollah		
68. Mulata Rani Majhi	Hiron Chondra Majhi		
69. Nahar Begum	Nur Halim Akon		
70. Hosneara Begum	Milon Shikder		
71. Rina Begum	Nur Zamal Fakir		
72. Peyara Begum	Late Salam Hawlader		
73. Fatema Akhter	Shopon Hawlader		
74. Rani bala	Shamol Hawlader		
75. Selina Begum	Wahab Matbor		

Appendix III

Table 1: Training of Trainers for ESPs and LFs of Polder 29 and Polder 30 in Khulna conducted from 11 – 17 January 2017

Date	WMGs	Venue of the ToT program	Master Trainer	Number of Participants
12-13 January	Asannagar, Senparara, Jhaltola, Dakshin Kalikapur, and Uttar Kalikapur	Senpara	Dr. Rita Sen and Nilla	34
12-13 January	Gangarampur, Kaemkhola, Gondhamari Kanthaltola	Gangarampur	Zahura and Lutfa	21
14-15 January	Gojendrapur Dakshin, Kapalidanga, Gojendrapur Uttar	Gojendrapur Dakshin	Meera and Lutfa	31
14-15 January	Baniakhali, Bhulbaria, Britti Bhulbaria, Kharibunia, Ratankhali and Taibpur	Baniakhali	Dr. Rita and Nilla	33
16-17 January	Maitvanga Vennabunia, Mailmara, Batiaghata, Charkhali Masalia and Balabunia	Maitvanga vennabunia	Dr. Faruque, Meera and Lutfa	35
16-17 January	Shukhdara, Britti Kholshibunia	Shukhdara	Dr. Rita, Dr. Faruque and Nilla	25
Total				179

Table 2: Training of Trainers for ESPs and LFs of Polder 43/1A and Polder 43/2F in Khulna conducted from 23 – 28 January 2017

Date	LFs from WMGs	Venue of the ToT program	Master Trainer	Number of Participants
23 – 24 January	Dakshin Atharogachia, Paschim Atharogachia and Uttar Atharogachia	Uttar Atharogachia	Dr. Faruque, Meera and Lutfa	22
23 – 24 January	Uttar Gulishakhali, Purba Gulishakhali and Dakshin Gulishakhali	Dakshin Gulishakhali	Dr. Rita, Dr. Faruque and Nilla	21
25- 26 January	Uttar Khekuani, Dakshin Khekuani, Uttar Angulkat and Dakshin Angulkata	Dakshin Khekuani	Dr. Rita, Dr. Faruque and Nilla	35
25-26 January	Uttar Gojkhali and Fakirkhali Gojkhali	Fakirkhali Gojkhali	Dr. Faruque, Meera and Lutfa	16

27-28 January	Paschim Sonakhali and Dakshin Sonakhali	Paschim Sonakhali	Dr. Rita and Nilla	19
27-28 January	Paschim Kewabunia, Purba Kewabunia, Prubo Shakharia and Paschim Shakharia	Purba Shakharia	Meera and Lutfa	37
Total				150

Table3. Description of WMGs, LCs, Groups, and LFs carryout the activities for scaling-out of the Ecopond approach to fellow farmers in Polder 29 and Polder 30 in Khulna

Detail information of ESP	Name of WMG	Number of LCs	Number of Groups	Number of LFs	Number of Fellow Farmers
Polder 30: Botiaghata, Khulna					
1.Rima Mondal M: 01937702069 MBA in Management Start work: I Jan 2017	Gongarampur, Kaemkhola, Gondhamari Kathaltola, Batiaghata, Maitvanga Vennabunia	7	13	37	341
2.Lotika Sarkar M: 01930353070 H. S. C.; Start work: 17 April, 2017	Batiaghata, Maitvanga Vennabunia				
3. Lucky Mondal M: 01732934772 H.S.C Start work: I Jan 2017	Bolabunia, Mailmara, Britti Kholshibunia, Charkhali Machalia, Shukdara	8	16	43	441
4. Chandana Sarker M: 01930353070 M A in History; Start work: 17 April 2017	Shukdara, Britti Kholshibunia				
Polder 29, Dumuria, Khulna					
5.Arifa Begum M: 01769931207 MA in Islamic History Start work: I Jan 2017	Asan Nagar, Jhaltola, Uttar Kalikapur, Senpara and Dakkhin Kalikapur	6	11	32	361
6..Jhumpa Mistri M: 01990290442 HSC; Start work: 1 Jan 2017	Kapalidanga, Uttar Gojendrapur, Dakkhin and Kharibunia	6	12	34	359

7. Taslima Begum M: 01928470659 BA 3 rd year 1 Jan 2017	Tiobpur, Ratankhali, Baniakhali, Bhulbaria, Britti Bhulbaria				
8. Rupannita Mondal M: 01833424243 BA (Hons); Start work: 17 April 2017	Ratankhali, Tiobpur, Britti Bhulbari	4	6	22	163

Table 4. Description of WMGs, LCs, Groups, and LFs carryout the activities for scaling-out of the Ecopond approach to fellow farmers in Polder 43/1A and Polder 43/2F in Barguna.

Detail information of ESP	Name of WMG	No. of LCs	No. of Groups	No. of LFs	No. of Fellow Farmers
Polder 43/1A, Amtoli, Khulna					
1.Mst. Fatema, Mobile: 0174935458 BA	Dakkhin Atharogachia	1	2	4	52
2.Ms Khadeja Begum, Mobile: 01751609908 BA (Hons)	Paschim Atharogachia	2	4	5	127
3.Mst. Momotaz Begum, Mobile: 01991904275 Class X	Uttar Atharogachia	2	4	8	100
4.Md. Eusuf, Mobile: 01742661684 H.S.C	Dakkhin Sonakhali, Paschim Sonakhali	4	7	16	217
5.Ms. Peyara Begum Mobile: 01765585573, Class VIII	Paschim Shakharia, Paschim Kewabunia	3	5	11	202
6.Salma Begum 01769935243 B A	Purbo Sakharia, Purbo Kewabunia	4	7	15	183
Polder 43/2F, Amtoli, Khulna					
7.Ms. Nazma Begum 01733423331 S.S.C	Dakkhin Angulkata, Uttar Angulkata	3	4	15	157
8.Md. Mizanur Rahman 01724539460 B.A in Accounting	Dakkhin Khekuani, Uttar Khekuani	4	5	14	154
9.Md. Abdul Khalek Hawlader 01748722478 S.S.C	Dakkhin Gulishakhali	2	4	10	102
10.Md. Manirul Islam 01731937753	Purbo Gulishakhali	1	2	5	51

B.A in Social Science					
11.Mst. Monika Begum01771264518; 01768340907 H.S.C	Uttar Gulishakhali	1	1	3	33
12.Monimjan Akter 01724772112 Alim pass (H.S.C)	Uttar Gojkhali, Fakirkhali Gojkhali	2	5	14	173

Appendix IV Questionnaire for Survey of Households and Ponds

1. Address

Village:

Para:

Upazila:

District:

2. Member of WMG group (Yes/No):

3. Farmers Name:

4. Farmers Father's/Husband's Name:

5. Mobile Number:

6. Number of Household Members:

Male:

Female:

7. Education (Farmer):

8. Main Occupation of Farmer:

9. Main occupation of Father/Husband:

10. Annual Income of Household

11. Description of pond of Household

11.1 Total number of pond/ponds: Small (up to 10 decimal): Medium (11-20 decimal)
Large (>20 decimal):

11.2 Size of ponds : Small (up to 10 decimal): Medium (11-20 decimal)
Large (>20 decimal):

12. Description of Small Size Ponds (to be selected for Ecopond)

12.1 Water availability: Seasonal Perennial:

12.2 Connective with outside sources (canals, ricefields and others): Yes NO:

12.3 Receive water from drainage/runway, tube well or other sources: Yes No.

12.4 Fish culture in pond: Yes ----- No. -----

12.5 Input use in pond: Lime ----- Urea/TSP and others -----

12.6 Use of other input in pond:-----

12.7 Fish species stocked in pond (name) and number in 2015 and 2016" -----

12.8 Fish Species stocked in number/kg amount (kg) In 2015 and 2016 -----

12.9 Species of fish harvested amount (kg)-----

12.10 Income from fish from pond (BDT):

- 12.11 Name of existing habitat in pond
- 13. Number of Sorjan:
- 14. Area of the Sorjan (decimal)
- 15. Types of Sorjan: Open ----- Closed: -----
- 16. Total number of rice field ditch: -----
- 17. Area of the rice field ditch (decimal):-----
- 18. Rice Field System: Open ----- Closed: -----

19. Remarks (details about your observation): -----

20. Empowerment of women

- 20.1 Do women member of your household involve in fish production in pond/ditches in rice fields/sorjan?
If yes, what activities (1) pond management (2) fingerlings purchase (3) purchase of other inputs (4) harvesting of fish
- 20.2 Do women have the authority to harvest fish from ponds/rice field ditches/sorjan for (a) household consumption (b) sale of fish (c) gifting of fish
- 20.3 Do women use the income from fish for their purposes? If yes then for what purposes?
- 20.4 Do women involve in any credit/FFS/WMGs/Others? If yes what positions she belongs to: executive/general member
Do women move outside homestead areas for microcredit, meeting, training, shopping, selling of agricultural product?