

Traditional knowledge and innovation analysis: rethink the contribution of rice-fish farming towards food security in Madagascar

Delphine LETHIMONNIER¹, Rija ANDRIAMAROLAZA¹, Barbara BENTZ¹, Julie MANDRESILAHATRA¹, Olivier MIKOLASEK², Jean-Michel MORTILLARO², Modestine RALINIAINA³, Diana-Edith ANDRIA-MANANJARA³, Marc OSWALD⁴

1: APDRA Pisciculture paysanne

2: CIRAD

3: FOFIFA

4: ISTOM

Abstract

In Madagascar highlands, first written references on rice-fish farming arise from the beginning of the 18th century with the emergence of irrigated rice cultivation which included fish production (FAO, 2004). The first introduction of *Cyprinus carpio* in Madagascar in 1912 (Kiener 1963) led to a transition toward the development of hatcheries and stocking programs for freshwater fish. The rice-fish farming system went through a series of evolution and diversification in Madagascar. Fish such as *Carassius auratus*, carps and later tilapia (*Tilapia zilli* and *Oreochromis niloticus*) became the most farmed species. Fry and fingerlings were cheap and easily available: they were bartered between fishermen and rice-fish farmers as well as provided by public aquaculture stations and some time, by self production more or less organised.

In the 1990's, the government engaged in a privatisation process and encouraged the setting up of private hatcheries to supply fingerlings. Only few certified hatcheries were allowed to sell fingerlings. Additionally, the government banned the trade of wild fry. These restrictions on carp fry supply threatened traditional rice-fish farming. However, in some areas such as Betafo, smallholders who master carp spawning techniques in rice field, thanks to previous extension programs, continued to provide carp fry through unofficial channels.

Since 2006, the APDRA NGO has been working and advocating on the rehabilitation of these smallholders' hatcheries. The NGO works either on the dissemination of carp spawning techniques at smallholders' level with the aim of diversifying and increasing the availability of carp fry supply. Several actions led to the emergence of about 1100 rice-field hatcheries in Madagascar, providing locally bred carp fry to rice-fish farmers.

In areas where rice-carp farming was introduced, recent observations have shown that the most vulnerable farmers are not able to engage in carp production. The major reasons for this exclusion are: (i) the lack of suitable land which is caused by precarious land arrangement and poor water supply and (ii) farmers' cash flow not allowing them to purchase fry especially since fish stoking takes place during the hunger gap months. A strong social heterogeneity is noticed among farmers in Madagascar leading to strong interdependence between well-off and poor farmers.

Nevertheless, local dynamics show that some poor or middle-income farmers have been able to set up new paths to overcome these barriers to engage in rice-fish farming. They use various techniques and fish species and are involved in socio-economic arrangements that are, in fact, similar to traditional practices.

A fresh look at these rice-fish farming practices must be taken, even if they appear to be in contradiction with current orientations defined by the sectoral strategies (promotion of commercial/industrial fish farming), to aim a more inclusive development of fish production and a better impact on the food security for the populations which are the most in need. New approaches to promote rice-fish farming among vulnerable farmers are therefore being explored by APDRA and partners.

Key words: Madagascar, Rice-fish culture, Carp, Vulnerability, Fry supply.