RICE/CARP FARMING IN THE PHILIPPINES AND CULTURAL ACCEPTANCE

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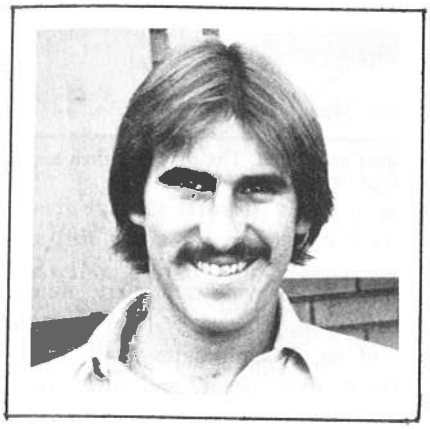

The Author

Thomas Polich received a B.A. in Environmental Conservation from the University of Colorado. He lives in Mayoyao, Ifugao and is the supervisor of the Mayoyao Fish Hatchery Project in cooperation with The Asia Foundation. He is sponsored here in the Philippines by the U.S. Peace Corps.

IN RESPONSE to inland fisheries demands for more manageable species of fish, development agencies in the Philippines have turned some attention to common carp (*Cyprinus carpio*) and its culture in rice paddies. Tilapia, which have been used extensively in rice fields, require more management than carp. With the advent of integrated fish farming and agriculture (agro-fisheries), we realize that carp are a valuable source of protein. They contribute organic fertilizer, reduce weeds, augment the income of the farmer, and improve the family diet.

To introduce common carp into rice paddies, a farmer must first be convinced of the value of aquaculture. Then the technology must be presented in an understandable manner, the paddies must be redesigned, and finally, success has to be assured to overcome any initial misgivings. Our results have been heartening, but integrated agriculture/aquaculture is effective only in light of appropriate technology and cultural acceptance. Further research is needed to completely develop successful integrated systems.

Common Carp in Ifugao Rice Terraces

A variety of carp are used in rice/fish culture projects all over the world. Most notable are those in China and Indochina where integrated rice/fish farming and rice/fish crops in rotation result in high yields of both rice and fish. Stocking densities are 2000 to 3000 carp per hectare with recovery rates of up to 85% of stocked fish. Indonesians raise primarily carp, including red, silver, and grass carp. In areas where farmers are not receptive to carp, intense propaganda is used to spread information about their benefits. Carp are also used in rice paddies in Italy and Hungary.

Carp are not as valuable as tilapia, prawns, or milkfish in the market, but if the primary objective is to provide additional food, then carp are an ideal source of protein. In the paddies carp do not require supplemental feeds. They are adapted to poorly oxygenated, slow-moving, shallow bodies of water. This makes them hardy fish, resistant to stress of handling during harvest or when water levels change. Since carp do not reproduce as rapidly as tilapia, a farmer can be guaranteed a large fish at harvest time. Carp are ideal for upland rice terraces where there is a limited amount of space, labor, or technical knowledge.

In the northern part of Luzon Island, Philippines, lie the rice terraces of Banaue, a 700 km^2 area of the rugged Cordillera Mountains. The area is inhabited by the Ifugao, who only a generation ago, were knov ' for headhunting. The people are now good natured, but reticent, still clinging to their old customs of woodcarving, weaving, rituals, and the laws of their forefathers. They seem content to lead lives much as they have for the last 2000 yr.

The province of Ifugao, in cooperation with The Asia Foundation and the United States Peace Corps, is building an integrated fishfarm/agricultural project to supply fingerlings to the people of Mayoyao and Banaue, Ifugao. The primary goal is to provide an adequate source of protein to correct dietary deficiencies, and secondly, to bolster the economy of these municipalities and the province.

The Mayoyao Fish Hatchery Project is being built by local manpower under local supervision, using local resources such as stone, sand, and lumber, and employing local technology. The walls of the ponds are constructed of rock, using a technique of rip-rapping mastered by the Ifugao 2000 yr ago

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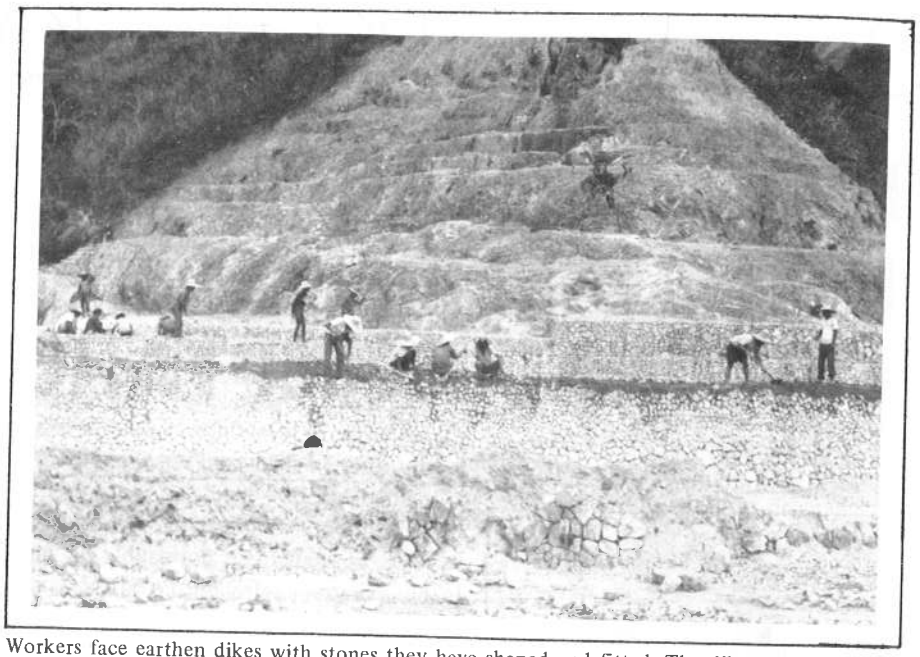
while building the rice terraces. The total area of the hatchery is 0.4 ha, including six ponds, hatching tanks, piping, and dispersal facilities.

Below the hatchery, a series of old rice terraces have been converted into gardens for corn, soybeans, peanuts, and other vegetables. Growing and processing these vegetables for feed will enable the farmers to feed chickens and ducks that will provide manure for fertilizing the rearing ponds. These fertilizers will, in turn, produce algae which ultimately feed the carp fingerlings. The integrated system eliminates the need for costly inorganic fertilizers, transportation, and most processed feeds. The remote location necessitates a completely self-sufficient system, and the rugged mountains force us to maximize the available space.



Workers face earthen dikes with stones they have shaped and fitted. The dikes are then sealed with cement. Each pond is exactly 300 m^2.

Adjusting Technology to Culture

Even though there are major physical barriers to overcome in the construction and financing of such a project, cultural barriers take precedence. Commitment to a new idea, especially one that drastically changes a physical environment which has remained stable for over 1000 yr, therefore guiding social rules, is a painfully slow process. Altering the condition of the rice terraces is seen to some Ifugaos as insulting to their ancestors. Some villagers, after being convinced of the value of carp, agree to stock them but refuse to eat them, valuing them for community status. Others want colorful carp in hopes of selling them to the Japanese for their aquariums and gardens.

Integrated agriculture/aquaculture impresses upon us the value of holistic, ecological, and self-sufficient systems of management, but great caution must be taken when applying these systems. Environmental compatibility is only part of the process. To be truly successful, the project must be culturally compatible as well.

One of the ultimate goals in the development of integrated systems of farming is to increase the health and welfare of needy rural people. Education enlightens people to the potential of their land and waterways, and technology gives them the ability to manipulate the environment and fulfill such potential. But if technological transfer is a panacea to all our troubles, it has not proven itself yet. We have come to realize that that technology must be appropriate, simple to explain and understand, and effective, before uneducated people benefit from its application.

Self-sufficiency is a vital part of integrated systems. Self-sufficient systems are in the long run less costly because they utilize local resources, remove transportation costs, and importation of materials. Systems like the one in Mayoyao show greater productivity, given capital investments and costs in relation to output. The system is easier for the farmer to understand because he sees everything from conception to completion of the production process.

Superstitions and beliefs also play a part in cultural acceptance. Discouraging a person or trying to refute his belief is not always the proper approach. Old men in Ifugao worry about the gods' wrath if they change the shape of the rice terraces. A hole must be dug in the center of the paddy 1 m square to provide sanctuary during heavy rains. The water level must be raised to 20 cm, gates built at the water's exit point, and the dikes' height increased. Some fear collapse of their walls (some over 30 ft high), and others believe that carp turn into rats and eat the rice. Verbal repudiation of these beliefs is not always sufficient, and the elders themselves must see beneficial results before a barrio commits itself to stocking their terraces.

After stocking the fingerlings, patience is still required. Some families eat the fish before they grow to an edible size. One farmer couldn't understand if 10 carp grow well in his rice field, why wouldn't 100? After 1 yr he had 110 tiny carp and was rather discouraged. Success after stocking must be guaranteed if the whole project is to be successful. Failure of a farmer to produce fish results in shame to his neighbors, disillusionment, and rejection of the project and fish raising in general. We therefore keep stocking densities very low (2 fingerlings/50 m^2) to assure rapid growth and good recovery.

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Combining new technology with honored cultural practices has proven to be an effective way of achieving success. Native priests are encouraged to mention the carp when chanting for a good harvest. The farmers are allowed to develop their own harvesting techniques. Their knowledge is sometimes great, and their fresh ideas command respect. Including them in the decision making removes their fear of such previously foreign concepts. It also gives them a feeling of self-worth and they don't feel "bulldozed" by modern technology.

The initial results of the Mayoyao Fish Hatchery have been good. Studies show a growth rate of 211.4 kg/ha year in the rice terraces, with the average fish size at harvest about 700 g. The response from the villages has been enthusiastic, and the volunteer in Banaue has delivered his year's supply of fingerlings in 6 mo. Jealousies still arise, but as more fingerlings are available to everyone, poisoning or poaching will be minimized. Concentration of our efforts will soon shift to proper management after stocking and the dispersal to more remote barrios.

Bright Future for Integrated Farming

The Mayoyao Fish Hatchery Project is designed primarily to give the Ifugaos an adequate and economical protein source. We are close to that goal, though more research is still needed to fully understand carp in upland rice terraces.

Integrated agriculture/aquaculture has a bright future with broad application. Self-sufficient systems are ideal for remote locations. They prove less costly and more acceptable to developing nations than conventional approaches. Integrated systems efficiently utilizing local resources and labor result in improved conditions for rural people. Coupled with appropriate technology and cultural practices, integrated farming has a good chance of effectively meeting basic human needs in the Philippines and other parts of the world. ●

PAULY JOINS ICLARM

ICLARM welcomes new Postdoctoral Fellow Dr. Daniel Pauly who joined the staff in early July. Concentrating on a subject with which he is already familiar—multispecies tropical fisheries—he will develop a program in cooperation with colleagues working in this field, leading to a theory of management of multispecies fishery resources, and test and apply the theory.

Dr. Pauly's experience with tropical fisheries suits him ideally to his present task. Besides having worked on a lagoon fishery in Ghana in 1971 and on a bilateral fisheries development project in Indonesia in 1975 and 1976, he was an ICLARM consultant in Manila during June-August 1978 laying groundwork for developing his present program.

Dr. Pauly will be featured in the "ICLARM Staff Profile" in an upcoming issue of the newsletter. ●

SEAFDEC'S AQUACULTURE DEPARTMENT HAS NEW CHIEF

DEAN ROGELIO O. JULIANO has been appointed as new Chief of the Aquaculture Department of Southeast Asian Fisheries Development Center (SEAFDEC) effective July 1, 1979. Dean Juliano succeeds Dean Domiciano K. Villaluz who retired recently. Currently Dean of the College of Fisheries, University of the Philippines, Dean Juliano assumed his new duties in July when he relocated to the Aquaculture Department's Tigbauan, Iloilo base.

Already ably shouldering much responsibility, he will be accepting new heavier load when he becomes Chancellor of the new University of the Visayas scheduled to open within 5 yr. The university will be comprised of the UP fisheries department now slated to move to Iloilo, and be backstopped by SEAFDEC and its substations, and the USAID brackishwater station at Leganes.

ICLARM congratulates Dean Juliano upon his appointment and looks forward to working with him in the future.

Dean Juliano, a former member of ICLARM's Program Advisory Committee, holds a Ph.D. from the University of Michigan. ●