

Integrating Gender and Nutrition within Agricultural Extension Services

Technology
Profile

Type of
Technology:
Intangible and
Biophysical

Household-based Pond Aquaculture and Homestead Gardening¹

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The **Integrating Gender and Nutrition within Agricultural Extension Services (INGENAES)** project works to improve agricultural livelihoods focusing on strengthening extension and advisory services to empower and engage smallholder farmers, men and women. The technology profiles support INGENAES's goal of improving the dissemination of gender-appropriate and nutrition-enhancing technologies and inputs to improve women's agricultural productivity and enhance household nutrition. The technology profiles identify issues and opportunities to make technologies more attractive for men and women farmers, to increase men's and women's benefits from using technologies, and to design distribution models for extension agents, input suppliers, and mobile devices to get the technologies into men's and women's hands.

Bangladesh is one of the world's most densely populated nations. It is located in South Asia, bordered by India and Myanmar (Burma). Independent since 1971, the country's agricultural sector provides 18.6% of the country's GDP and employment to 45% of the total labor force. In recent years, the country's positive economic growth has helped to achieve national food security and some reduction in poverty levels. Both the proportion of underweight children and children with severe stunting have seen rapid and dramatic declines in recent years (Bhagowalia, Menon, Quisumbing, and Soundararajan 2012: 1). However, poverty and malnutrition remain a serious problem for one-fourth of the population who have few assets and are often vulnerable to shocks from disease, economic crises, and extreme weather. Gender disparities are significant. Although 78% of employed women work in agriculture (compared to 53% of men), their contributions are not fully recognized because of cultural norms that value female seclusion and undervalue female labor. These norms also limit women's ownership of land in their own names (3.5%) and restrict access to and control over other productive assets. The Bangladesh national baseline survey of the Women's Empowerment in Agriculture Index in 2011 found that the domains contributing most to low levels of empowerment were weak leadership and influence in the community (33.8 percent), lack of control over resources (23.6 percent) and lack of control over income (15.0 percent) (Sraboni et al. 2013; Scalise 2009). In this context, providing women income-earning opportunities that are not tied to land or which require geographic mobility could be promising avenues for strengthening women's empowerment.

¹ The full name of the technology is "Household-based pond aquaculture (polyculture of micro-nutrient rich small fish with carps and/or tilapia) and vegetables on pond dyke and homestead area."

Technology Design and Dissemination

Homestead pond carp polyculture consists of a group of complementary technologies including training on pond management techniques, agricultural production, homestead gardening production, and family nutrition (intangible), as well as training on mola fish broodstock and vegetable seeds (biophysical). This group of technologies is being promoted by the Cereal Systems Initiative for Southeast Asia – Bangladesh (CSISA-BD) “Household Based Pond Aquaculture, Homestead Gardening, and Nutrition Awareness”² program which aims to increase income and reduce malnutrition by disseminating improved management practices for household-based ponds and homestead gardens.

During the initial phases of CSISA-BD, WorldFish observed a number of household-based ponds being underutilized. Since the ponds could be good sources for improving nutrition and providing opportunities for income generation, a woman-focused program was designed to make use of the ponds. Women farmers were taught optimal pond management, fish feeding requirements, stocking density, polyculture practices, and homestead gardening production in order to better utilize their homestead ponds (IRRI et al. 2011). Through the homestead pond project, women would be able to increase access to fish and vegetables, which could improve family nutrition and provide women with the opportunity to generate income through fish and vegetable sales. Furthermore, the management technique is centered on carp polyculture with mola fish – an indigenous fish species high in micronutrients, which WorldFish believes will benefit women and children’s nutrition.³

Historically, women have not participated in aquaculture activities in Bangladesh. Therefore, the CSISA-BD project developed a training package to address the lack of knowledge about homestead fish and vegetable cultivation (Islam et al. 2011). CSISA-BD offered trainings for two types of ponds: 1) commercial aquaculture ponds or ghers and 2) homestead ponds. The homestead pond trainings were delivered in villages where a large number of underutilized homestead ponds exist. The trainings were geared toward women to increase their participation in aquaculture, particularly using the homestead ponds.

WorldFish aquaculture development officers conducted the trainings over the course of two (2) eight-hour days. The training addressed basic aquaculture techniques (fertilizer application, feeding requirements, stocking density, polyculture), nutrition and diet diversity, record-keeping, and gender equality. The two-day training was presented using a combination of lecture and participatory training. Trainees were given mola fish broodstock and vegetable seed packets. Each training was restricted to less than 30 participants and those participants must be women. The project lifespan for each group of trainees is one year. Over the course of the year, in addition to initial training and participatory demonstration

BOX I DATA COLLECTION

The assessment team conducted semi-structured and group interviews with homestead pond project participants to investigate the potential impacts on men and women’s time, labor, income, food availability, food safety, and nutrition. Interviewers were conducted with individuals who received the homestead pond training, thus a comparison with “non-users,” (or non-trained individuals) is not available at this time. Nonetheless, the interviews provide information to make some inferences about gender and nutrition indicators.

The interviews were conducted in August, 2015 in villages in Khulna and in Dhaka divisions. The two villages offered some contrasting results. Women interviewed in Khulna have adopted the recommended aquaculture practices and are more involved in aquaculture, however in the Dhaka division, the women attended trainings but are not necessarily taking on more aquaculture activities themselves. Also, the group interviews revealed that in some cases women’s participation in aquaculture had increased, while in others, the men in the village were now using the homestead ponds to culture fish as an addition to their commercial pond production.

² Throughout the profile the capacity building program is referred to as the “homestead pond project.”

³ The data collection for this technology profile also examined WorldFish’s work on ecoponds. The results from that assessment are included at the end of this profile.

trainings, WorldFish hired local community extension officers from partner agencies (e.g., BRAC) to conduct follow-up coaching sessions and market linkage events for the beneficiaries.

One participant farmer was then selected by the group majority to serve as a demonstration farmer. This farmer offers her pond for training and is responsible for training other farmers in the community. She received a partial subsidy for the cost of inputs (20-30 percent) as compensation.

Gender Analysis

Food Availability and Quality

In Khulna, women spoke favorably of the homestead pond project in terms of increased access to food and improved household nutrition. In each interview, women noted how the improved aquaculture practices increased fish production in their ponds, which meant fish was more readily available for home consumption. Rather than bringing fish home from the market or waiting on fish from their husbands' commercial ponds, they could catch fish from the homestead pond. As a result, their families are consuming fish more often, in some cases for every meal.



A woman casts a net into her fish pond –
C. Eisenmann 2015

The homestead pond project in Khulna encouraged improved aquaculture management practices, alongside homestead gardening activities. The women interviewed claimed that their families are eating more vegetables and have a more balanced, nutritious diet as a result of the project. One woman said she feels healthier now and she understands the importance of eating a balanced diet full of vitamins and protein because of the nutrition training in the capacity building program.

In both project areas interviewed, mola fish broodstock was given to project participants who attended the two-day training. In the Khulna division, the mola fish was successful; women and men said they eat mola fish now since they learned the nutritional benefits of eating small fish. The man interviewed did not attend the training but also talked about the nutritional benefits of mola, suggesting that women are sharing their knowledge gained from the training and encouraging better nutrition within the household.

In addition to nutrition and food availability, both men and women in the Khulna division perceive the fish and vegetables from the homestead ponds to be of better quality and safer to consume. One woman noticed the difference in quality of her fish when she started using fish feed and lime; prior to the training she used dried cow dung as fish feed and pond fertilizer. Another woman enjoys having access to fresh fish and vegetables without having to worry about the use of preservatives in food sold at the market. Similarly, the husband of one interviewee said he previously purchased fish in the local market but he did not know the source of the product or how the fish were cultivated. He believes the fish from the homestead pond are healthier for his family and he is happy knowing that their fish is preservative-free.

Time and Labor

One disadvantage for women involved in the homestead pond culture is the increase in time spent tending to the ponds. Since the program emphasizes systematic methods for raising fish, participants are encouraged to engage in daily activities of feeding and monitoring pond water quality and more frequent harvesting activities. All of the women interviewed said they spend more time now, from 30 to 60 minutes more per day, on aquaculture compared to before the training. However, none of the women said the time spent on aquaculture interfered with their ability to complete other household chores. One of the women interviewees was only minimally involved with the pond management activities, yet still spoke of an increase in time spent at the pond because her neighbors are interested in learning about the project and she often has visitors at the pond.

In terms of labor, the interviews revealed mixed messages about whether the tasks associated with homestead ponds were difficult for project participants. All of the women in the Khulna division said the recommended practices for fish culture were more involved than previous practices, but not necessarily more difficult; they spend more time tending to the pond, but the rewards are great. All of the men interviewed see the homestead pond production as much easier since the pond is close to home as opposed to the commercial ponds or ghers which are located away from the home. One disadvantage for men might be the additional labor required of them for harvesting fish from the homestead pond since most of the women said they do not know how to harvest fish or are uncomfortable doing so.

In the women's group interview in the Dhaka division, however, the additional labor required of women as a result of the homestead ponds came out as a significant disadvantage. This is likely because after receiving the aquaculture management training, men appeared to view women as more capable and entrusted women with the management of the commercial ponds in addition to those near the homestead. Two women who received the training said "life has become much harder;" they have to walk long distances to get to the commercial ponds to feed and fertilize in addition to tending to the homestead ponds.

Income and Assets

The main advantages of the homestead pond project as told by the women and men in the Khulna division encompass food safety, food availability, and nutrition. Since the individuals interviewed mainly use the ponds for household consumption, there has been little to no change in income opportunities as a result of the homestead pond. Only the male respondents mentioned income from the sale of extra fish as an advantage of the homestead pond project. The interviews in the Dhaka division, however, told a different story. When the women's group was asked what advantages the women have experienced as a result of the homestead pond project, the answer was an overwhelming "more Taka" – the Bangladeshi currency. Although the women mentioned the convenience of having fish in the homestead pond when they needed it for household consumption, most of the fish from the homestead ponds are sold and extra income is generated for the household. The men's group also emphasized the benefits from earning additional income by cultivating fish in the homestead pond.

Issues and Opportunities

The results from this assessment suggest the homestead pond project produces benefits for households in the form of nutrition, food availability, and food safety with little disadvantage for men or women. While women face a larger time and labor commitment by engaging in homestead aquaculture, the women viewed the time investment as a minimal cost for improving aquaculture practices and increasing fish production. Increased fish production translates to more fish for home consumption or for sale.

Women's participation in aquaculture has increased as a result of the project; however, several women in our interviews admitted they do not know how to harvest fish. The capacity building program could be improved by adding more women-led demonstrations or participatory training on fish harvesting. According to representatives from WorldFish, the organization is designing alternative technologies for harvesting fish that would be more suitable for women.

The homestead pond project was designed to improve household nutrition and generate income-earning opportunities for women. The analysis suggests women are not taking full advantage of the opportunity to earn income by selling fish. While there is some trade-off between home consumption and the sale of fish, it is important that women are able to properly assess the benefits and losses from this decision. Additional marketing and sales training within the capacity building program and strengthening the market-linkage events to facilitate the sale of fish is recommended.

The conclusions and recommendations from this study are preliminary. A more rigorous gender analysis and technology assessment of homestead pond project would include more individual interviews. This study contained only a few responses from men; an increase in men's interviews will provide a complete

comparison of men and women's perceptions of the program. Furthermore, a comparison of non-participants (village residents who have access to a homestead pond but did not participate in the CSISA project trainings) is necessary to fully speculate on the gender and nutrition impacts of the capacity building program. Further research could also investigate the household decision making to consume fish at home versus sell in the market.

Ecopond Fish Habitats

In a parallel research effort, WorldFish conducted a participatory action research effort between April 2014 and September 2015, to increase the productivity and fish biodiversity of household ponds and increase the consumption of fish in the home using ecoponds (Barman et al. 2015). The ecopond is an ecosystem-based production technology designed to improve the habitat of a homestead pond and make the pond suitable for fish culture. The research aimed to assess the effectiveness of the eight different structures on fish production and biodiversity (Box 1). It targeted women who were provided four out of eight possible fish habitat structures per pond. The habitats were constructed using mostly natural materials, with the exception of a concrete ring. The habitat structures provide the fish with natural feed in the form of algae, shelter from predators, and an acceptable spawning environment.

BOX 1 FISH HABITAT STRUCTURES

- Water hyacinth ring
- Bamboo mat cage
- Bamboo braches
- Bamboo tubes
- Concrete ring set
- Aquatic vegetation cage
- Rope cage
- Coconut leaves

BOX 2 DATA COLLECTION

This assessment was conducted in Bangladesh in August 2015. Three interviews with “users” (research participants who were using the habitat structures in their pond), and four with “non-users” (control group participants) were conducted. A group interview with three women users interviews was also held. The assessment also included an interview with the ecopond project specialist, Saima Nilla.

WorldFish identified 60 women from four communities to take part in the research. They were divided into four different research treatments. Each group received different combinations of the habitats and no less than four different habitats. Three women in each community were selected to be the control group. No habitats were given to them or placed in the control ponds. WorldFish covered the cost of the habitats.

Participants, including the control group, attended learning sessions located at a learning center within the community. Learning centers could be a woman’s porch, an unused room in a participant’s household, or an open air community center. A learning center was set up in each of the four communities, where women meet weekly to learn about fish, caring for their ponds, and fish habitat technologies.

Key Findings

The participants provided WorldFish with feedback on each type of fish habitat. The water hyacinth ring, bamboo branches, aquatic vegetation cage, rope cage, coconut leaves, and bamboo tubes, all received positive feedback. The women noted how these habitat structures were very inexpensive or no cost at all. These structures take little to no maintenance and were unlikely to become damaged. The concrete rings, though, were heavy, expensive, difficult to transport, and called for more than one man to place in into the pond. Some of the rings broke during transportation or installation into the pond. However, the concrete ring has the ability to hold water during the dry season, which can be crucial for fish survival during this time. The women expressed how they appreciated the fish ring once it was in the pond, but the challenges with them were disincentives to purchasing them. The bamboo cage habitat was also found to break easily. For some, this habitat structure broke during installation into the pond, and for others it broke sometime after it was placed in the pond.

Fish were caught in small quantities for regular home consumption. Women generally used a fishing rod to harvest the fish. Sometimes a small sized net or cast net was used. However, the majority of the women explained that they relied on their husbands or other family members to harvest fish with a net. They expressed little interest in learning how to use the net, explaining that this was a man's job. WorldFish's gender specialist explained that fishing with a net usually requires the person to wade into the water, thus getting their clothing wet, and that this may be why women dislike using it.



INGENAES staff conducts an interview with a woman about her fishpond – C. Eisenmann 2015

A common complaint from the women was that when a net was used in the ecopond, it would get caught in the habitat structures and rip. Participants suggested that fishing with a net might require removing the habitat structures before casting to prevent this, but also expressed dissatisfaction with the time involvement of this.

During the learning sessions the women were taught how to maintain the correct level of algae for the fish to feed on and were found to be successfully carrying this out. The participants using the structures did not feed the fish with any table food or fish pellets. Fish successfully fed off the algae with close monitoring of the algae level in the pond.

In the control group, women struggled to keep their fish alive, as their ponds did not receive any habitat structures. One of the women with a control pond explained how the algae level in her pond became too high and the fish died. All of the control group women expressed desire in having habitat structures in their pond and understood the benefit. After observing the success of research participants, one of the control group participants decided to place bamboo branches in her pond, despite the structure of the research.

Conclusions

The assessment suggests that transportation and maintenance issues surrounding the habitat structures, high cost of the concrete fish ring, and complications around harvesting of the fish are key issues to address in the design and dissemination of these technologies. Methods of reducing the cost and potential breakage of the structures could potentially lead to wider use of the ecopond. It was also found that the fish ring is costly for a household to purchase and therefore may inhibit adoption. Addressing women's lack of participation in marketing, specifically teaching women to harvest fish with a net or finding a suitable alternative would be important to increasing women's independent access to fish for home consumption or sale.

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