



# Rice-Drawn Culture: experience of Myanmar

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Myanmar has a total land area of 676,577 km<sup>2</sup> and its population is about 54 million in 2006. As common with many of its ASEAN neighbors, rice and fish are the key staples in Myanmar. Its socio-economy is dependent on the agricultural and fishery sectors. Fresh fish, mostly from freshwater environment, constitutes a big bulk of the country's fish supply. Out the total fish production of 400,360 mt from aquaculture in 2004, production from freshwater aquaculture for the same year was 370,360 mt (93%). Of this total, giant freshwater prawn accounted for only less than 0.01% (FAO FishStat Plus 2006).

The Department of Fisheries of Myanmar is intensifying its efforts to attain increased fish production in various ways and means. Among the activities the country has recently promoted is the production of fish fingerlings for fish ponds and for replenishing depleted stocks in natural water bodies such as dams, rivers, reservoirs and rice fields during the rainy season. Another strategy being promoted is rice-cum-prawn culture, and a pilot project was conducted at Lay Daunk Kan Fishery Station of the Department of Fisheries in 2006 with the collaboration of Japan International Cooperation Agency (JICA) under the country's project on "Small-Scale Aquaculture Project for Promotion of Rural Livelihood".

*Myanmar has extensive rice field resources with a network of water and shallow flooded paddy areas that could also be used as rich source for fish production. The Government of Myanmar focuses its food production in rice as well as fish, as the county's major staple food. Production of freshwater prawns in rice lands is an alternative source of income for the rice farmers. With the adoption of sustainable rice-prawn culture, the country's rice lands can also be used to produce prawns without converting these into ponds as rice and prawn can co-exist within the same rice land areas.*

## Rice and fish culture

Contributing largely to the country's economy, freshwater aquaculture in Myanmar has been significantly developed since the promulgation of a law relating to aquaculture in 1989. Its development is however, constrained by many factors that include inadequate supply of quality seeds and feeds, low technology, insufficient capital, etc. The Department of Fisheries of Myanmar is addressing these constraints in order to attain sustainable aquaculture development in the country. There are more than 15

freshwater commodities being cultured in Myanmar, but the dominant species is rohu (*Labeo rohita*) followed by catla (*Catla catla*) and mrigal carp (*Cirrhina mrigala*).

The Department of Fisheries is now promoting rice-fish farming as an alternative livelihood to improve the income from rice farming, i.e. producing fish with rice in the same land area. Rice-fish culture has a very long history in many Southeast Asian countries and the technology is already available for adoption elsewhere.

In a country such as Myanmar, where vast tracts of rice lands are available, there is no problem about verifying such rice-fish culture technology and the impacts could be evaluated in the process. Rice-fish culture is therefore envisioned to benefit more families in terms of providing sufficient supply of protein and additional income for the rural communities. The country’s rice-fish culture program was initiated by the Department of Fisheries in 2003 and after realizing the benefits from this program, the country proposed to give it a high priority for rural community development.

Myanmar shares the experiences and technology with the other ASEAN countries through program cooperation with the SEAFDEC Secretariat and SEAFDEC Departments, by specifically participating actively in the ASEAN-SEAFDEC Special Five-Year Program for Sustainable Fisheries Development in the ASEAN Region. In keeping up with development of the various sectors in fisheries in the region, Myanmar acquires technologies and experiences from its fellow ASEAN members. The experiences gained are utilized to achieve further development in the country’s fishery activities. Specifically, the experience from other countries in the region on rice-prawn culture promoted through the Aquaculture Component of the Special Five-Year Program encouraged the country to promote the technology for food security in its rural communities. The implementation of the country’s rice-prawn culture pilot project was boosted with the technical assistance from JICA.

## The giant freshwater prawn

Although Myanmar’s freshwater fish resource is considerably wide, very little report has been made on the giant freshwater prawn resource. The FAO Fishstat Plus 2006 indicated a very negligible data on this resource, which was below 0.01% of the country’s total freshwater production from aquaculture (Figure). The Department of Fisheries of Myanmar reported three common species of the giant freshwater prawn in the country, these are: the very popular *Macrobrachium rosenbergii* (locally called “yea cho pazon htoke kyee”);

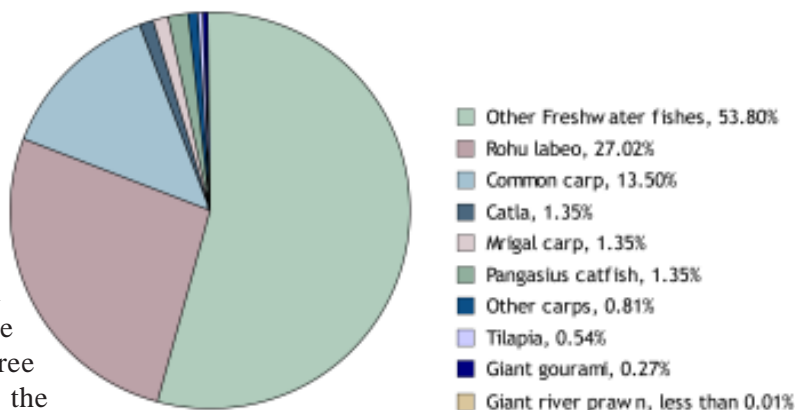
and to some extent, *M. villosimanus* (locally called “yea cho pazon sark htoke”) and *M. malcolmsonii* (locally called “yea cho pazon let ma kar”).

As is the trend in other countries in the region, Myanmar also considers *M. rosenbergii* as an attractive alternative to the penaeid shrimps (e.g. *P. vannamei*) as the export price of the penaeid shrimp has plummeted to a record low because of over supply. Although exporters may be making good margins in the foreign trade, the penaeid shrimp farmers from Southeast Asia are not getting much profit for their produce; so many countries are now considering the giant freshwater prawn culture as an option.

Giant freshwater prawn is found throughout the warm waters of the Indo-Pacific region from India to the Philippines. However, the culture of this prawn is constrained by the non-availability of high-quality broodstock. At present, farmers still rely on the wild gravid females for the larvae. There have been many pilot projects implemented in the Southeast Asian region for the sustainable culture of the freshwater prawn.

One such project is the collaborative effort between Cantho University of Vietnam and Japan International Center for Agricultural Sciences (JIRCAS) for the seed production and culture of *M. rosenbergii* in the Mekong Delta Region of Vietnam, which resulted in the development of technology for determining the maturity of prawn spawners (Wilder and Ogata, 2004). Since prawn hatcheries largely depend on broodstock from the wild that leads to over exploitation of the natural stocks, the findings of Cantho University-JIRCAS Team give hope for the development of captive freshwater prawn spawners that can lessen the industry’s dependence on wild spawners.

There are many reports indicating problems in the large-scale production of the freshwater prawns. These include stocking density as the prawns can not be cultured intensively and longer culture period. While 2-3 crops per year could



Freshwater fish production in 2004, Myanmar (in mt, expressed in %)

be attained in penaeid shrimp culture, it can take from six to ten months to grow the freshwater prawn to commercial size (1-2 crops per year). Another concern is the varying sizes of the prawns at harvest within the same culture period. Usually the prawns do not grow at the same rate and not in the desired uniform size and in most cases, there are many small sizes, priced much lower than the larger ones.

The giant freshwater prawn can command good prices in the market, and its culture technology is ready for adoption. In Thailand, some large shrimp-farming companies have invested much in freshwater prawn farming and applying good farming practices, making the quality of their prawns generally very consistent. Thailand has gone quite far in developing the aquaculture of freshwater prawns with production steadily increasing at 10,000 mt/year (Uraiwan and Sodsuk, 2004). Through the Department of Fisheries of Thailand, breeding techniques have been developed producing good quality seeds for distribution to farmers, resulting in high survival rates and impressive growth rates. Thailand has also established good production procedures for freshwater prawn aquaculture through a code of conduct similar to that established for marine shrimps. It has also embarked on a number of R&D activities aimed at improving the quality of the prawn such as its selective breeding program and the application of biotechnological approaches to genetic improvement. Myanmar is hoping that in the near future it will also be able to reach its goal of producing the giant freshwater prawns in commercial quantities.

## Rice-prawn culture pilot demonstration project

In the country's initial effort to produce prawn side-by-side with rice, a one-acre rice field was used for the pilot demonstration project on growing rice with prawns. This was conducted in 2006 at the Lay Daunk Kan Fishery Station



*Digging of canal along the ricefield bund for prawn culture (above) and the prawn culture area (right)*

of the Department of Fisheries of Myanmar, where rice was produced for 101 days in August-November 2006 and the prawn was cultured for 88 days during the same period.

## Pond preparation

The preparation was done in two phases, rice field preparation and prawn stocking. In the rice field (400 ft x 100 ft) used for this project, a 2.5 ft x 2.0 ft ditch was made along the bund. The field was properly surrounded by nylon net to prevent predators from entering the field and to prevent the prawn from escaping out of the experimental field.

## Harvesting

Rice and prawns were harvested on 15 November 2006 and 22 November 2006, respectively. A total of 735 of prawns were harvested with an average weight of 9.6 g and 8.7 cm and survival rate of 73.5%. The smallest prawn weighed 4 g while the biggest weighed 48 g.

Before harvesting, transverse bunds were made inside the canal and the water was drained out by hand. Then the prawns were harvested by netting and picked manually. The yield obtained from one acre of rice field was 7.56 kg of prawns while rice production was 32 baskets (one basket = 45 lbs).

## Conclusion

The pilot project on rice-cum-prawn culture resulted in increased production even if 6.25% of the rice growing area was dug in order to dig a canal for the prawn culture. In this project, it was found that the unconsumed food in the paddy field also served as fertilizer for the rice. As for prawn production, the yield was considerable during the 88-day culture period with survival rate of 73.5%. The prawns have also been observed to have used the paddy plants as shelter during molting. One of the factors that may have led to better production of rice and prawns was the abundance of water flowing through the rice field all the time during the experiment.





The prawn harvest: unequal sizes (above) and one kg harvest (right)

The farmers in that village where the pilot demonstration was conducted have become interested in stocking fish and prawn seeds in their rice fields too, and intend to conduct rice-cum-prawn culture in their next paddy growing season. Through this practice, farmers can harvest rice and prawns obtaining better production from the same area. In other words, “Two Crops in One Harvest from the Same Field at the Same Time” is a means of promoting food security in rural communities, contributing to enhance the socio-economic status of the country.

Integrated agri-aqua activities are now gaining importance in many Asian countries. As better demonstrated in China, multiple water uses vis-à-vis the integrated agri-aqua system



Harvesting of the prawns (top) and cleaning the produce (above)

have contributed to increasing the income in rural communities. Myanmar’s initiative in carrying out this rural livelihood strategy will contribute significantly to the country’s food security. Rice-prawn culture indeed could form a vital part of the household’s livelihood especially for the rural communities. The Department of Fisheries of Myanmar under the Ministry of Livestock and Fisheries, in playing its role in managing the country’s fisheries and aquaculture activities, can now intensify its efforts to attain food sufficiency through increased fish production by maximizing the multiple uses of its water resource. With agri-aqua technologies already developed in other ASEAN countries as well as in neighboring Asian countries, Myanmar is already paving the way to increase food production not only for local consumption but also for sharing the surplus with its neighboring countries.

## References

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