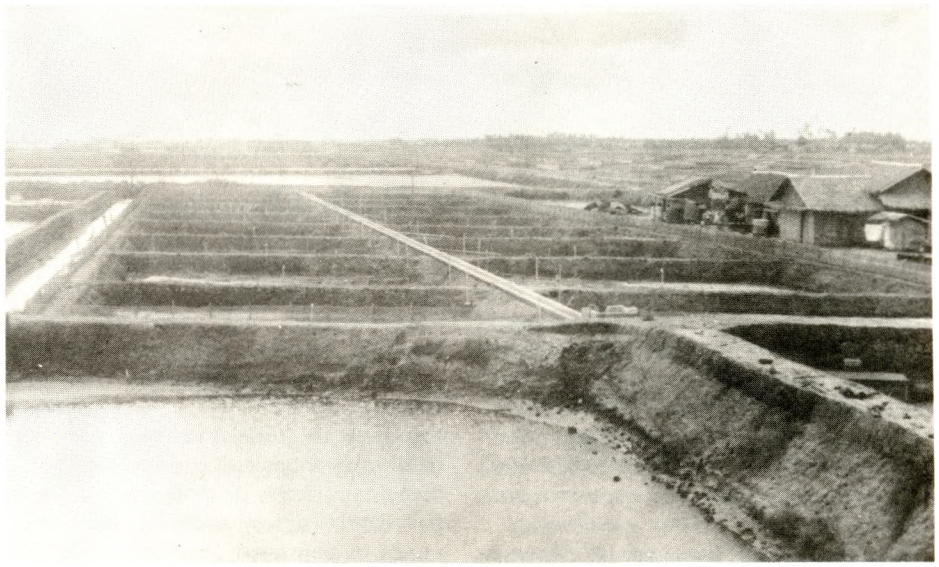
SEAFDEC nursery pond system solves prawn fry survival problems

The Philippines has a long history of aquaculture predominated by bangus farming in brackishwater ponds. Pond operators increasingly find that when they harvest their fish, they also harvest prawns which accidentally enter the pond during regular water change or which are stocked unnoticed along with bangus fry. They are also finding that they would earn much more if they could harvest more prawns as these command a much higher price than bangus.

The Aquaculture Department is popularizing sugpo farming not only because of high demand for this item both in the local and export markets, but also as a means of increasing food production, improving nutrition and raising employment and income levels in the villages. For a start, beginning 1974, the Department provided pond owners, initially in the Island of Panay, with sugpo fry produced from its hatcheries. This encouraged many pond owners to join the Fishpond Cooperators Program — a research-production scheme — which the Department set up to gather benchmark information on various traditional ways employed in farming sugpo and to encourage the application of scientific techniques in the fishfarm.

One constraint has since surfaced. Pond owners have observed that sugpo fry caught from its natural habitat fare better in the rearing or grow out pond. Is it possible that hatchery-bred fry are less resistant?

In 1975, the Department reported a survival rate of 2 to 30 percent from nauplius stage to P_{12}-P_{21}. The then Training and Extension Division reported a 10.38 percent over-all survival of hatchery bred-fry made available to the first group of Fishpond Cooperators (rearing from P_{11}-P_{14} until marketable size) and 9.3 percent survival for the second group. The Cooperators attributed the low yield to unviability of fry and suggested further tank rearing of post-larvae preferably up to P_{25} or P_{35} approximating the age of fry caught from the wild. But that would mean longer hatchery operations and added expense not to mention problems such as space, feeds, stress, cannibalism, etc. An answer had to be found.



The sixteen units 200 m^2 ponds with a supply canal, made of concrete hollow blocks, running through the center and with drain canals on both sides. Foreground is a portion of two reservoir ponds which provide enough water with optimum salinity.

To increase survival of prawn fry up to marketable size, the Department launched the improved pilot nursery pond system. This improved design and operation — from all indications so far — has become the vital link between the hatchery stage and the grow out pond phase. By enabling the harvest of hatchery-bred sugpo fry as early as P_4 and P_5 and by providing prawn juveniles that are fit and ready for stocking, the pilot nursery pond system has solved the critically long gap between the hatchery and the grow out pond.

Project leader Florentino P. Apud, Jr. of the Pond Research in Prawn, who came up with the idea, implemented it, and since its start of operation in mid-1977, has been constantly improving its results has reported that since the start of operation of the SEAFDEC 1 ha pilot prawn nursery pond system sometime in the middle of 1977 about 80 to 90 percent of the hatchery produce in Tigbauan has been accommodated at stage P_2 to P_4 or P_5. *This has raised hatchery production by about 100 percent.* A sizable quantity of juveniles (about 775,000 excluding those not harvested in ponds) was produced from July to December 1977 alone and another half million in the sec-

ond quarter of the year 1978. During the first quarter (summer months) Hatchery and Nursery undertook major repairs, hence operation was minimal. Sizes produced range from 0.4 g to 1.5 g at stages P_{30} to P_{40}. These sizes were just appropriate for stocking in grow out ponds and were preferred by pond operators, Apud claimed. Of the total harvest, about 57.73 percent went to SEAFDEC Fishpond Cooperators in the Visayas; 23.6 percent were retained in the Leganes Station for further pond experiments in grow out ponds up to marketable size; 17.8 percent went to Cooperators in Luzon and for experimentation at the Binangonan Station; and 0.93 percent for experiments at the Aquaculture Department main station in Tigbauan.

According to Apud, demand has increased so that a commercial size nursery pond system had to be established. The system has 24 pond units of 1,000 m^2 each, equipped with separate supply and drain canals and reservoir system for effective water management. It also has a centralized concrete catching pond and a harvest center for effective harvest of prawn juveniles.

These harvest facilities are important because they minimize stress and increase convenience in handling, storage and packing for transport. The harvest center is provided with elevated filtered sea water tanks, an aeration system and storage room for ice. Ice is used for acclimation or reduction of water temperature and maintaining the same at 22°C during transport.

Once in full operation, the set-up will be capable to accommodate from a minimum of 2.4 million fry to a maxium of 5 million fry per operation at a stocking

(Continued on p. 7)

Ferrocement tank for sugpo maturation

A practical, easy and economical method of constructing ferrocement tanks highly suitable for sugpo (*Peneaus monodon*) maturation has been developed. This was contained in a paper submitted for publication to the prestigious *Journal of Ferrocement* by Rodolfo T. Tolosa of the SEAFDEC Aquaculture Department.

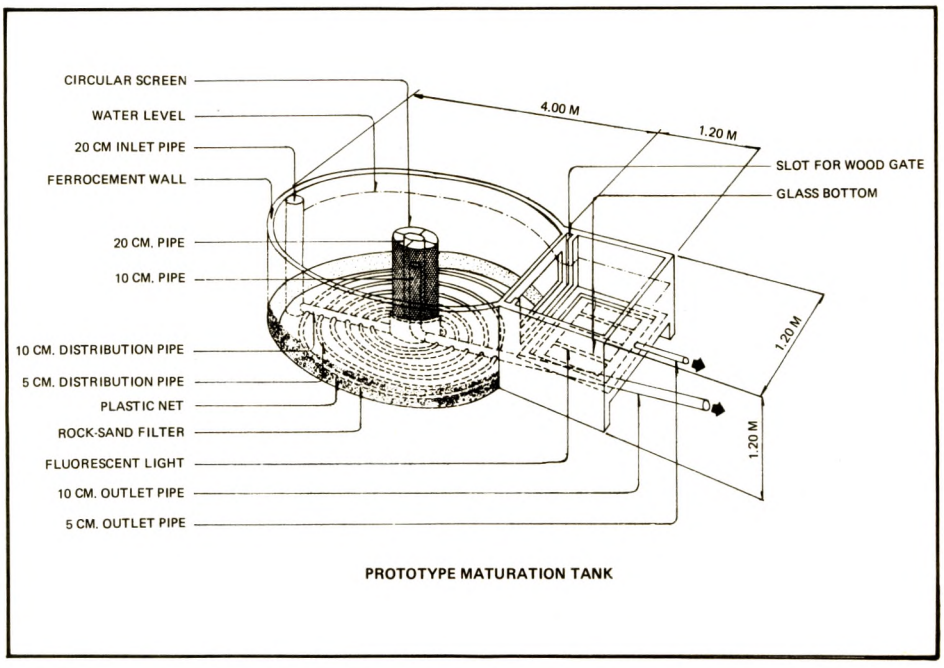
Engr. Tolosa said three 12-cu m cylindrical tanks had been built and now in operation while one 25 cu m capacity is being planned for construction.

The tank has two components — a cylindrical portion which is 4 m in diameter and an auxiliary rectangular portion measuring 1.2 x 1.2 m. The prototype design provided for a holding structure made of ferrocement with a thickness of about 4 centimeters only (see isometric drawing of prototype).

The enclosure can accommodate 80 adult prawns at a 1:1 male to female ratio. For this purpose a volume of about 12 cu m and a water level of 1 m were deemed sufficient, Toloso reported. The research consideration made it necessary to have a tank in the form of a cylinder to provide greater convenience in the movement and circulation of the prawns. Other design considerations were that materials used for the enclosure had to be readily available, durable and with a low thermal conductivity. The inside surface of the wall had to be smooth to prevent injury of prawns.

A flowthrough system of water supply instead of the aerated stagnant water type was used. A flowthrough system has the advantage of renewed water and a minimum build-up of pollutants in the tank.

(Continued on p. 7)



PROTOTYPE MATURATION TANK

fishfarmers. Demonstration has to be more regular with a genuine extension service which intervenes most often. Technical assistance will be provided by trained extension officers or instructors and by the monitors and assistants. They are responsible at the same time to provide frys of *Tilapia nilotica*, free of charge, to individual fish-farmers as well as to dispense advice on feeding and fertilizers suitable for fishes. Fishfarmers have to provide their own feeds and fertilizers. Up to the present, no particular disease has been reported. However, if they do occur in the future, health inspection and disease control will be undertaken through the laboratory of the Maritime and Lagoon fishing directorate or of the hygiene service.

The budget for the experimentations and the pilot demonstrations is provided annually by the Government. Extension has to be more compact and continue with the private or rural fishfarmers since the present extension personnel is still very insufficient despite all the good intentions. Thus, it is urgent to train extension agents to be able to implement genuine aquaculture extension services to achieve the objectives projected in aquaculture. □

Information source for the article is the report, "National Aquaculture Development Plan in Ivory Coast," which was translated from the original French text to English by Weena Sornchai of the Asian Institute of Aquaculture.

SEAFDEC nursery

(from p. 5)

density of 100 to 200 fry per m^2. At a 45-day period per operation, including pond preparation, the set-up is therefore capable of undertaking about 6 to 8 operations per year which means it can accommodate from 15 to 40 million fry in the same period, Apud reported.

For inquiries on the construction and operations of the nursery pond, communicate with Florentino P. Apud, Jr., P.O. Box 256, Iloilo City, Philippines, 5901. □

BFAR, SEAFDEC conduct mobile training

(from p. 8)

ected BFAR personnel from all regions in the country on small-scale prawn hatchery operations preparatory to the setting up of demonstration village-level prawn hatcheries in BFAR training centers.

BFAR is the agency of the government of the Philippines, under the Ministry of Natural Resources, which is responsible for the development of fisheries and aquatic resources in the country. Headed by Director Felix R. Gonzales who is the current chairman of the SEAFDEC Council of Directors, the Bureau has regional stations strategically located for the conduct of various training programs, some of which have complete facilities for continuing research.

Meanwhile, the Aquaculture Department has just completed a 4-day training in prawn culture (*Penaeus monodon* F.) in Zamboanga City, Southern Philippines involving 50 pond owners and their technicians, from October 25 to 28. Topics discussed by resource persons from the Department included prawn broodstock development, small-scale hatchery, pest and predator control, feeding and diets, as well as problems and potentials in prawn farming. Held under the auspices of the Asian Institute of Aquaculture, the training was conducted on the request of milkfish pond owners in the area who have taken interest in farming *P. monodon* as existing ponds for milkfish are readily converted to grow this crustacean. Agencies which assisted in the training were BFAR, the Mindanao Regional School of Fisheries, the Armed Forces of the Philippines South Command (AFP Southcom), and pond owners' associations in the area. □

Ferrocement tank for sugpo

(from p. 5)

To insure a uniform distribution of dissolved oxygen, a piping system that distributes water equally in the tank was needed.

The project also required a filter system to improve water quality and at the same time provide a substrate for the prawn broodstock. Another need was to have an adequately illuminated area in the tank into which the broodstock can be drawn and examined for ovarian maturation.

The total cost of materials for one unit whose components include the ferrocement enclosure, PVC piping system, electrical system, filter system as well as finishing amounted to ₱5,363.90 (₱1.00 = US$0.137).

The enclosure cost ₱1,785.40, the piping system which made use of PVC pipes was ₱2,593, the electric system came up to ₱784, the filter system ₱90.00 and finishing was ₱110.50.

Details of the design and construction methods may be requested from Engr. R. T. Solosa, SEAFDEC Aquaculture Department, P.O. Box 256, Iloilo City, Philippines 5901. □

OI, SEAFDEC in joint R & D

(from p. 3

through interest in both basic research and the practical needs of today's demanding society; maintain the quality of life of man through the study of aquatic plants and animals and preserve the heritage of the sea for future generations through education and management of resources.

The Aquaculture Department of the Southeast Asian Fisheries Development Center is a treaty organization established on July 9, 1973 among six nations, namely, Malaysia, Singapore, Thailand, Vietname, the Philippines and Japan and is charged with the responsibility of developing aquaculture in Southeast Asia. It has succeeded in completing the life cycle of the prawn, *Penaeus monodon,* from broodstock development, breeding, and larval rearing under controlled conditions and culture in ponds and pens to marketable size. It has also succeeded in induced breeding and larval rearing of milkfish, *Chanos chanos*, under controlled conditions and artificial breeding and larval rearing of *Scylla serrata, Portunus pelagicus* and others. □