

Ethnic Women in Aquaculture in Nepal

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ABSTRACT *The Women in Aquaculture project was launched in two districts of central Terai in Nepal jointly by AIT (Thailand) and Institute of Agriculture and Animal Science (Nepal). The project has trained five groups of about 150 women belonging to a traditional ethnic fishing community and supported by fish farming as a means of additional income generation and source of protein supply for the family.*

KEYWORDS *ethnic groups; food security; fish farming; participatory research*

Introduction

In Nepal, about 85 percent (of total 26 million) people live in rural areas. Owing to limited employment and income generating activities, the majority of men migrate to cities or even abroad. Although subsistence agriculture and livestock rearing have become primarily women's responsibility, their role has not been recognized (Acharya, 2000).

In rural Nepal, cereals and root crops provide the main food items of the Nepalese diet. Deficiency of Vitamin A has caused night-blindness and xerophthalmia. Disorders due to shortages of other vitamins, for example, D, C and E and minerals (iron and iodine) have also been reported. Limited supply of animal protein has been one of the main problems. Of the total protein intake, a person should get at least 33 percent from animal sources for good human health (AIT, 1994), but in Nepal it was only about 16 percent in 1989/90, 12 percent in 1994/95 (MDD, 1996) and a recent report shows only 10 percent (Pradhan, unp). UNICEF data (1996–2005) show that more than half (51 percent) of children under five suffer from stunting. Various reports have showed that 90 percent of Nepalese children suffer from one or more forms of malnutrition.

There are more than 100 ethnic groups in Nepal and the targeted ethnic group, the Tharu, ranks fourth with 6.8 percent of the total population (CBS, 2006). Traditionally, this ethnic group has been capturing fish from lakes, swamps, rivers and streams (Gurung, 2003) to feed their large families, which range from 4 to 17 members (Bhujel and Shrestha, 2007). Most ethnic minority populations are less aware about family planning due to less access to education and low participation in social activities. Many Nepalese women are still illiterate and the proportion is even higher among ethnic groups.

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Ethnic women are also heavily involved in growing vegetables on small pieces of land for home consumption. Inclusion of fish ponds in small-scale farming systems could be a viable option to supplement protein and other essential nutrients and to generate income using farm by-products and kitchen waste, such as rice husks, fruit peels and vegetable wastes. Fish farming, in Nepal, has good potential because of its technical efficiency (Sharma and Leung, 1998), high profitability (Baral, 1992), abundant water resources (Yadav and Bhujel, 1998; CBS, 2006) and high demand for fish (Rajbanshi, 1995). Illegal fishing has resulted in a decline of fish catch; consequently, it has affected the livelihoods of the fishing communities (e.g. Tharu, Majhi, Pode, Gandharva, etc.).

Annual per capita fish production (1.6 kg) and consumption of fish are far less than other Asian countries, for example, India (5 kg), Bangladesh (12 kg), Laos (15 kg) Vietnam (20 kg), Cambodia (25 kg) and Thailand (30 kg) (FAO, 2006). Fish import has increased recently; salted and sundried fish are mainly from India while canned and dried fish are from Indonesia, Thailand and Korea (Shrestha, 1994; Pradhan, unp.). Considering the demand and value of fish in Nepal, small-scale aquaculture is being promoted by Asian Institute of Technology (AIT) and other organizations (Edwards *et al.*, 2002). Women's potential role in this sector has been recently realized; however, very limited work has been done targeting ethnic women.

Methodology

A pilot project was initiated in 2000 in Chitwan, central Terai, Nepal jointly by the AIT of Thailand and Institute of Agriculture and Animal Sciences (IAAS) of Nepal to improve rural food security and generate supplemental income through small-scale aquaculture by empowering ethnic women. Involving project farmers as part of the research, the project aimed to develop applicable models for future expansion in other parts of the country.

260 The project, funded by the NGO Women's World Day of Prayer (WDP), German Committee initially

supported a group of 26 women farmers to dig one pond each. They were provided with training that included a field visit. Five of them were supported to begin with fry/fingerling production to supply other farmers. During the training they were shown how to dig, lime and fertilize pond, and what and how to feed fish. Although the recommended size of a pond was 200 m², they were allowed to dig ponds of any size depending on availability of land. Only about half of the construction cost was covered by the project and most of the farmers used their family's labour. The farmers selected belong to the Tharu community, and both males and females of the community used to catch fish from rivers, streams and swamps. Fish used to be one of the main items of their regular diet and was considered a precious item to offer to the guests. They began experiencing difficulties in finding fish to catch. Among the selected farmers, about half of them had less than 0.5 ha of land, whereas the national average is approximately 0.8 ha. Only four farmers had little more than 1.5 ha. All of them are dependent on subsistence agriculture. The size of the family ranged from four to 17 with an average of seven.

Technical support was provided to the women's group including procuring fish fry. The farmers were provided with a notebook to keep records of all inputs and outputs. They were given options to choose the species of fish they liked. At the beginning phase of the project out of 21 grow-out farmers, twelve farmers chose Nile tilapia (*Oreochromis niloticus*) for culture, whereas nine chose carps, for example, Rohu (*Labeo rohita*), Mrigal (*Cirrhina mrigala*), Silver carp (*Hypophthalmichthys molitrix*) and Grass carp (*Ctenopharyngodon idella*, etc.). Carps were commonly known, whereas Nile tilapia was a new species for them. The farmers were allowed to harvest fish whenever they wanted but were asked to keep all the records of consumption and sales including inputs used. Use of green water (plankton-rich) developed by using livestock manure and locally available on-farm by-products and kitchen wastes as feed were recommended. The final harvest of the crop or the remaining fish after occasional catch for consumption/sale was done after about eight months.

In this project, men also helped their women counterparts, especially in pond construction, renovation, preparation, water supply canal renovation, fingerling transportation and fish harvest. More importantly, men's contributions to the project activities increased women's morale, which was one of the keys to success.

Results and discussion

Results (Table 1) of the initial phase of the project showed that more project farmers chose Nile tilapia for culture. They wanted to test it first; therefore they constructed smaller ponds that yielded lower production, consumption, sale and income as compared to carps. However, the per unit area productivity was slightly higher from tilapia. Nevertheless, fish productivity in this participatory trial was more than double that produced by the model farmers in Bangladesh (1.7 t.ha⁻¹) while comparable with the productivity obtained in Thailand (2–8 t.ha⁻¹) and Vietnam (4.6–6.2 t.ha⁻¹) (Edwards *et al.*, 2002). Fish production, consumption and income from sale peaked at about 350 m² pond size (Figures 1 and 2). The relationship shows that these parameters decrease if the size of the pond increases. It indicates that as the pond gets bigger, inputs/resources available on-farm are not enough to support relatively larger-scale production. It suggests that pond size

should not exceed 350 m² for the resource-poor farmers. The data showed that project farmers consumed, on average, 40 percent of the fish produced, whereas 60 percent was sold. On the other hand, in model fisheries villages of Bangladesh, 31 percent was consumed and 69 percent was sold (Edwards *et al.*, 2002). Based on the results, a pond of 150–300 m² size to be managed by a woman can be recommended for a family, as it would produce about 50–90 kg of fish, out of which 20–35 kg would be for family consumption and 30–50 kg for sale; this can generate about US\$30–60 income per year. This supplemental income can contribute up to 20 percent of the total income required for the poverty benchmark. However, comparative studies on time devoted to raise fish in relation to other sub-sectors and detailed cost benefit analyses have not yet been conducted. Research on these aspects is needed.

Impacts and implication

Given the success of the first phase, the donor extended another two-year phase to expand the activities in the same district as well as in another adjacent district, that is, Nawalparasi, under which an additional 53 women farmers were included in the project. In continuation, the Canadian Cooperation Office (CCO) provided funds for another 60 farmers to join these groups

Table 1. *Outcomes of the pilot project*

<i>Descriptions</i>	<i>Carps</i>	<i>Nile tilapia</i>	<i>Average</i>
No. of farmers	9	12	—
Pond size (sq. m.)	234	131	175
Fish production (kg/family/crop)	66	42	52
Fish production (kg/family/year)	99	63	78
Productivity (t/ha/yr)	4.2	4.8	4.5
Fish consumption (kg/family/crop)	25	17	21
Total value of fish produced (US\$/crop)	75	37	55
Income from fish sale (US\$/crop)	47	22	33
Contribution to total income (%) ^a	20	10	15

Notes: A crop means one fish growing season, that is, eight months

^aPercent contribution to the income required to be above the poverty benchmark of US\$1 a day assuming that fish pond was managed by one female member of the family.

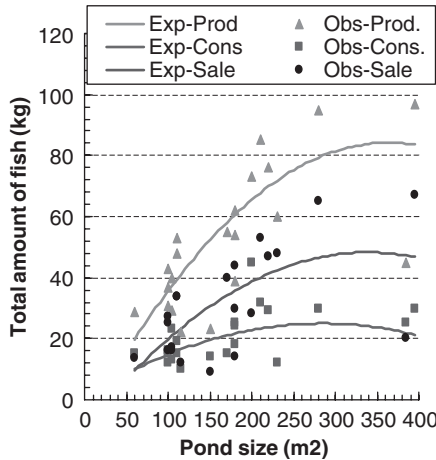


Figure 1: Relationship of pond size with fish production, consumption and sale

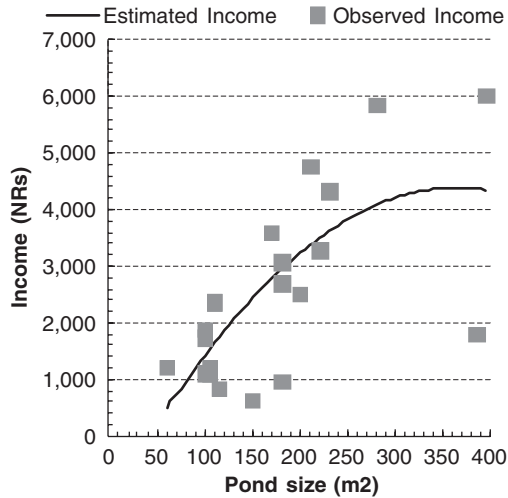


Figure 2: Relationship between income and size of fish ponds

and establish cooperatives so that they could continue or expand their activities, including the establishment of small businesses after the end of the project period. Thirteen new farmers, led mostly by women, constructed ponds with some help from relatives and neighbouring project farmers before the end of the first phase of the project. Now many more farmers have done so, and there is a need to carry out a survey to find out the increased number.

The project not only assisted in producing fish but also provided women with opportunities of participation in social, political and other activities. Organizing regular meetings and discussions have helped women to help themselves. Therefore, creating self-help groups of vulnerable ethnic women in rural areas has proven to be an awakening of their rights and benefits. Underprivileged women who were too shy to speak with visitors from the cities or other areas now can freely talk and put their ideas forward. The pilot project has so far created five women's groups in two districts and the project team hopes to create more groups in the same or other districts by establishing similar model villages. The project has also created stronger bonds among academicians, community leaders and extension officers of the government.

The project also proved that direct intervention through small-scale aquaculture managed by women is possible. It requires, however, a careful selection of target groups and a suitable site. Although the project was small, it has a significant impact. Being able to grow fish at home, families are very happy as they do not need to go for fishing and come back in the evening with empty hands. Once ponds are constructed, little effort is enough to manage it compared to raising animals. Therefore, women can save considerable time to take part in social activities. Families can catch fish for family consumption, especially during festivals for their guests or for sale at any time and any day, instead of gathering of a whole village to slaughter a goat/swine. In line with Hindu culture/religion, cattle cannot be slaughtered in Nepal, and pigs and chickens are not accepted by many people; fish, however, is accepted by all communities and even considered a token of good luck in some ethnic communities. Growing fish at home has increased the amount and frequency of animal protein intake in family diets. Fish has often been considered 'Living Cash' and a pond as 'Saving Bank' because women can catch their fish at any time they want and sell it whenever they need cash, for example, child education, celebrations, festivals and others.

Meanwhile, the project team has made continuous efforts to improve the model and expand

further. Farmers as well as the Project Team thought that fish culture with vegetable gardening would better utilize land, water and labour to generate more income. Therefore, in the second phase vegetable gardening was integrated with fish farming. Water from the fish pond has been used to irrigate the vegetable garden. Fish ponds have been used as water storage for the dry winter season, ensuring a continuous supply for vegetable gardens. Fertile water that has been used to irrigate the vegetables grown on the dike or nearby land, and vegetable leaves/stumps/peels are used as inputs for fish ponds. Vegetable wastes are used to fertilize the pond. This has made the system sustainable, as external inputs are not needed. Fish culture with vegetable gardening has tremendous scope, as it is more profitable than cereal crops and can generate income and employment throughout the year; hence it serves as the best alternative for people in rural areas.

Among the project farmers, a few have shifted to commercial farming. Most of them increased the size of the pond while others have even added a few more ponds. Some others were trying to find high value species. The Project Team has introduced giant fresh water prawn (*Macrobrachium rosenbergii*) from Thailand for co-culture with the fish as a means for higher income, as prawns can be sold directly to hotels and restaurants. The results were very promising. The five women's groups have now been registered as cooperatives to continue their group activities. A few members have already been successful commercial farmers, benefiting more from the knowledge and skills gained from the project.

Basically, there are four models or systems so far being tested by the farmers:

1. Fish only (monoculture or polyculture),
2. Fish and vegetables,

3. Fish and prawn,
4. Fish, prawn and vegetables.

Although there is no comparative study, it should be of interest to the researchers that these models have been used by ethnic women in resource-poor communities. The models show characteristics of moving from simple to complex, low input to high, low skill to high skill activities, low revenue generating to high, and family level to commercial enterprises. Depending upon the availability of resources and the skill, a family may choose any one of them or even move gradually from model 1 to 4. Using the second model of fish farming with vegetable gardening, a slogan '*Aeutachora aeutachori autamachhapokhari*', which means 'one son, one daughter and one fish pond', was selected as finalist by the World Bank during its global competition called 'Development Market Place' held in Washington, DC in May 2007.

The project has been considered one of the most successful models in Nepal. The project site has been a popular place for visits by farmers and officials of many government and non-government organizations. More importantly, in contrast to the previous notion that prevailed in the country, it has provided evidence for policymakers that fish can also be cultured economically in small ponds. The Government of Nepal has accepted the concept and started its promotion. In addition, a development organization has supported about 650 families to construct ponds in western Terai and more will be added. There are indications that more NGOs and other developmental organizations will get involved soon. If everything goes well, rural aquaculture development in Nepal is likely to gain momentum, and its contribution as well as women's roles will be more visible in terms of food security, income, employment and the country's overall economic development.

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