

Social, Economic, and Cultural Considerations for Saltwater Cage Culture of Florida Red Tilapia in Northeastern Haiti

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ABSTRACT

Social, economic and cultural factors involved in saltwater cage culture of the Florida red hybrid tilapia (*Oreochromous urolepis hornorum* female X *O. mossambicus* male) in coastal communities of northern Haiti were studied during May through October, 1987. Fishermen were selected as the most appropriate target group within the local population due to their fishing skills, experience at sea, and their possession of boats to reach potential cage culture sites. Economic benefits of saltwater cage culture to fishermen are examined. Work ethics, schedules, cost of fishing and marketing of fish are some of the variables discussed.

INTRODUCTION

In April 1987 the Caribbean Marine Research Center (CMRC) initiated a project to determine the viability of saltwater cage culture of the Florida red hybrid tilapia (*Oreochromous urolepis hornorum* female X *O. mossambicus* male) along Haiti's Northeastern coast. The study site chosen was Fort Liberté, located approximately 30 kilometers east of Cap Haitien and about 10 kilometers west of the Dominican Republic border. The major objective of the project was to determine if this hybrid could be grown in high-density cages placed in Fort Liberté Bay. Concurrently, a comprehensive "social feasibility" study, as consistent with guidelines set forth by Smith (1984), was started. Initially, we investigated socio-economic and cultural factors which would force alteration of our original technology design and strategy for promoting cage culture in order for our project to be "appropriate" for Haiti. We plan to continue with an assessment of potential changes the introduction of this new technology could force upon existing socio-economic and cultural conditions before moving from research to extension of saltwater cage culture .

CHOOSING VOLUNTEERS

At the beginning of the project we rejected a group of volunteers which included local businessmen, church deacons, and maintenance men chosen by a local pastor. We chose, instead, to work within the fishing community of Fort Liberté. The initial phase of our cage culture operation was carried out as an "on location" biological research effort, not as a participatory community development project. Nevertheless, local people were needed to help take care of the cages on a daily basis and thus develop basic manual skills of mariculture. A meeting open to members of the 100-150 fishing households was arranged via the official local representative of the Ministry of Agriculture ("agent pecheur"). The purpose of the CMRC project was explained and a call for applications for employment as watchmen was made at the meeting. Only four men were hired, but contact with the entire community was kept up throughout the project. This established important lines of communications and the foundation for understanding and trust between project personnel and the local population.

Why did we choose fishermen over the church group and/or other land-based groups within the town's population of over 6000? First, fishermen are accustomed to working long hours on the water. Although Fort Liberté fishermen do not exhibit the daring and bravado described elsewhere (Forman, 1970), they are not afraid to work at sea. Skills and confidence to work on the water are essential to mariculture. Cages were situated 1-2 kilometers across the bay from Fort Liberté in the lee of prevailing winds. The employees were required to row to and from work in calm and inclement weather. One downtown resident was employed to feed the fish, record mortalities, and take temperature readings because of his higher level of education. However, he never was able or willing to row himself to work.

Second, fishermen already possess some equipment necessary for cage culture production, the main item being a boat. Other persons would have to purchase a boat thus increasing the cost of their investment. Because of wind and wave patterns, all sites suitable for cage culture in Fort Liberté are situated across the bay from the town population center, thus requiring the use of a boat to reach them. The same absence of sites accessible from the shore exists on other bays along Haiti's northeastern coast (Rust *et al.*, 1991).

Third, fisherfolk are familiar with the marketing of fish. They, in this case the women more than the men, know prices commonly received for different species and are adept at bargaining for maximum returns on fish. Fort Liberté "marchands" knowledge of prices and market relationships were not limited to their local area, but extended to the urban market in Cap Haitien, which can help expedite sale of cultured fish.

Fourth, fishermen and women have some skill in the preparation and preservation of fish for marketing. The preservation methods presently practiced are, however, unsatisfactory, and Haiti's transportation network is

poor. Hence, the quality of fish is drastically reduced by the time it reaches markets even less than 10 kilometers from the landing sites. Aquaculture projects need to address post harvest problems as well as production ones. FAO is currently conducting a project to improve drying, salting, and smoking techniques in southern Haiti.

Finally, we chose to work with fishermen because they might be displaced by the introduction of a new, competing "fishing" activity into the local economy. The output from mariculture will increase the supply into fish markets, possibly making it difficult for capture fishermen to sell their entire catch and perhaps forcing prices downward.

It was these considerations of habits, knowledge and skills that prompted CMRC to work with fishermen and not persons with land-oriented backgrounds.

We rejected the opinion of some previous studies that fishermen show low potential as adopters of fish farming (Forman, 1970; Pollnac, 1978), and agreed with Pillay and Wijkstrom's assertion that incompatibility is not absolute (1980). Throughout the project we worked to discover if, in fact, fishermen were our optimum choice. We researched how our mariculture development project would have to be designed in order to interest them in putting their skills and knowledge to work in cage culture as a subsidiary or alternate occupation. This study looked at three main areas:

1. The organization and workstyle of the group's traditional occupation, captural fishing.
2. The costs and returns of that activity.
3. A comparison with these same factors for saltwater cage culture .

ORGANIZATION AND WORKSTYLE

Fort Liberté fishermen employ a small variety of fishing equipment from oar- to sail-powered wooden boats. Absolutely no motorized or mechanized fishing exists in this area or in Haiti's fishing industry as a whole (Hatzios, 1984). The main gear utilized by Fort Liberté fishermen is a beach seine. One person is owner of both boat and gear. No joint ownerships of boats and/or gear were found. Most owners also participate in the fishing effort. When they choose not to fish, they send the boat out under the control of a captain with five to eight crew members. No definite kinship pattern is evidenced between or among crew members. This owner-hired labor rather than familial crew structure indicates that the promotion of mariculture among individuals who can hire employees may be more feasible and appropriate in Fort Liberté than the establishment of special associations or cooperatives. Some persons argue that such a development strategy could increase the "social and economic distance" between owner and worker groups (Norr and Norr, 1974). CMRC will consider this issue as part of a social impact assessment before pursuing any definite extension scheme.

Crew members do not seem to remain with one boat for long periods of time. During the summer, many schoolchildren were also employed on boats and had to be replaced when school reopened in October. In addition, crew members may or may not show up for work each voyage. It is not rare for a seine boat owner to find some of his crew missing at sailing time. On whim, crew members might attend festivals, take a day of rest, or go to the doctor. Fortunately, there are usually extra persons willing to join a crew for a trip. This flexibility and day-to-day workstyle is deeply ingrained in the fishing community both on and off the sea. In contrast, fish farming requires a very steady work commitment. Trips to cages must be made regularly to ensure production results.

COSTS

The cost of initiating a capture fishing venture in Fort Liberté is high. New boats cost over \$250. Used boats cost \$100 and up, depending on condition. Boats must be purchased with cash, not credit. Sometimes a boatbuilder will accept one-half down and the balance on delivery. Nets are made locally by the owner himself together with hired help who are paid per unit net sewn. The estimated total cost for beach seines is \$500 to \$600. These capital costs must be considered in the context of an average national per capita income of \$300, with estimates as low as \$100 for the rural sector.

Fort Liberté fishermen have made these investments in the past. At the present time, they rarely make new purchases. Instead, they conduct continual maintenance to keep boats and gear in operation. They patch their boats with cold tar every three to four months to prevent any major holes which would require professional repair by a local boatbuilder. Similarly, fishermen purchase net twine by the individual 1 pound spool ("boule") and repair holes in their seines every afternoon and all day Sunday. They rarely replace entire sections. No habit of saving money for future repairs was evidenced among the fishermen. If a boat is disabled, it might sit on the shore for over a month until the owner finds enough money for repairs. Whereas Pollnac *et al.* (1975) and Pollnac and Poggie (1978) interpret continual preventative maintenance as evidence of a deferred gratification orientation, we interpret this as short-term orientation. This orientation, as discussed later in this paper, influences fishermen's potential for engaging in cage culture.

Fishermen claim a lifespan of 25+ years for their boats and nets if properly maintained. We estimate that cages, as presently designed, must be replaced every five years by comparison. That life span could conceivably be prolonged if, as mariculturists, fishermen have the same commitment to maintenance. Lack of investment power and/or savings will constrain mariculture development. In order to make saltwater cage culture more economically feasible for the local population, our project is working to reduce the costs of material inputs.

Operating costs for seine fishing in Fort Liberté are minimal. Fishermen mention the need to have food and water to take with them, but they admit they can and have made trips without such provisions when necessary. The only essential input for each voyage is labor; crew members are paid only in shares of the harvest. If there is no harvest, no shares are paid, so the owner avoids upfront costs. With no daily cash operating costs, fishermen can engage in their occupation whenever they desire or need money (and weather allows). However, cage culture which requires daily hired labor and feed.

RETURNS

Analyzing returns to the capture fishing effort was blurred by the fishermen's perception that they can continue to catch as much fish as they have in the past. This runs contrary to the general view of an overfished marine resource base in Haiti (Stickney and Kohler, 1986). The fishermen's positive perspective is not entirely unrealistic; they do catch fish as revealed in our survey of fish landings and sales during July-September 1987. The average daily total catch of Fort Liberté seine fishermen was 2293 fish; 86.83% of that catch was comprised of fish no longer than 3 inches, many being juveniles. All fish landed are marketable, however, regardless of size or quality, allowing the fishermen a small but steady income. Our surveys showed a boat earning as low as \$1.80 and as high as \$125.40 per trip; the average was \$15.60. When divided into shares, owners and crew averaged \$8.91 and \$1.11 per trip, respectively. Trips lasted from three hours to three days, but averaged 11.7 hours. Saltwater cage culture must show equal or better returns in order for fishermen to change or supplement their traditional occupation with this activity.

The periodicity of returns to capture fishing in Fort Liberté is also important. Fishermen have become accustomed to working and covering expenses on a day-to-day cash basis, and they cannot perceive of being able to support households without such a continuous income. This short-term gratification orientation and related spending and budgeting behavior are crucial to their potential for becoming fish farmers, because mariculture operations require months of work and growth before sales can be made (Pollnac, 1975).

DISCUSSION AND RECOMMENDATIONS

Several differences between the workstyles and economic structure of capture fishing and mariculture have been identified in Fort Liberté. The lack of deferred gratification orientation and related spending patterns are seen as the main socio-economic factors inhibiting capture fishermen from becoming fishfarmers. However, other occupational groups in Haiti, such as farmers, who some think would make more appropriate candidates for cage culture, would not make the effort any easier. Many Haitian farmers are gardeners working small mixed-vegetable plots who have become accustomed to earning money as

needed to cover expenses. They do so by continually harvesting a few vegetables to sell in the local market rather than waiting to harvest all at one time. In fact, Haitians engaging in business and commerce in general constantly buy and sell items. Long-range production planning, contracts, etc., are only evident in Port-au-Prince.

The need for short-term returns and budgeting is essential to the success of mariculture. This need requires increased financial and management commitment on the part of a mariculture project, regardless of the target group chosen in Haiti. Credit programs to cover not only starting and operating costs, but also living expenses until the first harvest need to be devised and tested. Since the requirement to satisfy daily economic needs exists, management becomes more complex. Rotating production systems can be devised to ensure a continuous harvest, even daily depending on the scale of operation. A continual supply also would suit the market conditions. Without the capacity to preserve/freeze large quantities of fish, dealers must purchase small amounts every few days rather than in bulk. The viability and appropriateness of these ideas and recommendations on how to address the socio-economic orientation and cultural background of fishermen will be tested in ensuing phases of the CMRC-Haiti project.

The transition from research to extension will be made only after CMRC better understands local conditions and can demonstrate that saltwater cage culture will be appropriate for Haitian people in terms of socio-cultural conditions, low risks, and sufficient economic benefits.

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