



PD/A CRSP NINETEENTH ANNUAL TECHNICAL REPORT

TECHNICAL ASSISTANCE FOR FINGERLING PRODUCTION SERVING SMALL- AND MEDIUM-SCALE TILAPIA PRODUCERS AND TRAINING AND TECHNICAL ASSISTANCE FOR HONDURAS INSTITUTIONS WORKING WITH SMALL- AND MEDIUM-SCALE TILAPIA PRODUCERS

*Ninth Work Plan, Adoption/Diffusion Research 9 and 10 (9ADR9 and 10)
Final Report*

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ABSTRACT

A central issue for aquacultural development in Honduras is fingerling supply. Previous PD/A CRSP research reported that farmers in remote places found that fingerlings were difficult to obtain but did not consider this sufficient reason for withdrawing from fish farming. The Zamorano principal investigator and his technician in this project confirmed that the Comayagua research station El Carao was not a reliable supplier of fingerlings for area producers. Private fingerling producers are few and generally geared to supply large-scale commercial operations. The overriding objective of activity 9ADR9 was to provide technical assistance and training to current and potential fingerling suppliers to small- and medium-scale tilapia producers in Honduras.

A Peace Corps program of technical support to fish farmers was possibly the most focused on-farm assistance to small-scale fish farmers in Honduras, but this program ended in 1995. The national extension program in aquaculture has a presence in many regions, but the effort is fragmented and underfunded. A number of nongovernmental organizations (NGOs) have been active in rural development, including several active fish farming projects, but expertise in this activity is often insufficient to provide critical technical information required for productive pond management.

In November 1999 we consulted with 13 representatives of national and international, government and nongovernmental organizations (NGOs). From these consultations a strategy and timetable were developed for implementing technical assistance and training for fingerling suppliers and technicians working with NGOs currently or potentially involved in small- and medium-scale fish culture development. At least 33 small- and medium-scale tilapia producers (each with 150 to 12,000 m² of water surface) and 26 restaurants were subsequently interviewed to assess the production and marketing demands for tilapia in Honduras. With the collaboration of a local NGO, representatives of NGOs with actual or potential interest in aquaculture development were invited to a one-day seminar to describe opportunities and constraints for family-scale fish culture in Honduras. The Zamorano team continues to identify and provide technical assistance to regional fingerling producers and organizations involved in aquaculture extension. During the life of this activity, three technical workshops were provided for actual and prospective fingerling producers and extensionists. More than 30 publications on fingerling production and pond management practices have been incorporated in a web-based information system developed by a local NGO, primarily in response to the needs of local NGOs.

INTRODUCTION

A critical issue in the development of tilapia farming in Honduras is fingerling supply. Molnar and Lovshin (1995) found that fingerlings were hard to obtain for many farmers, but fingerling supply was not a reason for withdrawing from fish farming. For many farmers in remote areas, fingerling transport may be difficult, costly, and hard to organize. These conditions underscore the importance of increasing the number of private fingerling suppliers, enhancing autonomous fingerling production among small-scale producers in remote locales, and stabilizing the public and nongovernmental sectors as broodstock suppliers. Given the historically uneven performance of the public sector, it is vital that private sources of seed stock become the foundation for the industry. The

objective of this activity was to collaboratively assist in providing the technical information required to develop and strengthen small- and medium-scale producers of tilapia fingerlings.

A Peace Corps program of technical support to fish farmers was possibly the most focused on-farm assistance to small-scale fish farmers in Honduras, but this program ended in 1995. The national extension program in aquaculture has a presence in many regions, but the effort is fragmented and underfunded. A number of nongovernmental organizations (NGOs) have been active in rural development, including several active fish farming projects, but technical expertise is often insufficient to provide critical information required for productive pond management. An analysis of previous fish

culture development projects involving family-scale fish culture in Central America, where aquaculture is not well established, emphasized that such development projects require many years of effort before fish farming becomes a stable agricultural activity (Castillo et al., 1992; Lovshin et al., 2000). Interruptions in the development process have often led to disillusionment and a generalized rejection of fish culture by participants. Given the relatively short horizon of our project, we concluded that we must work collaboratively with local organizations with long-term vision and commitment to development. The second objective of this activity was to identify the NGOs and agencies interested in incorporating small-scale fish farming in their development programs and then to provide technical assistance and training to their field staff.

METHODS AND MATERIALS

Planning

In November 1999 the principal investigators (PIs) from Zamorano, the University of Georgia, and Auburn University visited 13 directors and representatives from educational and national and international governmental, nongovernmental, and private agencies involved in tilapia culture in Honduras. During this visit a strategy and timetable were developed for implementing technical assistance and training for fingerling suppliers and NGO extensionists.

Implementation

In early 2000, at least 33 small- and medium-scale tilapia producers (each with 150 to 12,000 m² of water surface) and 26 restaurants were interviewed by the Zamorano PI and technical team to assess the production and market demands for tilapia in Honduras. With the collaboration of a local NGO, the Zamorano PI invited representatives of NGOs with actual or potential interest in aquaculture development to a one-day seminar to describe opportunities and constraints for family-scale fish culture in Honduras. Based on this information exchange, these organizations could better decide about the appropriateness of fish farming in their development program.

In September 2000 a two-day fingerling production technical workshop was presented by Zamorano and Auburn PIs for approximately 20 actual and prospective fingerling producers. The workshop included an analysis of conditions and fingerling demands, formal presentations on production techniques, and roundtable discussions.

In March 2001 a one-day workshop for approximately 15 tilapia producers and NGO representatives was held at Zamorano to discuss potential production techniques and to develop an interactive mechanism by which the economic impact of pond management practices could be assessed. The biological production characteristics of a given management can reliably be extrapolated from results obtained in regions with similar climates, but profitability is highly variable due to variation in the value or cost of individual inputs and outputs. Spreadsheets were therefore developed for each potential management practice, in which production inputs and outputs were fixed but the per unit value or cost of each line item could be entered by the user. Economic conclusions were expressed as Return to Labor above Variable Costs and Return to Labor per Unit of Labor Expended.

Institutionalizing Access to Technical Information

In conjunction with another activity in this project and in collaboration with a local NGO, Red de Desarrollo Sostenible-Honduras (RDS-HN), more than 30 documents related to tilapia fingerling production and grow-out techniques for small- and medium-scale operations were posted on a Spanish-English website <www.aquacultura-ca.org.hn>. The documents include theses, manuscripts published by the International Center for Aquaculture and Aquatic Environments (ICAAE) at Auburn University, Southern Regional Aquaculture Center (SRAC) publications, and original documents prepared by project PIs.

RESULTS AND DISCUSSION

During the 1999 planning activity in Honduras that was attended by all project PIs, 13 officials from relevant organizations and entities were consulted, including the following:

Angel Carcamo	Global Village
Raquel Isaula	Director, RDS-HN
Raul Zalaya	World Neighbors
Mike Giles	CARE, Honduras
Carlos Zelaya	Director of the local office, Food and Agricultural Organization (FAO)
Carlo Elvir	Coordinator of Local Watershed Management, FAO
Marco Lopez	Former Minister of Agriculture, Honduras
Marco Polo Micheletti	Ministry of Agriculture (MOA), Honduras
Adalberto Sorto	Director General, National Development Program
Marc de Lamotte	National Director of Human Resource, CARE
Cesar E. Duron	Human Resource Manager, Honduras
Arthuro Galo	Coordinator of Development Projects, MOA
Dennis Sharma	USAID, Honduras

All officials who were visited expressed a commitment and willingness to collaborate in the development of small- and medium-scale fish culture in Honduras, but an overriding concern was the budgetary commitment for a long-term effort. The need for a team approach was obvious.

With the collaboration of one of the local NGOs visited (RDS-HN), the Zamorano PI invited more than 50 representatives of NGOs with actual or potential interest in aquaculture development to a one-day seminar to describe opportunities and constraints for family-scale fish culture in Honduras. Based on the informal discussions during and following this meeting, about 20 NGOs expressed their determination to incorporate aquacultural development in their program, provided their outreach personnel could receive adequate training.

A two-day fingerling production technical workshop was organized at Zamorano for approximately 20 actual and prospective fingerling producers. The workshop included an analysis of conditions and fingerling demands, formal presentations on fingerling and grow-out production techniques, and a roundtable discussion with participants. The technical competence of the participants was highly variable. A single workshop appeared to be sufficient for some participants, but follow-up sessions, including additional hands-on field

experience, seemed appropriate for the majority of the participants.

In conjunction with another activity in this project and in collaboration with RDS-HN, more than 30 documents related to tilapia fingerling production (Popma and Green, 1990) and grow-out techniques (Bocek, 1989; Green et al., 1994; Popma and Lovshin, 1996; Meyer and Triminio, 2001) for small- and medium-scale operations were posted on a Spanish-English website <www.aquacultura-ca.org.hn>. The majority of the documents were posted from February through August 2001. The number of "hits" on the relevant documents as of 9 August 2001 was 398. The affiliation and objectives of the users and their perception of the usefulness of the information are as yet undetermined.

CONCLUSIONS

Personnel of the ICAAE and the PIs in this project have dedicated more than 110 person-years of effort to development projects in 97 countries. One lesson learned from these experiences was that the development of family-scale fish farming in regions where aquaculture is not a traditional farm activity has a higher failure rate than large-scale commercial aquaculture enterprises and cannot be accomplished in a few short years. Constraints faced by prospective farmers relate to infrastructure (roads, electricity, etc.), availability of production inputs, access to markets, economic status of both producers and potential consumers, business management skills, and timely access to technical information. The cost of pond construction (cash or family labor) requires that ponds be utilized intensively. To accomplish this, ponds may have multiple functions (fish farming, irrigation, integrated animal husbandry, etc.) or nutrient inputs can be increased. Feeds are used on most commercial farms but are physically or economically unavailable for most small, family-scale farms with little land. Fish feeds, when available and generally profitable, add a degree of economic risk often inappropriate for resource-limited producers with little business management skill. For farmers with little land, on-farm available nutrients (manure, agricultural by-products, etc.) are sufficient for only small ponds. The opportunity for cash income is a strong motivator for prospective small-scale producers, but transport of the fish harvest to market is often difficult, and potential consumers often lack the cash to purchase the product. In spite of these constraints, a fish-farming development program can lead to the most productive use of their small plots of land, provided the development effort is committed, competent, and sustained.

Constraints faced by a group promoting the development of family-scale aquaculture in a region where it is nontraditional are many. Low fish production from small, relatively isolated ponds makes an extension program very expensive in terms of cost per ton of fish produced. The transition of fish farming from a nontraditional to a traditional farm activity is slow during early development because cash-poor and overworked producers are reluctant to invest scarce resources in questionable enterprises. The cost-benefit ratio of the outreach effort during early development may prematurely break the will of sponsoring groups, resulting in a development failure and disillusioned producers who reject any subsequent fish-farming effort.

The assessment of the appropriateness of fish culture and the training needs of a development group require an understand-

ing of the socioeconomic characteristics of the community and the cost and availability of potential aquaculture inputs. The selection of appropriate culture species and management practices are critical. Contrary to operations utilizing nutritionally complete feeds, the species selected for most small, family-scale farms must be able to effectively utilize natural food organisms to supplement the nutritional deficiencies of agricultural by-products and on-farm available nutrients. Transportation and economic constraints also impose the eventual need for regional independence of fingerling supplies. This implies the selection of a species and production techniques appropriate for many local producers.

Information is often limiting on the biologically and economically most appropriate production strategies. Experimenting with resource-limited farmers in the target region is a dangerous development strategy because it often places them at unacceptable risk, and a failed experimental management practice often leads to a generalized rejection of fish farming. Expected production results can often be accurately extrapolated from experiences in other regions with similar climate and conditions, but economic results may be highly variable because of regional differences in input costs and the market value of the fish. Pond management practices should not be promoted until adequate information is available on the biological and economic benefits. Successful fish-farming development projects require a team effort. Local NGOs often have long-term vision and mid-level extensionists with generalized agricultural and development skills but little specialization in fish culture. Specialized training and case-specific research is often provided by another group. Training must be cost-effective, dynamic, and responsive to developing questions.

This CRSP project does not have the long-term horizon required to undertake fish-farming development in regions where there is little previous tradition. Our objective was to assist in "training the trainers," those individuals with direct contact with prospective producers and with long-term commitment to the community. The mechanisms for accomplishing this included using case-studies to assess conditions and to research incompletely understood management practices, offering short-courses, and providing information to incorporate into a dynamic and interactive web-based network.

ANTICIPATED BENEFITS

The described anticipated benefits of these two activities were improved quality and quantity of fingerlings for the private sector, including small- and medium-scale producers, and an increased understanding by NGO technicians and independent producers of the benefits and constraints of low-input tilapia farming. A high percentage of outreach personnel working in rural development often have an understanding of the overall needs of their target constituents and a broad, general knowledge of many potential agricultural enterprises. However, they often have a poor understanding of fish farming, leading to unrealistic expectations or offhand rejection of the potential benefits of this activity. In regions where fish farming is nontraditional, the benefits of training the trainers can vary from a simple rejection of an outreach effort where inappropriate to a slow transition of fish farming into a profitable and widely accepted farm activity. A historic analysis of such development efforts worldwide reveals mostly failures, especially where efforts were not sustained for several years.

However, the high risk of failure is balanced by the understanding that the target group is faced with the greatest constraints and is in greatest need of improving their nutritional, health, and economic status.

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