Development of Brackish Water Aquaculture Emphasizing Sustainability in Western Visayas, central Philippines

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I. Abstract

Western Visayas is located in central Philippines and consists of Guimaras Island, Panay Island and Negros Occidental. This region is advanced in aquaculture. Interviews were conducted at Ivisan and Carles municipalities, located at the northeastern part of Panay Island, in November 2003 to investigate the state of aquaculture start-ups by local people. Many small-scale aquafarmers had started in the business after 1997. Most (93%) respondents currently engaged in aquaculture wanted to continue in their business. In this paper, marine fishcage culture, marine fishpen culture, oyster culture, mussel culture and seaweed culture are collectively termed "small-scale aquaculture".

Brackish water aquaculture in Western Visayas originally started by digging ponds in mangrove forests, but the growth in the number of ponds resulted in the degradation of water quality and outbreaks of prawn disease. Today, tiger prawn culture has declined and milkfish culture remains stagnant because of low price induced by a glut of milkfish. Both municipalities, however, are active in planting mangrove trees with the help of the central government, and coastal fishermen aggressively engage in small-scale aquaculture. The investigation revealed that both pond culture and small-scale aquaculture are leading towards practicing sustainable production systems and for some reasons it was noted that their production was lower than before.

Keywords: Brackish water aquaculture, Small-scale aquaculture, Philippines, Sustainability

II. Introduction

Aquaculture worldwide has developed in response to economic expansion and has helped activate local economies and improve peoples' diet and nutrition. However, problems are growing due to the deterioration of water quality caused by intensive culture and excessive use of formulated feed leading to rising prevalence of prawn diseases. To cope with these difficulties, the central government of Japan, established the Law to Ensure Sustainable Aquaculture Production in 1999.

Fish production in Southeast Asian countries depends more on aquaculture compared with that of Japan. This report outlines the development of brackish water aquaculture that emphasizes sustainability by using the Philippine case as an example. The fishery industry of the Philippines accounts for 4% of GDP and 5% of the total employed population. Aquaculture accounts for about one third of fishery production. In particular, brackish water aquaculture of milkfish, which has a history of hundreds of years, provides essential protein to the population. Milkfish is also the Philippines national fish.

Coastal fishing people in mangrove areas in the Philippines earn their living mostly from fishing. But the increasing number of fishers and the deteriorating marine resources limit their income. In addition, these people are trapped in poverty due to lack of other sources of income. The central government of the Philippines promotes small-scale aquaculture to help provide a new source of income to coastal fishing people.

This study was conducted on coastal areas with prosperous small-scale aquaculture businesses. It is a joint research project with Southeast Asian Fisheries Development Center Aquaculture Department (SEAFDEC/AQD), as part of the project " Studies on sustainable production systems of aquatic animals in brackish mangrove areas ", a five-year international project initiated in 2001 by the Japan International Research Center for Agricultural Sciences (JIRCAS). The Project focused on Western Visayas, one of the more advanced aquaculture

areas, where mangrove brackish water aquaculture is actively promoted with the support of the central government. The study aimed to investigate the influence of mangrove brackish water aquaculture on the local economy and review of the changing patterns of the aquaculture business in these areas.

III. Research methods

Western Visayas, one of the 15 administrative regions, is located in central Philippines. This region, comprised of Guimaras Island, Panay Island and Negros Occidental, is advanced in aquaculture. Panay Island has four provinces: Iloilo, Capiz, Aklan, Antique. SEAFDEC/AQD, located in Iloilo, provides technical assistance to domestic aquafarmers.

The survey was conducted at two municipalities (Ivisan and Carles) located at the northern part of Panay Island. The study site previously received technical assistance on aquaculture from SEAFDEC/AQD. We chose Ivisan municipality in Capiz province and Carles municipality in Iloilo province after discussions with three researchers (Susana V. Siar, Nerissa D. Salayo and Didi B. Baticados) at the Socioeconomics Section, SEAFDEC/AQD. The survey was conducted between November 2 to November 30, 2003. Secondary data were also received and analyzed.

IV. Results and Discussion

General status of brackish water aquaculture in Western Visayas

Table 1 shows recent changes in brackish water aquaculture production in Western Visayas. The volume of total production was 88,711 t in 1995 and rose to 99,258 t in 2001 due to increased production of seaweed culture (the 5th largest of the 13 regions). The value of total production, however, dropped from 8.5 billion pesos (1 peso is about 2.3 yen) in 1995 to 3.4 billion pesos in 2001 due to the decline in production of tiger prawn.

Table 2 shows changes in prices of major species of farmed fish, shellfish and seaweed in Western Visayas. Items priced in descending order in terms of value in 2001 are tiger prawn, grouper, mudcrab, milkfish, oyster, seaweed and mussel. Tiger prawn, grouper and seaweed are for export. The price of grouper stayed low in 1999 and 2000 due to economic weakness in its importer countries (Taiwan, Hong Kong, etc.). Other kinds of fish are mainly for domestic consumption.

Decline of tiger prawn aquaculture and stagnation of milkfish aquaculture

Brackish water aquaculture in the Philippines is divided into two types: one in brackish water ponds and the other in unenclosed bodies of water. Tiger prawn and milkfish are major products in brackish water pond culture, while mudcrab is often produced in combination with other species. In this paper, marine fishcage culture, marine fishpen culture, oyster culture, mussel culture and seaweed culture are collectively termed "small-scale aquaculture" since their scale is smaller than that of brackish water pond culture.

All tiger prawns are produced in brackish water pond culture. Its production in Western Visayas recorded a high at 33,958 t in 1995 and has remained at around 1,000 t since 1998. One of the reasons for this serious decline was the closing of many intensive culture businesses in Negros Occidental due to the outbreak of prawn disease. Water used to raise tilapia, found to be effective in preventing the outbreak of prawn disease, is pumped into intensive culture ponds. Since this system requires separate ponds to raise tilapia, prawn production is also naturally lower than that without tilapia ponds. Because the region is prone to outbreaks of prawn disease, there are now more aquafarmers carrying out low-cost extensive culture than high-cost intensive culture. The production of tiger prawn, which plunged from the 1995 level, is predicted to stay flat for the foreseeable future.

Milkfish is mainly raised by pond culture, although there has been an increased in intensive fishcage or fishpen culture of milkfish since 1999, when fish prices were still high. The national production level then rose to 232,000 t in 2002 (against 170,000 t in 1999), causing a glut. As a result, milkfish prices fell in 2002, forcing some intensive aquaculturists, who had spent large sums on formulated feed, to quit the business.

Since the price of milkfish is expected to remain low in the foreseeable future due to overproduction, low-cost extensive culture of milkfish is proving to be more advantageous than high-cost intensive culture. Given these circumstances, conditions for brackish water aquaculture of tiger prawn or milkfish in Western Visayas are increasingly favoring the extensive system of aquaculture.

Development of small-scale aquaculture

Table 1 shows that oyster culture production has been increasing since 1999, despite fluctuations in 1996 and 1998, whereas production of mussel, is characterized by large annual fluctuations, which dropped in 2001. The survival and growth rate of young shellfish strongly affect on the volume of production annually. Grouper culture in pond recorded the largest production in 2001. Grouper is raised in ponds as an alternative to tiger prawn. Production of mud crab has been increasing since 1997. Seaweed production has grown so fast as to more than cancel out, value-wise, an almost 50% fall in cultured seaweed prices.

Interviews were held at two municipalities (Ivisan and Carles), revealed that the planting of mangrove trees and small-scale aquaculture are being promoted with the support of the central government. The survey also showed that brackish water pond culture is mainly operated by richer people, including business people or merchants, engaged in businesses other than fishing, who lived inside or outside of the municipalities. It was also revealed that locally residing coastal fishermen are the main operators of small-scale aquaculture, the majority of whom are in the 'impoverished' bracket. Poor people live in bamboo frame houses thatched with coconut leaves. Marine fishpen culture of milkfish requires bigger capital if it uses the high-formulated feeding method of culture. In such cases, the aquafarmers are people above the middle-income bracket.

In Ivisan, the central government has supported the Fisheries Resource Management Project (FRMP) of the Bureau of Fisheries and Aquatic Resources (BFAR). The Project has been ongoing for five years, from 1999 to 2003, and is expected to be extended for a year or two. In Carles, the Department of Environment and Natural Resources (DENR) carried out the Northern Iloilo Mangrove Project, which was scheduled for completion in 2003.

Local residents approach to small-scale aquaculture

Table 3 shows the results of the survey conducted for local residents in the two subject municipalities. A total of 40 people were interviewed, many of whom are local coastal fishing people. The area being investigated in Ivisan is a purely fishing area, whose primary income largely comes from fishing. Any secondary income comes mainly from aquaculture. All the small-scale aquafarmers had started in the business after 1997. The survey site in Carles has households who are engaged in work other than pond aquaculture or fishing, showing a variety of sources of income, but many of them turn to aquaculture for their primary and secondary incomes.

Concerning the start-up year of their aquaculture business, in Ivisan, 29% started between 1997 and 1999 and 71% started between 2000 and 2003. All are small-scale aquafarmers. In Carles, 36% started before 1989, 21% between 1997 and 1999, and 43% between 2000 and 2003. From 1997 to 1999, many people started small-scale aquaculture, but the number of people starting pond culture has been increasing since 2000, partly because of turnover in operators due to the operational deterioration of pond culture.

Most people currently engaged in aquaculture answered that they wanted to continue in their business. Those who answered that aquaculture is easy gave such reasons as: (1) oyster culture involves only the anchoring of bamboo stakes, after which they simply wait for the catch; (2) with pond culture (extensive style), plenty of natural food and the good quality of water make subsequent management easier; (3) for seaweed culture, anybody can quickly learn how to do it, as it only involves the tying of ropes; and (4) small-scale aquaculture, such as fishcage culture, shellfish culture, and seaweed culture, requires a small investment and a lower workload until shipment. Those who answered that aquaculture is not easy cited such examples as: (1) operation is difficult since the price of formulated feed for milkfish is high; and (2) fishcage culturists have to watch out for poachers at night and check for damage to nets.

Development of sustainable aquaculture

Brackish water aquaculture in Western Visayas originally started by digging ponds in the mangrove forests, but the growth in the number of ponds resulted in the degradation of water quality and outbreaks of prawn disease. Today, tiger prawn culture has declined and milkfish culture remains stagnant, whereas coastal residents in both municipalities are active in planting mangrove forests with the help of the central government, and coastal fishermen aggressively engage in small-scale aquaculture. It was revealed from the investigation that both pond culture and small-scale aquaculture are tending towards being sustainable.

The importance to the Philippine government's aquaculture promotion policy centers on its positive influence on acquisition of more foreign currency by export of marine products, enhanced food security for the

people, and as a remedy to the poverty suffered by low-income coastal fishing households. Unlike Japan, the Philippines, as well as Southeast Asian countries, is characterized by high interest rates and an unsatisfactory system of preferential loans to coastal fishers, and is therefore less likely to encourage people to start up new businesses. Small-scale aquaculture, however, does not require much capital or much feeding management work, and is expected to find more operators among coastal fishers.

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