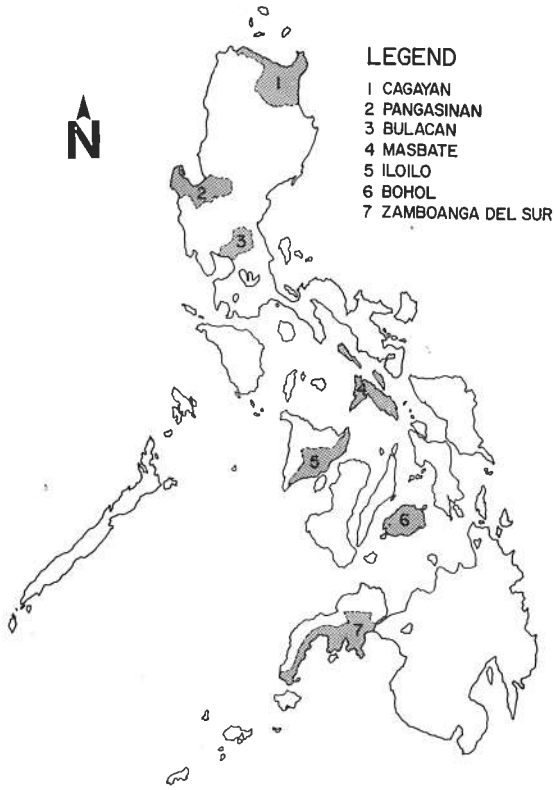

Philippine Milkfish Production Economics Study Underway

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WORKING in close collaboration with the Philippine Fishery Industry Development Council (FIDC) and the Philippine Bureau of Agricultural Economics (BAECON), ICLARM has recently completed the field survey phase of an in-depth study on milkfish production in seven provinces in the Philippines. The provinces were selected according to the four climate types in the country and are, from north to south, Cagayan, Bulacan, Pangasinan, Iloilo, Masbate, Bohol, and Zamboanga del Sur. In addition to a survey based on memory recall, all three cooperating institutions have also initiated an elaborate farm record keeping system with cooperating milkfish farmers. Milkfish production activities will be recorded in a book provided to each participant as these activities are carried out. In this way, bias in memory recall can be eliminated. The main purpose of the two-pronged survey is to collect information on input-output relationships in milkfish production.

Although the national average production of milkfish is 600 kg/ha/yr, there are large differences in the yields of Philippine milkfish ponds both between and within provinces. These yields range from 200-400 kg/ha/yr in some provinces to over 1000 kg/ha/yr in others, suggesting that some ponds are poorly utilized and that a substantial increase in milkfish production could be achieved in most of the existing 176,000 ha of milkfish ponds if producers had a better understanding of the relationships between inputs and outputs.

Most informed people agree that one of the main limitations to higher aquaculture production has to do with the limited use of supplemental inputs for production. This may be due to the cost and availability of inputs or the lack of understanding of the economics of input use. The use of inputs in an aquaculture setting implies that the environment in which the cultured organisms, e.g., milkfish, are raised is under some degree of control by the producer. Aquaculture operations can therefore be managed to maximize revenues. This is unlike capture fisheries where the producer has little or no means to manipulate the environment to provide optimum conditions for growth.

Why are most milkfish ponds in the Philippines under-utilized? One possible explanation lies in the fact that the "workings" of the aquatic production process have not been fully understood. To date no attempts have been made to conduct rigorous economic analysis of aquaculture operations with a view to estimating the input-output relationships of production. Quantifying and analyzing input-output relationships have, in large measure, been discouraged by the absence of appropriate and reliable data, often because of the proprietory nature of such information.

The paucity of reliable data on aquaculture production systems has prompted ICLARM to initiate two projects with cooperating institutions in the Philippines and Thailand, respectively. The objective of the Philippine project is to collect reliable data to establish the empirical input-output relationships of milkfish production. Close attention has been given to the design of the survey questionnaire. Supervision has been provided to ensure that the data collected reflect actual field conditions. The Thailand project is outlined in a separate article, p. 5.

With the functional input-output relationships empirically established, these production functions can be used to provide information for improved

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ferent payao located about 10 km to the north. The fish of this catch were a little bigger and contained more yellowfin, the more valuable species. Also in this catch were leatherjackets, *Aluteres monoceros,* triggerfish *Canthidermis* sp., and several rainbow runners, *Elegatis bipinnulatus.* Observed at the surface near the payao were the sergeant-major, *Abudefduf saxatilis* and the pilotfish, *Naucrates ductor.* Two dolphin, *Coryphaena hippurus*, were seen swimming in the area.

Several factors could have caused the smaller second day harvest. It is possible that the purse seine encircled only a small side of the school if the school was not in a circular pattern around the haybong or the largest portion of the school might not have drifted with the haybong after it was transferred from the payao to the small boat. Another possibility is that predators disrupted the school. There are many reasons behind a small catch which is one of the chance factors inherent in this business.

At present, the payao harvesting months are from January to June during the dry season. Local fishermen say that tuna are present year round. If the payao could be made to withstand typhoons and associated forces, there is no reason harvesting could not be done year round at a rate of once a month. If a local family owned one or two payaos, it could prove very lucrative since commercial harvests are averaging about 15 t.

My recommendations to improve the system and to make it more durable and efficient are:

1. Dispense with the bamboo raft portion of the payao; use only an anchored buoy with an attached haybong. The bamboo is subject to rotting and must be replaced every few months. Storms can also damage the raft. Also, the shadow effect of the bamboo raft has been shown to be negligible in attracting pelagic fishes (Hunter and Mitchell 1966).

2. Lengthen the haybong and substitute relatively inert materials such as plastic or rubber for the decomposable coconut leaves.

3. Wait until minutes before the purse seine is set to transfer the haybong. In this way, it is less likely that the fish will not be concentrated around the haybong and the net should be able to encircle a large segment of the schooling tuna.

Literature Cited

von Brandt, A. 1960. Fishing methods in world sardine fisheries, p. 563-623. *In* H. Rosa, Jr., and G. Murphy (eds.), Proceedings of World Scientific Meeting on the Biology of Sardines and Related Species. Rome. Vol. II, Subject Synopsis No. 3.

Hastings, R.W., L.H. Ogren and M.T. Mabry. 1976. Observations on the fish fauna associated with offshore platforms in the northeastern Gulf of Mexico. Fish. Bull. 74(2): 387-402.

Hunter, J.R., and C.T. Mitchell. 1966. Association of fishes with flotsam in the offshore waters of Central America. U.S. Fish. Wildl. Serv. Fish. Bull. 66(1): 13-29.

Treybig, D.L. 1971. How offshore platforms help fishing. Ocean Ind. 6(4): 64-65. ●

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decision-making affecting the production operations. For example, given the prevailing prices of inputs and outputs, it is possible to determine the most profitable quantity of milkfish to produce and how much of each input to apply. As the demand for inputs, such as land, water, fertilizers (organic and inorganic), fry/fingerlings and labor increases, these inputs become increasingly scarce, so it is important that they be used in the most economically efficient combinations. Further, the production function can also show which of the inputs contribute the most to total production and therefore where improvements in input utilization can be made to increase yield. It can also be used to show whether there are increasing, constant, or decreasing returns to scale of production operations.

The fitted production functions not only provide information on the marginal productivities of the inputs and efficiency of input utilization but also on substitutability among inputs. For example, an appropriately specified production function can provide information on whether the relatively more costly input, such as inorganic fertilizers, can be substituted with a less costly input, such as chicken manure. To provide answers to the questions above, various functional input-output relationships will be specified and estimated. These functions will be estimated by province, climatic regions, pond ownership patterns (private vs. government leased ponds) and between high and low yield ponds.

Production function estimation as an analytical tool can be invaluable in the light of current enthusiasm and efforts to promote aquaculture in developing countries, especially as there have been recent changes in the relative availability of inputs needed for aquaculture.

It is hoped that the results of the study will help fish farmers and government officials to organize fish production and the utilization of scarce inputs so as to improve the efficiency and performance of aquacultural operations. Data analysis will be completed in mid-1980. ●

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surveys conducted monthly throughout the Gulf of Thailand.

They agreed that such regular surveys were useful, not only to determine changes in the demersal community but also as a means to collect biological information needed for ecological study.

It was agreed that more meetings, such as the Bangkok seminar, should be held, to upgrade the knowledge and experience of various fishery scientists/institutions in the region on stock assessment methodology and to exchange views and technical knowhow on the various stages of demersal fishery management, which is what is most needed in the region today.