



PD/A CRSP SEVENTEENTH ANNUAL TECHNICAL REPORT

SOURCES OF TECHNICAL ASSISTANCE FOR FISH FARMERS IN THE PERUVIAN AMAZON

*Eighth Work Plan, Adoption/Diffusion Research 1-2 (8ADR1-2)
Progress Report*

Joseph J. Molnar

Department of Agricultural Economics and Rural Sociology
International Center for Aquaculture and Aquatic Environments
Auburn University, Alabama, USA

Fernando Alcántara Bocanegra and Salvador Tello
Institute for Investigation of the Peruvian Amazon (IIAP)
Iquitos, Peru

ABSTRACT

The Institute for Investigation of the Peruvian Amazon (IIAP), a PD/A CRSP host country institution in Peru, is the leading governmental organization working in aquaculture and fisheries research in the Peruvian Amazon region. In addition, IIAP produces fingerlings, offers training courses, and works with nongovernmental organizations (NGOs) endeavoring to promote fish culture. This report summarizes data collected from a sample of 146 practicing fish farmers in the Napo, Tamishiyacu, and Tahuayo River systems areas north and south of Iquitos, as well as in the Iquitos-Nauta Road area directly south of the city. Fish farmers were identified in selected communities that were provided technical assistance in aquaculture by CARE/Peru and several other NGOs. Results address perceptions of need for technical assistance based on gender and the type of operating arrangements for aquaculture. Results suggest women and group farmers have distinctive sets of experiences and preferences for technical assistance. About 38% of the women had no contact with extension versus 9% of the men. All the women respondents indicated that they desired extension contact in the future, but 5% of the men did not.

INTRODUCTION

Aquaculture in the Selva

There is a unique relationship between aquaculture and fisheries in many parts of the Selva (Hall, 1997). The abundance of large, rapidly growing fish species supports an extensive capture fishery in the Amazon, its tributaries, and a large number of oxbow lakes. The fishery, however, is cyclic, as fishing is more difficult during the high water period of December through March. At this time, fish prices for some species are as much as twice the low-water-period price. This cyclical deficit in the supply of fish coupled with a widespread perception that river and lake fish stocks have declined and will continue to do so are the primary motivations for fish culture in the Selva. Commercial-scale fishers using large-scale fishing gear have depleted fish stocks in many oxbow lakes, further encouraging pond-based fish production. On the other hand, the annual population growth rate is 3.1% (Bayley et al., 1992). About 46% of the protein for human consumption in the Selva comes from fish (Eckmann, 1983).

Abundant supplies of warm water, generally available pond inputs, and easily obtainable grow-out stock are some of the favorable conditions for fish culture in the Amazon River system. Fingerlings can be obtained with cast-nets in rivers and in oxbow lakes or through purchase from fishermen or governmental organizations like IIAP and Fondo Nacional de Desarrollo Pesquero—Acción Promotora para el Desarrollo de la Acuicultura (FONDEPES). These institutions produce fingerlings with induced reproduction in controlled environments. Longstanding efforts by the Ministry of Fisheries, IIAP, and other agencies that were provided

technical assistance in aquaculture have stimulated interest in fish ponds. Current NGO efforts in some communities build on previous government efforts. In others, NGOs are introducing pond aquaculture as a new activity.

Nongovernmental Organizations Working in Aquaculture

In 1992, CARE/Peru began an effort to increase food security and raise incomes by targeting families in nine villages along the Napo River. The Napo is a tributary of the Amazon about 20 km north of Iquitos. In 1995, a parallel effort was begun in six villages along the Tamishiyacu River and another six villages along the Tahuayo River about 30 km south of Iquitos. At each of the 21 villages an initial pond was established for training and demonstration purposes. Subsequently, farmers dug about 250 ponds, between 10 and 30 per village. Aquaculture was part of a broader strategy of community development, health education, and food security improvement.

The CARE/Peru project also provided fingerlings, nets, small loans for pond construction costs, and continuing technical support for aquaculture. One aquaculture technician worked with Napo River villages, while five others provided technical assistance to the Tamishiyacu and Tahuayo River regions. When cultured fingerlings were available, ponds were stocked with *Colossoma macropomum* (gamitana). When cultured fingerlings were not available, farmers used wild-caught fry and juveniles or delayed restocking until they could obtain seed stock. Most CARE/Peru ponds were operated by a single family, but about 14% of study respondents participated in aquaculture through community or group ponds.

The Spanish NGO Agencia Española de Cooperación Internacional (AECI) supported the services of a technician who advised about 75 pond operators located primarily along the as-yet-uncompleted Iquitos-Nauta Road. In 1998, about 15 ponds had achieved at least one harvest. The remaining were growing their first crop of fish. The aquaculture technician was one of about five staff members working in various aspects of agricultural and community development in the Iquitos area. Farmers were provided technical assistance in pond construction and instruction in production management. An Italian NGO—Terra Nuova—supported by European Community funds was extending the work initiated by AECI in this area. Terra Nuova has begun working recently in cooperation with IIAP in a food security program primarily in the as-yet-uncompleted Iquitos-Nauta Road and in the year 2000 will work in the Tigre River with Indian communities.

Caritas Internationalis is a Catholic assistance agency that targets poor communities not presently served by government programs or other NGOs. The Iquitos office is one of four in Loreto Department. It has seven technicians—including one specialist in aquaculture—who spend two months in target communities followed by one week in Iquitos. With the exception of some lowland area communities where flooding makes fish culture impossible, most Caritas communities have families with functioning fish ponds. These villages are located on rivers largely west of Iquitos and more distant than the communities served by other organizations in this discussion.

Governmental Organizations Working in Aquaculture

Two government agencies are particularly important for aquaculture in the Selva. The Peruvian Ministry of Fisheries (Ministerio de Pesquería, Dirección de Acuicultura) is a regional enforcement and fisheries development agency. The regional headquarters is in Iquitos and ten other offices are in Loreto Department. Each has a staff of between two and ten persons. Eleven aquaculture specialists, including those at the Iquitos headquarters, provide technical assistance and training programs throughout the region. In the past it has offered a program of technical assistance on pond construction and production techniques in many communities surrounding Iquitos. Recently efforts have been directed to protein-deficient areas near the Ecuador frontier, largely populated by indigenous tribal people. These populations are in great need of assistance and the government needs to reinforce the political allegiance of populations in the disputed border area with Ecuador.

Fisheries stations are a source of fingerlings in some locales, but IIAP and FONDEPES are the largest public fingerling suppliers in the Iquitos area. IIAP is a governmental organization that produces *Colossoma macropomum* (gamitana) and *Piaractus brachipomus* (paco) fingerlings the last 12 years for the entire Peruvian Amazon. It operates a 2.5-ha fingerling production station near Iquitos and another 2.0-ha fingerling production station near Pucallpa, about 1,000 km south of Iquitos. In addition, IIAP produces fingerlings in Tarapoto in cooperation with the Ministry of Fisheries, as well as at the Ahuashiyacu station, south of Tarapoto. In Iquitos, the IIAP station has produced about 130,000 fingerlings per year since 1985. Last year the Pucallpa station produced nearly 80,000 fingerlings. IIAP continues to offer training courses for the CARE and AECI extensionists and for farmers, especially in the Iquitos area.

FONDEPES is a national fisheries development agency. It operates a 10-ha fingerling production station near Nuevo Horizonte, 35 km southwest of Iquitos. The agency projects a shortfall in the stock of wild fingerlings and plans to engage in production of grown fish for the market as well. Plans are to produce fingerlings for a variety of species, but this agency's strategy features *Prochilodus nigricans* (boquichico). This species requires a less intensive level of cultivation, but is mainly suitable for home consumption and local markets. This species was the single most frequently reported kind of fish grown by farmers operating the ponds we visited during our fieldwork.

Each of these organizations is presently or potentially a partner with PD/A CRSP activities. There is a clear need for expanded understanding of gamitana and paco reproduction and growth processes. New technology for increasing the yield of current breeding techniques and expanding the period during which breeding is possible will yield clear and widespread benefits for aquaculture producers in the Selva (Kohler et al., 1999).

METHODS AND MATERIALS

Sample and Data Collection

Structured interviews were conducted with a sample of 146 fish farmers having accomplished at least one harvest in the past two years (Casley, 1988; Townsley, 1996). The sample was drawn from fish farmers who were NGO program participants in selected communities that were provided technical assistance in aquaculture by CARE/Peru and several other selected nongovernmental and governmental organizations, primarily the Fisheries Ministry and IIAP, in the Napo, Tamishiyacu, and Tahuayo River systems that combine to form the Amazon, as well as in the Iquitos-Nauta Road area south of Iquitos.

The survey instrument was adapted from previous research conducted by Molnar et al. (1996) in five PD/A CRSP countries—Honduras, Thailand, the Philippines, Rwanda, and Kenya. The Peru survey, however, reflects the unique conditions and context of Amazonian fish culture, the diversity of species, and the singular relationship of aquaculture to the river fishery in the region. Ponds were identified in communities on three river systems north and south of Iquitos as well as in the Nauta Road area south of Iquitos. Data collection took place in early 1999 and was conducted by graduate students from the Department of Fisheries at Universidad Nacional de la Amazonia Peruana.

Analysis

The analysis tabulates the survey responses by gender and type of organization—individual or group ponds. Group ponds were those operated by three or more families; individual ponds were those operated by one or two families. From this information, central patterns of comparison and differences in access and interest in technical assistance can be discerned.

RESULTS

Women and Men

Table 1 shows a series of questions profiling level of contact with various sources of technical assistance. No formal governmental aquacultural extension services are organized in

Table 1. Sources of technical assistance by gender and operating arrangement among fish farmers in the Peruvian Amazon, 1999.

Survey Response	Gender		Operating Arrangement	
	Men (N = 125)	Women (N = 21)	Individual (N = 125)	Group (N = 21)
	(%)		(%)	
HAD CONTACT WITH EXTENSION?				
No	9	38*	15	5
Yes	91	62	85	95
LAST EXTENSION CONTACT?				
Never Contacted	9	38*	15	5
In Past Month	76	57	73	75
Months to Year	7	0	5	10
More than a Year	8	5	7	10
WANT EXTENSION HELP?				
No	5	0	4	5
Yes	95	100	96	95
LAST FISH STATION CONTACT?				
Never Contacted	87	90	88	81
In Past Month	7	5	6	14
Months to Year	2	0	2	0
More than a Year	4	5	4	5
CONTACT WITH UNIVERSITY TECHNICIAN?				
No	95	95	96	91
Yes	5	5	4	9
HAPPY GROWING FISH AS A CROP?				
No	4	5	3	10
Yes	96	95	97	90

* $\chi^2 p < .05$

the Selva. Consequently, the questions concerning extension are interpreted as contacts with CARE/Peru and other NGO representatives working in rural communities. It is a matter of happenstance that there were 21 group farms and 21 women respondents. Only three respondents were both women and from group farms.

The data show that men reported significantly more contact with extension, as 91% had had extension contact versus 38% of the women respondents. Among those who had contact with extension, there was little difference between women and men in the recency of that contact.

All the women respondents indicated that they wanted extension help in the future, but about 5% of the men said no. Few differences by gender were found for contacts with government stations or university technicians. About 5% of each gender indicated that they were unhappy with growing fish as a crop.

Group and Individual Ponds

Some NGOs utilize group ponds as a means of introducing aquaculture in poor communities. Group ponds often are products of a *minga* or cooperative ring organized to dig and stock a pond shared by a community or subset of families in a community. About 15% of the sample respondents represented ponds operated by three or more families. Group ponds have a

number of problematic aspects that often discourage participation, including but not limited to the difficulty of apportioning the harvest in accordance with labor or other inputs provided to the group. Often the yield from a pond is not sufficient to motivate the large number of people that may participate in a group endeavor (Molnar et al., 1985; Schwartz et al., 1988).

Group farmers reported slightly more contact with extension than did individual farmers, 95% versus 85%, but individual farmers were more likely to have had recent contacts with extension. There were no significant differences in contact with university technicians. Overall, members of pond groups were the least content with fish as a crop, as 10% indicated that they were not happy with growing fish.

CONCLUSION

Fish farmers in the Selva have few natural obstacles to at least limited success with fish culture in Amazonia. Poverty and lack of access to capital are basic problems in poor rural communities and can be obstacles to intensification and a higher level of practice of aquaculture. One important means of raising the productivity of aquaculture as a farm enterprise is through technical assistance to guide pond construction, reproduction, feeding, and fertilization. The data suggest that fish farmers in the Peruvian Amazon are quite receptive to education and practical advice in fish culture, but that the demand far outstrips the supply of these services. The several

NGOs that work with poor rural communities feature aquaculture as part of their repertoire of interventions for which they provide assistance. Thus, NGOs are a logical audience for PD/A CRSP research findings. NGO fieldworkers have regular contact with villages. They can provide information about local experiences and problems with aquaculture that would not otherwise be available. NGOs can provide venues for IIAP scientists to serve as resource persons for training programs, field days, and other types of farmer meetings.

Government agencies provide technical assistance and supply fingerlings to fish farmers in many locales. In Peru, as in most other PD/A CRSP countries, budget limitations, competing demands, and other factors constrain the ability of agencies to provide technical assistance to fish farmers on a regular and widespread basis. Where government extension and fingerling production centers exist, they are important PD/A CRSP partners. The experience in Peru suggests that NGOs can be productive and enduring mechanisms for supporting family-based fish culture in rural areas.

ANTICIPATED BENEFITS

The central benefits of this study accrue to an improved understanding of the knowledge system for aquaculture in the Peruvian Amazon. The many species cultured there and the ready availability of fingerlings and natural foods enhance the possibilities for small- and medium-scale aquaculture in poor rural communities. The data reported here are providing important insights into needs and problems experienced by fish farmers for use by the staff of IIAP as well as the several governmental and nongovernmental actors working in aquaculture in the Amazon.

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