



Aquaculture and fisheries in **RICE-BASED ECOSYSTEMS**

BACKGROUND

Rice-based ecosystems are habitat for many aquatic organisms adapted to this environment.

- ✦ A large number of these organisms are utilized for food, and they provide essential nutrients that are otherwise not sufficiently present in the diets of the local people.
- ✦ Management practices can enhance or diminish the productivity of the aquatic systems.
- ✦ The importance of the aquatic organisms for the livelihood of local people is often not recognized by policy makers on various levels.

PILOT PROJECT ACTIVITIES

- ✦ The project investigates some of the ecosystem services provided by rice as called for under the programme of work of FAO's Strategic Objective 2 on provision of goods and services and addresses CBD's and RAMSAR's request to FAO as called for in CBD Decision X/34 and RAMSAR Resolution X.31.
- ✦ Pilot activities were started in three countries in SE-Asia: Indonesia, Lao PDR, and the Philippines.
- ✦ Focus is on the assessment of aquatic biodiversity utilized by the local people.
- ✦ A regional training workshop in the Philippines and three national training workshops in the three countries were conducted.
- ✦ Research areas were selected and initial meetings with the local communities were held in the form of participatory rural appraisals (PRA).
- ✦ Field activities were started in 2013 and results are currently being published.



INDONESIA

The highly sustainable water management system in effect in Bali, Indonesia, known by the term Subak, has been developed more than 1000 years ago. For Balinese, irrigation is not simply providing water for the plant's roots, but water is used to construct a complex, pulsed artificial ecosystem. The Balinese use all elements of this system for their livelihood. Apart from tending to their rice crop, they also collect a variety of aquatic organisms to eat as well as to provide fodder for their pigs and cows.

On the island of Java, earliest evidence of rice cultivation dates back to the 8th century. Until this day, the rice lands of Java are said to be among the richest in the world. Just like the Balinese, the Javanese use the diversity of aquatic organisms associated with their rice fields for food and livelihood. In the past however, massive use of pesticides as part of the Bimas rice intensification program has led to a depletion of the aquatic biodiversity. Because of negative side effects, this policy has since been abandoned in favor of Integrated Pest Management IPM.



The pilot study has shed light on the current situation. In the assessment in Java, 61 species of aquatic organisms were identified that were directly used by the local people, in Bali, 58 species have been documented. The majority is fish but people collect and consume as well frogs, snails, reptiles and insects. Also aquatic and semi-aquatic plants play an important role, both as part of the local diet and as fodder for livestock. A variety of tools and implements used for the catch and collection of these species

were documented and a number of different ways to utilize the different species were recorded.

One noteworthy development is the current interest in Tutut (*Bellamya javanica*), a snail that has long been used for food in rural areas. It is currently becoming popular in urban areas as well as a fashionable health food. This is a good example of the socially and economically increasing role of aquatic biodiversity from rice-based ecosystems.



LAO PDR

Lao PDR has a rich aquatic biodiversity and the rice fields have become a sanctuary for a diverse set of aquatic organisms. The aquatic resources from rice-based ecosystems are vital to the Lao people, especially those living in rural rice production areas. An earlier study has been carried out which examined the role and nutritional value of aquatic resources in the diet and livelihoods of rural people. It revealed that the aquatic organisms are a substantial part of the food supply of Lao rural people and provide animal protein and micronutrient resources for consumption in rural households. Thus aquatic resources contribute significantly to the local diet. A household survey conducted on the importance of rice field fisheries, with the primary objective "to make the invisible fishery visible", suggested that fish and other aquatic organisms caught in rice fields are not only sufficient for human consumption but that the total amount can be sizeable.

The current study, carried out in two provinces of the country, has identified a total of 95 organisms from the rice-based ecosystem. Despite the data being collected at the end of the rainy season when the edible aquatic animals and plants in rice fields are decreasing, the results demonstrate the importance of this resource to local



livelihoods. In a joined exercise, community representatives and local government officers were able to jointly calculate an estimated value of the aquatic animals and plants normally consumed each day by local farming families.

By facilitating and supporting local ownership of this small pilot project, the Ministry of Agriculture and Forestry MAF and FAO have ensured that the information it generated

has been incorporated into local policy dialogue. The project has also demonstrated how with appropriate support and facilitation, rural communities and local government authorities can work together and effectively lead a project developed under collaboration between MAF and FAO. The Ministry hopes to be able to expand this methodological approach in its future collaboration with FAO and other international development partners.





THE PHILIPPINES

Rice cultivation has a long tradition in the Philippines. The world-famous “stairways to heaven” rice terraces in Banaue, Ifugao are among the oldest testimonials for rice cultivation in the Philippines. Nowadays, most rice is produced in the paddy fields of lowland Luzon, but paddy rice is grown throughout the archipelago. And, ever since, Filipinos used the rich biodiversity associated with their rice fields. Fish, frogs, crabs and snails, reptiles and insects were caught and collected for food, medicine or to be sold in the local markets to generate income for the family.

The pilot project focused on three sites: Nueva Ecija and Bulacan in the lowlands and Ifugao in the highlands of Luzon. The sites in Nueva Ecija and Bulacan were regularly visited by a researcher to assess and document the available aquatic biodiversity. The more remote site in Ifugao was visited by a team of seven researchers for a two-day field trip. They



conducted interviews and identified eight animal and four plant species from the rice-based ecosystems that were caught and collected for consumption by the villagers.

In the lowland areas, 32 aquatic organisms were recorded, used by the local people in various ways. Most of them were eaten directly, prepared in a variety of ways, either cooked or fried. A typical preparation is called paksiw in the Philippines: fish is stewed with vinegar, garlic and ginger. Prepared in this way, the dish will store for a few days. It is, however, very delicious and thus mostly consumed at once.

It was observed that people use electro fishing as one, albeit illegal, method to catch fish. This is a potential problem because the method is non-selective and kills fish fry along with other organisms that are not collected. It thus damages the resource base and should be further discouraged.

