R & D Notes

Aquaculture development plan in Ivory Coast

Fish production in 1974 was 74,000 tons, of which 12,000 tons came from inland waters and about 10 tons from fish culture in ponds.

Importation in 1974 was 86,000 tons of fish for a total consumption of 160,000 tons. This deficiency in fish production was made up by the importations valued at CPA. F. 7,000 billion.

Annual per capita fish consumption is 25 kg in the next ten years for a total projected consumption of 240,000 to 350,000 tons. Marine water culture will provide 40,000 to create 45,000 tons while aquaculture is expected to supply 15,000 to 20,000 tons.

Objectives

The long term objective of the plan is to eliminate deficiency in animal proteins especially in the northern part of the country. This can be achieved through aquaculture development, by utilizing all the means in the regions where there is adequate water supply and sufficient local agriculture by-products for fish feed. For this purpose, it is necessary to establish fish farms, rural fish culture in ponds and integrated with the rearing in rice valleys, floating cages, racks and enclosures rearing in lakes, lagoons, rivers and mangroves.

A medium-term goal in Ivory Coast is to consolidate the practices which have already been undertaken and to extend the fisheries techniques which are rectified through the fisheries researches Centre of Bouaké (CTFT-Cote-d'Ivoire), the FAO/(UNDP)/AVB/IVC 526 project at the lake of Kossou, and the Abidjan University in the experimental fish farmhouses and production, rural pond fishculture with the associated rearing of pig and poultry, floating cages, racks and enclosures in the fresh and brackish water.

Meanwhile, the immediate need is for the continuation of extension in rural areas by establishing new ponds with better surroundings to suit hydro-agricultural management if possible. It is necessary to create a pilot farm of fish culture in order to establish the financial viability of fish culture in all its forms as well as to pursue intensively all the researches like feeding, reproduction, fry stocking, cages, racks, enclosures, etc.

Production Targets and Means

The planned production targets aimed to cover the deficiency of 100,000 to 125,000 tons will be achieved through the following methods:

a) Construction of 1,550 ha of rural pond fish culture integrated with pig and poultry rearing.

b) Construction and exploitation of 3,000 floating cages, racks and enclosures rearing in lakes, lagoons and mangroves for an estimated production of 6,000 tons.

c) The exploitation of 10 private and mixed pilot fish farms covering 100 to 110 ha which should yield 1,000 tons.

d) Construction of 500 ha of rice racks that is estimated to produce 100 tons.

Systems and Species Selected

The results of fisheries researches at the Tropical Fishery Technical Centre of Bouaké have shown the feasibility of certain systems of fish raising which can be expanded. In pond culture, good results have been obtained from the monoculture of *Tilapia nilotica* fed with rice or cottonseeds. Yields have ranged from 3 to 5 tons of fish/ha/year.

The polyculture of *Tilapia nilotica* with a predator (*Lates niloticus* or *Clarias lazera*) gives better outputs ranging between 6 to 8 tons by using rice bran or ground cottonseeds. This system is still under the experimental stage.

Technological Situation

Application research results has provided an advance technology in respect to monoculture and polyculture of *Tilapia nilotica.* Technology is being demonstrated in respect to the use of artificial fish food made out of agricultural by-products like rice bran, ground cottonseeds, (parche de) coffee, palm-nutcakes, cotton, copra, brewer's grains.

The training of the average cadres higher staff, controllers or assistants is well in advance. The extension techniques of Tilapia culture in the rural areas are also being well established.

The experimental stage concerns the natural production of the fry stocking of *Clarias lazera,* improvement of artificial fish feed through the formulation of feeds composed of local agriculture by-products, fish raising in floating cages in the lakes, natural reproduction and stocking of certain species which have economic potentials such as Chrysichthys, Heterobranchus, Auchenoglanis and Macrobrachium.

Demonstration operations are done at the fry stations with *Tilapia* and *Clarias, Tilapia* and *Lates.* Pond fertilization is also being demonstrated.

Training of Core Personnel

The demands of core personnel to achieve the targets are divided into two levels:

Subordinate Staff: Instructors or fish extension workers; extension personnel who should be trained on the spot. The estimated demand is: short term – 14 instructors, medium term – 80, and long term – 457.

Medium Staff: Fisheries monitors and assistants for which the minimum requirement is the Brevet d'Etudes du Premier Cycle (BEPC) and preferably a baccalaureate. The duration of training is from 8 to 10 months. The medium staff is a technician in aquaculture able to manage a commercial fish farm and to supervise extension-workers. The estimated demand: short term – 5 medium staff; medium term – 20; long term – 118.

Extension Services

Demonstration has been going on for several years through the routine operations of the fisheries stations of the state in the under-prefectures and the villages. They aim at stimulating the interest of peasants and individuals in practicing fish culture in ponds and at improving rearing practice by teaching the rural and private

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

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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

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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

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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

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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. □