Asian Aquaculture

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Asian Aquaculture Institute Established

Aquaculture research and development is moving on to new frontiers; fish farming in Asia, where 70 percent of the world's aquaculture output is produced, is now to receive added impetus with the establishment recently of the Asian Institute of Aquaculture (AIA), a new unit of the Southeast Asian Fisheries Development Center (SEAFDEC) Aquaculture Department.

This was announced recently by Dean D.K. Villaluz and Dr. Q.F. Miravite, Chief and Executive Director, respectively, of the SEAFDEC Aquaculture Department based at Tigbauan, Iloilo in the Philippines.

At the same time, Villaluz and Miravite announced the appointment of Dr. Joseph C. Madamba as Director of the AIA, effective May 23, 1978. Dr. Madamba is the former director general of the Philippine Council for Agriculture and Resources Research (PCARR).

An internationally known scientist and research system administrator, Madamba played a vital role in the development of the Philippines' national research system for agriculture and natural resources. At present, he is also a member of the internationally prestigious Technical Advisory Committee to the Consultative Group on International Agriculture Research (TAC/CGIAR), a member of the Board of Trustees of the International Council for Research in Agro-Forestry (ICRAF) and a member of the Board of Regents of the newly established Mariano Marcos State University. With his leadership as first director general of PCARR,

Dr. J.C. Madamba

the Philippines' research system for agriculture and natural resources has become one of the models for other Third World countries to follow. Madamba was succeeded as PCARR director general by Dr. J.D. Drilon, Jr. on May 6, 1978.

Asia has vast fishery resources with major potential for aquaculture development. However, this resource abundance is equally faced with awesome problems: notably the lack of scientific and technical expertise for aquaculture development in the Asian region.

The AIA charter, which was framed in February this year, envisions a mechanism to train manpower—from research managers and researchers, to operators, down to the technican level, and to hasten the transfer of fish farming technology in Southeast Asia and other developing countries. The AIA is commissioned by its charter to carry out the following functions:

1. Provision of opportunities for regional and international scientists and technologists to conduct development-oriented research in aquaculture and avail themselves of the facilities and resources of the SEAFDEC Aquaculture Department and other appropriate institutions;

2. Training of scientific and technical level manpower in applied aquaculture research and development in Southeast Asia and other developing regions of the world;

3. Promotion of regional and international cooperation among scientists, technologists and fish farmers, as well as institutions engaged in aquaculture development; and

4. Provision of opportunities for verifying and packaging aquaculture technology and disseminating the same to interested countries and institutions.

With the emergence of AIA, a brighter future is seen for aquaculture development. AIA hopes to institutionalize the education and training of fishery and aquaculture manpower resources in Asia. There are universities and research organizations in some countries offering fisheries courses and related disciplines but none has assumed a regional character or scope. This "compartmentalization," brought about by geographic and national boundary limitations, defeats the purpose of meeting the manpower development problems of aquaculture.

AIA was created to tap the ready resources of these universities and re-

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The Technology Continuum

A concept for the transfer of aquaculture technology in Asia

There is always a great disparity between yields attained at the experimental level and those obtained at the farm. This is plainly evident in agriculture where, as in the Philippines, rice yields have remained generally low (1.2 to 1.7 tons per ha) despite IRRI having developed the technology to harvest 8 to 10 tons. With corn, it is the same story where, at the experimental level, yield is as high as 5 tons per hectare per crop but reduced to 2.64 tons at the field testing level and 1.4 tons at the farm level on optimum areas and 0.5 tons in marginal lands. Similar examples abound in animal husbandry, forest production and, obviously, aquaculture, a fairly recent field of concerted scientific concern compared to crop and livestock culture.

Case of the Late Corn

In fairness to the generators of technology, it is not an established fact that results of their scientific efforts are that inappropriate although every now and then we see a good example as in the case of a top-notch Filipino plant breeder, Dr. Virgilio G. Carangal, who during the recently concluded Asian Workshop on Technology Generation, Verification and Dissemination candidly told this story.

It appears that he was given a Presidential award for developing a high-yielding maize variety which was vigorously promoted among farmers in Mindanao who eagerly tried, and promptly rejected, it. The new variety, it turned out, matures 10 days later than the old corns the farmers had been using, which of course upset their entire cropping system.

"It was nice to receive a citation," Carangal remarked, "but hardly satisfying to think that what I had been acclaimed for was not entirely useful."

It was an attempt at understatement but the point is clear: technology must be tested in the actual production setting, taking into consideration the specific location and the specific situation, before it can be recommended with confidence.

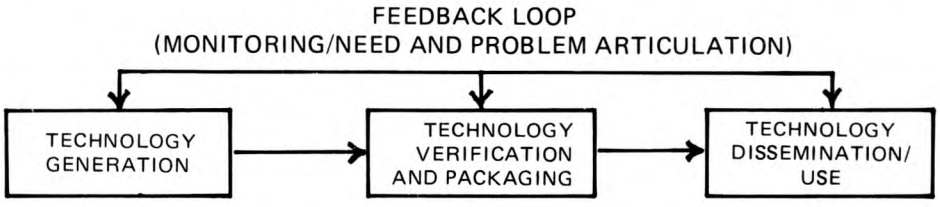
The Concept

Actually, verification of technology, according to former PCARR director general Joseph C. Madamba, presently director of the Asian Institute of Aquaculture, is only one of the processes in the so-called technology transfer continuum. At one end is technology generation, at the other is technology dissemination and use. Being a continuum, it is clear that a breakdown somewhere along it affects the efficiency of the entire technology transfer system.

In the transfer of technology, two things are moved, Madamba says, the *component technology* (i.e. everything about milkfish culture) and the *appropriate production system.* These are to be applied in the context of the producer's setting, capabilities and limitations, resources, and probably aspirations, Madamba says.

The target is to effect complete and high-fidelity transfer from source to end user; the main requisite is to have a reliable and strong mechanism for forward and backward linkages to monitor and provide feedback of needs and problems of both technology source and ultimate user.

The scheme may be illustrated as follows:



Application to Aquaculture

Generation

Research and development programs could be conducted along various aquaculture commodities such as milkfish, carp, mussels and oysters, crab, prawn, and other important food species. These programs may range from the basic to the applied and problem-oriented researches depending on the technology gaps.

The commodity programs should be conducted in a network of research stations with a main station (i.e. the Aquaculture Department of SEAFDEC) handling the needed research on the component technology and the cooperating stations to be located, in other countries, doing the studies to cover differences in environments, socio-economic conditions and production systems. The research team in a cooperating station will be working with the research system of the country where it is located.

For *borrowed* aquaculture technology, the second component of the technology generation stage, the network's research teams and the local scientists will have to challenge and test it for in-country adoption. Technology proven successful elsewhere is not automatically and without question applicable to another country or, if it comes from another world region, to Asia.

Verification and Packaging

Technology developed by local scientists, international research centers, and other national research systems can only be said to be viable if adapted and made responsive to end-user actualities, says Madamba. To avoid let-downs generally caused by the enthusiastic dissemination of a breakthrough or a miracle product without benefit of verification, it is imperative to test these results on both a location-specific and situation-specific basis before they are fed into the extension and media pipeline, he explains.

Testing involves research stations with a multi-disciplinary team of researchers; it is done in the local setting. A scheme of pilot program packaging and testing would further fine-tune the verification stage. Here, a pilot test area is selected from several producers' sites in a given ecological or agro-climatic zone. Results of the pilot program could then be packaged for dissemination to and application by producers with similar product-

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SEAFDEC Schedules Fishery Training Programs

The SEAFDEC Aquaculture Department has scheduled four types of training for the second half of 1978 and for early 1979.

These are: 1) special fisheries training for U.S. Peace Corps Volunteers; 2) mobile training in pond development for central and eastern Visayas; 3) various aquaculture training for pond owners and pond technicians at SEAFDEC stations; and, 4) aquaculture training for overseas participants.

Special Training

The special training scheduled for July-August is an intensive pre-service technical training in fisheries for 39 U.S. PCV's who will be engaged as fisheries extension workers in the Philippines. It will cover fish culture (marine, brackiswater, fresh - water), research, fish capture, and fisheries administration.

Designed to help prepare the Volunteers for their work as extension workers, the program will bring together, in a learning environment, researchers, practitioners and extension specialists. A re-training of the same group may be conducted after six months in order to assess the applicability of the technologies learned and to provide the participants opportunity to share their experiences and identify their needs for more effective handling of field assignments.

Local On-Site

The mobile training for central and eastern Visayas – planned for August – is being introduced for the first time. It will be held in four proposed training sites outside of the Department's stations. The activities will be undertaken in cooperation with the Philippines Bureau of Fisheries and Aquatic Resources (BFAR) and local fishpond operators or fish farmers associations. The training which will be handled mostly by Department researchers and scientists will cover such topics as pond development, pond management, pond engineering, and milkfish and prawn culture. It will involve some 50 participants at each of the four sites. Among the reasons for conducting the local-on-site training are that it will considerably reduce cost to participants and that participants can be trained where their ponds are located, thus getting more effective instruction.

Local in-Station

Training conducted at SEAFDEC stations are attended by pond owners, pond technicians and agency observers to update their knowledge of milkfish culture, prawn culture, mussel and oyster farming, fishpond engineering and hatchery management. This training is scheduled for late 1978.

International Training

The aquaculture training for overseas participants is designed to meet the needs of SEAFDEC member-country representatives as well as those coming from other developing countries in Southeast Asia, South Asia, Africa and other tropical areas. The program – scheduled to begin in January 1979 – covers separate sessions in aquaculture research methodology, aquaculture management, fishpond engineering and small-scale hatchery management. Depending on the subject-area, the length of training may last from one to four months. Participants to this training are nominated by their governments.

The international training program and the local in-station program are conducted yearly.

Rural thrust-

SEAFDEC, Mariano Marcos State U Launch Seedbank Project

Vast fishpond resources are awaiting exploitation to generate more economic opportunities for the rural people. But there is a snag: unavailability of a continuous and reliable supply of fry.

On this score, the SEAFDEC Aquaculture Department and the Mariano Marcos State University are going into a milkfish seedbank establishment project. It becomes operational this July. Mariano Marcos State University is located in the Northern Luzon province of Ilocos Norte. The seedbank project will be set up in strategic areas of the Ilocos Region, comprising four thickly populated provinces.

The project is an offshoot of a recent visit of Prime Minister F.E. Marcos to the SEAFDEC research complex in Tigbauan, Iloilo. The President noted the technological advances that had been achieved by the Aquaculture Department in the culture of milkfish, prawn, crabs and other aquatic food species and pronounced the establishment of a rural fishery development program. Such program shall involve the cooperation of the SEAFDEC and the Marcos Foundation, with the foundation providing financial assistance in the establishment of rural-based fishery projects and the Department giving the technical support.

The SEAFDEC-MMSU project sees the organization of seedbank cooperatives among fry gatherers with the fry grown and started into fingerlings to provide a year-round supply of good quality seedlings.

Milkfish, a popular and important food item among Filipinos, could become the mainstay of an expanded rural-based aquaculture industry with the solution of the fry availability problem and the infusion of scientific practices in its culture.

Minister Marcos also strongly supported the move to make the SEAFDEC Aquaculture Department into a nucleus for an Asian regional network for aquaculture research.

Floating Fishpens for Rearing Fishes in Malaysia*

Floating fishpens were first introduced in Malaysia in 1973 for rearing groupers, *Epinephelus tauvina,* in the Straits of Penang. Over three years, this method has proved to be technically feasible and commercially viable. Total production of groupers from floating fishpens in Penang is around 10 tons a year, using a coastal area of about half an acre.

MERITS

The system has the following advantages:

1. It takes advantage of the good water quality of the open sea with the adequate circulation of water by tidal flushing hence ensuring adequate oxygen supply and eliminating the accumulation of waste from fishes.

2. In deep reservoir or mining pool where anaerobic condition prevails at the bottom, floating fishpens could take advantage of the upper layer of the water which is rich in plankton and high in oxygen content.

3. It allows easy management at which the floating cages could be periodically checked, repaired, cleaned or even renewed. The condition of the nets used to contain the fish could be easily maintained.

4. Periodic checks on the condition of the cultured fishes in floating fishpens could be done. Fishes could be easily hauled out for examination, weighing or treatment.

5. As the fishpens are not permanently installed to fixed locality the cages could be easily moved from one locality to another if threatened by water pollution.

6. By using off-bottom methods, predators can be controlled with less loss of stock.

7. Fishpens can be used in areas where the bottom is not suitable for traditional shellfish farming, rocky or uneven.

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*From Fisheries Bulletin No. 20, 1977, "Floating Fishpens for Rearing Fishes in Coastal Waters, Reservoirs and Mining Pools in Malaysia" by Chua Thia-Eng and Teng Seng Keh, School of Biological Sciences, University Sains Malaysia. [The Bulletin was published by and available ($5.00) from the Publications Unit, Ministry of Agriculture, Kuala Lumpur.]

Larval Rearing

Milkfish Researchers on Threshold of Another Breakthrough

High mortality of artificially reared milkfish (*Chanos chanos*) larvae — one of the remaining critical problems in the drive toward developing the technology to mass produce *bangos* fry — has apparently been licked by SEAFDEC Aquaculture Department scientists.

They have succeeded in rearing larvae that have survived beyond the critical point which is about 56 hours or 2-1/2 days from hatching. Previous efforts have resulted in 100 percent mortality after the 6th day in the research laboratories in Tigbauan, and survival of only 32 larvae in the research station in Pandan.

35000 Survivors

In May 23 this year, the researchers obtained, at the Tigbauan main station, fertilized eggs from a hormone-induced spawner or *sabalo*. The fertilization rate achieved was around 38 per cent while hatching rate of fertilized eggs was at 73 per cent which provided some 35000 larvae almost all of which survived to post larval stage, the stage marked by the total consumption of the yolk and the formation of the mouth of the fish. In short, when the fish is ready to feed.

Rearing Techniques

Key to the apparent success may lie in the rearing techniques tried. Dr. Jesus Juario, leader of the milkfish research program of the SEAFDEC Aquaculture Department explained that the post larvae were given several types of feed: *Chlorella sp.*, rotifer (*Brachionus sp.*) the

(Continued on page 7)

ch & Development Notes

How to Establish a small-scale Hatchery for Penaeus monodon

A guideline for the design, operations and economics of a small-scale hatchery for the larval rearing of the tiger prawn (*Penaeus monodon* Fabricius), known in the Philippines as *sugpo,* has been prepared by the Aquaculture Department of SEAFDEC.

According to Rolando R. Platon, project leader of the Barangay Hatchery Project of the Aquaculture Department Prawn Program, the guideline essentially scales down the hatchery technology to a level which can be adopted by the private sector, especially in the villages, with a minimum of financial and technical input. Platon, who prepared the guideline, said studies are being done to further reduce the scale of the operation.*

The hatchery guideline presents a comprehensive description of the various factors, resources and activities needed to set up the project. These are: criteria for selecting hatchery site; physical facilities required; how to culture the prawn's natural feeds, including the needed nutrients for stock culture of *Chaetoceros, Tetraselmis, Chlorella* and *Brachionus*; disinfection of spawners; spawning and hatching operations; rearing in larval culture tank; harvesting method; and pretreatment and transportation. A cost and return analysis at different levels of hatchery capacity is presented. The guideline also illustrates the layout of the hatchery system and the designs for a sand filter for concentration of diatoms, 2-ton wooden tanks for the culture of *Brachionus* and algae.

An important economic consideration of the small-scale hatchery is that there are 14 runs per year, each run lasting for 16-18 days. The economics of the project also indicate a stocking rate of 100,000 nauplii per rearing tank, a survival rate of 30 percent or a production of 30,000 postlarvae per tank, and a postlarvae selling price of ₱80.00 per thousand.

Platon said 3 operators have so far established a small-scale hatchery with a fourth one starting to build.

Site Criteria

The principal criteria for hatchery site selection include the following: sea water quality and quantity in which adequate volume of seawater is available and

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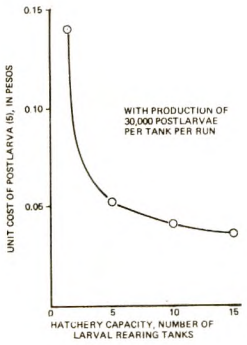

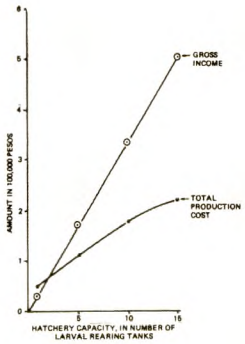

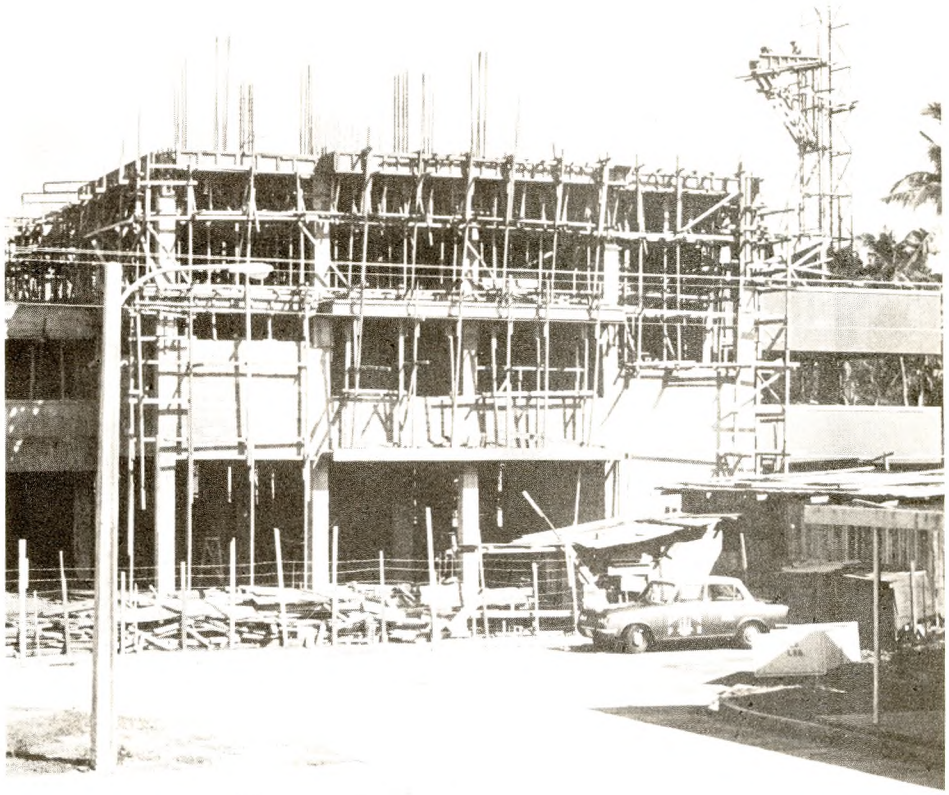

This 4-storey research building will house the expanded reproductive physiology and nutrition laboratories of the SEAFDEC Aquaculture Department. With a total floor area of 7,067 sq m, it is expected to be finished by September, 1978 at an estimated cost of ₱14.8 M.

*Copies of the guideline may be requested from Mr. Rolando R. Platon, Aquaculture Department, SEAFDEC, P.O. Box 256, Iloilo City, Philippines.

A concept for the transfer of aquaculture technology... *from p. 2*

ion situation in or out of the agro-climatic zone where the pilot program was done.

It is necessary to incorporate whatever technology is developed in a farming system and then packaged and tested.

The advantages of conducting such controlled experiments in farmers' field are:

1. It will considerably increase production and productivity and will provide immediately visible satisfactory results.
2. It is economically favorable to the farmer.
3. It is manageable by the farmer, and compatible with his farming system.
4. The product is acceptable to the farmer.
5. The product is easily marketed.
6. The inputs are readily available and accessible to the farmer.
7. The risk to the farmer is low.

Subject Matter Experts

Experiments in this phase are designed by researchers and subject matter specialists (SMSs) with the close collaboration of extension workers. Under the present Philippine research system, the SMSs are "commodity experts" who will provide the vital link between research and other technology users by working in the different experiment centers and stations.

At present the SMSs are turning out the *"Philippines Recommends* Series." The series is a "one-story" package of alternative recommendations designed to simplify technology to be used by extension specialists in helping farmers improve their production.

In summary, the objectives of the field trials are:

- To validate technology results.
- To obtain feedback information to guide research programs.
- To better understand traditional farming practices and possibly improve on them.
- To evaluate practices and technologies both technically and economically.
- To learn how the farmer receives, evaluates and eventually uses the technology.
- To modify technologies for specific areas.
- To introduce new technologies to extension workers and to farmers.
- To train professionals working in farmer level experimentation, the researchers and farmers
- To serve as an interphase or planned linkage between Research and Extension

Technology Dissemination/Utilization

Three aspects are worth considering in technology dissemination. These are: (a) farm demonstrations, (b) extension, and (c) acceptance of the technology by farmers in the form of its application to actual production. But unlike in technology verification and packaging where the researchers take the lead responsibility, with the extension workers closely collaborating, this time it is the extension worker who plays the lead role in technology dissemination and utilization.

AIA created... *from p. 1*

search agencies in a concerted effort of solving the myriad problems of aquaculture development. Hopefully, this cooperation will not only strengthen efforts in producing desired high-quality graduates at both the M.S. and Ph.D. levels, but will also successfully integrate and interchange faculty, researchers, students, and course areas in the field of aquaculture.

The AIA is also envisioned to serve as a forum through which the best minds in fisheries can work together to map out solutions to problems, strategies, plans and policies for hastening aquaculture development. This way, the drafting of inter-agency or inter-country plans, the undertaking of problem-oriented research projects, the laying out of policies to service Asian universities and other institutions, among others, will be facilitated and implemented sooner.

R & D Notes

Floating fishpens... *from p. 4*

Production and Yield

The floating fishpen system is among the most productive means of fish production through aquaculture. The present grouper farm produced 8 tons of fish in a total area of 619 sq m, including the area between two cages, or approximately 12.2 kg/sg m. The yield per hectare (122 tons) is many times higher than that of pond culture of Chinese carps (3-5 tons/ha), milkfish culture (0.45-1 ton/ha) or mullet culture (150-300 kg/ha). The yield of bighead carps from productive reservoir is also extremely high. The production is estimated to be 296 tons per hectare if only the net area is considered under culture.

Technical Considerations

Floating Cages

Both fingerlings and adults can be reared in floating cages. The size and shape of the rearing cage depends on the types of fish cultured and the physical condition of the site.

The floating fishpen consists of a floating platform and net cages suspended from the platform.

It is important to ensure that the cage and the platform are strong enough to resist strong currents, winds or waves during a heavy storm. Size of the net-cages used ranges from 1 to 100 sq m but not to exceed 100 sq m as periodic change of the nets and maintenance is difficult. Cage depth is about 2 meters.

The netting used for making the net-cage should be of sufficient thickness and able to resist seawater and heat. Nets made of 21 to 24 ply polythene thread is suitable as it is sufficiently strong to resist tearing by crabs or cutting by the edges by oyster shells. Unlike nylon, polythene netting appears to be able to stand the strong heat of the sun for a considerable period of time.

Culture Site

In selecting a site for cages, consider the following:

1. The location should be calm and protected from strong wind and current.

2. Tidal range should not be too large; best range should be around 1-2 meters allowing sufficient exchange of water through the cages

3. The dissolved oxygen content of the water of the site for cages should not be less than 3 cc/l.

4. Clear water is an advantage for cages as the nets will not be clogged by fouling organisms and silt particles.

5. For coastal aquaculture, water salinity should not be less than 15°/oo for groupers, 25°/oo for rabbitfishes, snappers and threadfins but a wider fluctuation of the salinity from 10°/oo to 30°/oo is suitable for the rearing of sea bass, *Lates calcacifer.*

6. Site should be easily accessible for the transportation of feeds as well as for bringing the fish out to market.

7. Site should be as much as possible free from otters which are rather common around mining pools, rivers or coastal waters. Otters are known to tear nets with their strong teeth.

Suitable Fish for Culture

For floating fishpens, one should consider such factors as the hardiness of the fish, availability of fry in sufficient quantity, disease resistance, larval history, environmental requirements as well as other factors such as the acceptability of the cultured fish to the consumers and its market price.

Feeds

Carnivorous fishes take sliced trash fish readily when they are more than 10 cm in length. Smaller fishes or fry about 2-8 cm in length should be fed with small shrimps such as *Acetes* or mysids. For freshwater fishes such as the bighead and silver carp, no feeding is needed if the reservoir is rich in plankton. But for intensive stocking, supplementary feed such as rice bran is given. Experiments have so far revealed better conversion and growth rate when the estuary groupers are fed once in two days with sliced trash fish rather than intensive feedings. Results also indicated that good conversion rate, less mortaility rate and even growth are ensured.

Feeds should be free from parasites. When trash fish is used as the main feed, ensure that they are fresh and properly cleaned. Pellet feed is considered to be the best as parasites and germs are destroyed in the process of preparation.

Economic Aspects

For profitability, it is important to produce fishes which fetch higher market value and have ready market. Choice of site is important because a wise selection and efficient utilization of the environmental factors such as temperature, salinity, disolved oxygen content and plankton productivity, contribute to the success and profitability of the venture.

Capital investment includes equipment for the preparation of feeds, deep freezer, building for storage and disease treatment, and boat. Operating costs generally include items such as cost of seeds, feeds, disease treatment, electricity, fuel, labor and rent.

Family Unit Floating Fishpens

With the decline of inshore catch, the floating fishpen system of culturing fish may help alleviate the situation by absorbing some of the fishermen into culture fishery.

A family of two can easily handle and operate four floating net-cages of size 28 x 18 x 5 feet, which can contain around 1000 fishes each. With grouper, the ratio of net income over capital cost is calculated to be 51.2 percent excluding labor cost. The net income of each fisherman per month is about M$294.

Small-Scale Hatchery... *from p. 5*

unaffected by inland discharges containing agricultural runoff or industrial wastes; proximity to the source of spawners; road accessibility; and availability of power source, fresh water, and technical personnel needed for hatchery management.

The best method to determine the suitability of seawater for larval rearing is to conduct preliminary tests using pails or small tanks on the probable site. The production of postlarvae with resonable survival rate from eggs in a series of at least 3 runs would indicate likelihood of success in actual operation.

Facilities

Some of the facilities needed are a sand filter to rid the seawater or organisms like fish and jellyfish, including silt and mud during heavy run-off, an air supply system with a compressor or blower that can deliver air at an effective pressure of 1.5 meters column of water, a 2-ton larval rearing tank which may be made of marine plywood, 1-ton shallow wooden tanks for algal culture, 1-ton cubic wooden tanks for *Brachionus* culture, and a roofed structure with walls to house the larval rearing tanks, the algal starters, and as a monitoring area.

Larval Rearing of Milkfish... *from p. 4*

trochophore larvae of oysters and six different types of artificial feeds.

More Trials

The milkfish research program is a continuing one and additional experiments are being done with the postlarvae such as salinity level, food preference and other parameters that could shed light on the development of the technology for successful mass rearing of fry which in turn would considerably help in the establishment of seed banks.

Economic Impact

This latest development is significant in terms of solving the problem of ensuring a steady and reliable supply of fry, a big drawback of the milkfish industry. Fishpond operators still rely on the seasonal supply of fry and thus cannot operate at an optimum level. This however does not mean the displacement of people who depend on the collection of fry for livelihood. The SEAFDEC milkfish experts assure that the extensive present and potential requirements of the milkfish industry can readily absorb all the fry that can be collected from coastal waters and those that may eventually be raised in seedbanks.

SEAFDEC's milkfish program – an integrated and continuing research thrust – has so far hurdled the following problems: domestication of spawners; inducing spawners while in captivity to ovulate through hormonal injection; artificial fertilization and hatching of eggs; and, with this latest advancement, possibly mass rearing of fry until these are ready for release and distribution.

Asian Aquaculture Development Plans up at International Conference

Strategies for the development of aquaculture in the Asian region will be formulated at the first Asian Aquaculture Conference to be held in Manila, 1-6 August, 1978.

This was announced by Dr. Joseph C. Madamba, director of the newly created Asian Institute of Aquaculture.

Four vital aspects will be discussed: MANPOWER, RESEARCH and EXTENSION, CREDIT and DATA BASE.

Madamba said it is along these four areas that a multi-pronged approach to developing the fishery resource of the Asian region will be formulated.

"Regional priorities will be crystallized along these areas," he said, "to provide a solid basis for short and long term development activities anchored on the generation and dissemination of appropriate aquaculture technology for South and East Asia."

Sixty fisheries experts from 11 Asian countries will be participating. The team of experts from each country will be composed of a planner, a scientist, an educator, and a credit specialist.

The Asian conference will be immediately followed by in-country planning sessions to further refine the priorities and to evolve ways to operationalize — on a mutual working basis — the strategies developed during the meet.

First for aquaculture in Asia, this regional planning exercise is expected to be done on a 4-year cycle.

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Aquaculture Department Executive Director at World Fisheries Meets

Two important international fishery conferences, with direct bearing on Philippine and Asian fisheries development, have recently been finished — the FAO Committee on Fisheries conference of the UN Food and Agriculture Organization (FAO) held in Rome from 12-16 June 1978, and the conference on aid programs for aquaculture development in Pontevedra, Spain.

These were attended by Aquaculture Department Executive Director Q.F. Miravite, who was representative for SEAFDEC in the FAO meeting and the Philippine delegate in the Pontevedra conference. The latter was a forum for the discussion of aid programs for aquaculture development, in which the top issue was the establishment of the recommended Asian regional network for aquaculture research.

The proposed network organization was the offshoot of the study made by a team of international experts headed by Sir Charles Pereira of the U.K. Ministry of Agriculture, Fisheries and Food. The Pereira mission recommended the SEAFDEC Aquaculture Department in the Philippines to be the nucleus of such a network. This led to the establishment of the Asian Aquaculture Institute as the initial step toward the forging of the regional research network (see story in p. 1).

Miravite also visited SEAFDEC donors in Europe and North America to apprise them of the center's accomplishments and development.

Dr. Quiterio F. Miravite, executive director of the SEAFDEC Aquaculture Department, gives brief report to media after one of his previous trips abroad as Philippine delegate to an international conference on fisheries development.

Asian Aquaculture

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