



After the rice harvest, many Ifugao paddies become floating gardens.

# Rice-Fish Practices in Ifugao Province, Philippines

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Ifugao lies in the Cordillera Mountains in the north-central part of Luzon. It is famous for its colorful inhabitants, lush forests, crystal waters and magnificent rice terraces. The people have traditionally practiced rice-fish culture. Approximately half the area (total area  $\approx$  8,000 ha) of rice terraces are currently utilized for capture of mudfish (*Ophicephalus striatus* = *Channa striata*). There are no data on production of this piscivorous species in Ifugao, but from observations made, it is quite low. Changing farming practices such as use of chemical pesticides (needed for high-yielding rice varieties) and illegal fishing practices are reducing native fish production and area.

In this area of unlimited water, rich soil and choice ricefields, only around six ha are currently being utilized for rice-fish culture of *Tilapia nilotica* and *Cyprinus carpio*. Reasons for this limited transition to rice-fish culture include differences between modern techniques and traditional practices; shortage of trained extensionists; limited accessibility into many areas; and limited availability of desired fish species.

As pointed out previously (see ICLARM Newsletter, October 1979, p. 13-15), in order to spread fisheries technology in this province, it must be appropriate and culturally acceptable to the people. By slight modifications to lowland techniques in rice-fish culture, it is felt that the technology will be more appropriate to local conditions and practices.

The necessity of trench construction for rice-fish culture has discouraged many people in Ifugao from culture practice. The partial explanation for the nonacceptance of trench construction is the traditional belief that the ricefields, which have been handed down from

generation to generation, are sacred and should not be scarred. If it were not for the trench prerequisite, large numbers of farmers would gladly stock tilapia and carp in their rice paddies.

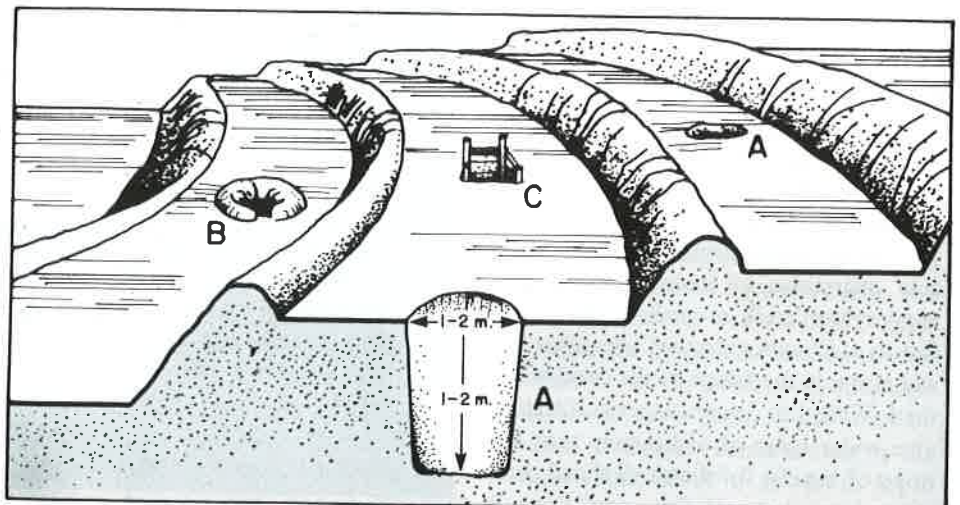
One traditional modification to the rice paddy for the capture of *O. striatus*, which can also be utilized for the culture of tilapia and carp, is the construction of a harvest pit. The pit, called a *pukungan* in central Kiangan, serves similar functions to the trench in lowland areas. The *pukungan* is 1-2 m wide and 1-2 m deep. Farmers who maximize their harvest of *O. striatus* construct at least one pit per rice terrace, and sometimes more than one on their lowest paddy.

There is great potential in utilizing this capture technique for rice-fish culture. With the existence of the pits, the farmer needs only to enlarge dikes (which are seasonally rebuilt), screen water

inlet(s)/outlet(s), and remove the mudfish. The importance of organic fertilizer for increased water productivity is stressed and supplemental feeds including rice bran, chopped or cooked vegetables, dried *ipil-ipil* (mimosa) leaves, *Azolla*, or food scraps are suggested. For the beginning fish culturists or those isolated from fingerling sources, the exclusion of mudfish fry is recommended. Stocking rates are similar to lowland recommendations, 5,000/ha for *T. nilotica* fingerlings, and 5,000-10,000/ha for tilapia-carp polyculture. Due to the long growing season of almost 6 months for the mountain rice varieties, stocking size for fingerlings can be smaller than the 20-25 g recommended for lowland culture.

In most areas of Ifugao where mountain rice is planted, there is only one rice harvest per year. During the remaining months, the terraces are flooded and either left idle or planted with compost mounds for small-scale vegetable production. The vegetable mounds, rich compost made out of floating aquatic weeds, increase productivity of paddy water and present an excellent potential for integrated gardening-fisheries. Both conditions represent much potential for a rotational fish crop during the rainy season.

In an area of high traditional consciousness, such as Ifugao, the application of traditional techniques of fishing for rice-fish culture and rotational cropping of rice and fish is seen as a way to improve fisheries development, fish production, and the socioeconomic level of the people.



Cross-section of Ifugao rice terraces, showing traditional harvest pits, (A) standard pit, excavated from soil, (B) pit with secondary dike, (C) pit lined with wood to prevent erosion.