

# International Research Collaboration in Rice-Fish Research

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**J**ust ten years from now Asian farms must provide food to 3.6 billion people and a decent livelihood to 2.2 billion agricultural workers. A prerequisite will be higher food production and higher purchasing power along with environmental protection. It is hard to imagine such improvements being wrought without radical changes in the ways land and water are used. Integrating the production of rice and fish in the same water on the same land with other enterprises of the farm system can help to achieve this (Fig. 1). The rationale for integrated agriculture-aquaculture systems is that integration of rice with fish production, livestock raising and forestry improves the sustainability, productivity and profitability of the whole farm.

Even modest adoption of integrated systems could dramatically increase farm income and food (see Table). More than one-hundred-and-fifty-fold increases in income (from US\$0.3 to 47 million) and fish production (from 0.5 to 79 thousand tonnes) could be achieved if Vietnam, for example, reached a target of harvesting 300 kg/ha/year of fish from just 5% of its rice lands. Under current productivity levels, India and Thailand could target increases in fish production and farm incomes by similar orders of magnitude. The Philippines and Bangladesh could

*Growing fish in ricefields could dramatically increase farmers' incomes from rice lands and fish production in Asia. This article describes how collaborative international research can strengthen national research in rice-fish through the "Integrated Rice-Fish Group" of the Asian Rice Farming Systems Network.*

theoretically produce 45 and 140 thousand tonnes at a value of US\$33 and 64 million, respectively.

Interaction between rice scientists and aquaculturists over the last three years in the Asian Rice Farming Systems Network (ARFSN) Rice-Fish Project of the International Rice Research Institute (IRRI) and

the International Center for Living Aquatic Resources Management (ICLARM) has stimulated rice-fish culture development in several countries (Fig. 2). The government of Indonesia has announced a plan to expand rice-fish farming in West Java by 20,000 ha and in North Sumatra, by 2,500 ha, involving roughly 37,000 farmers. The Thai Department of Fisheries has a target to train 480 farmers per province this year and to contact a total of 2,000 farmers per province. In addition, the Department

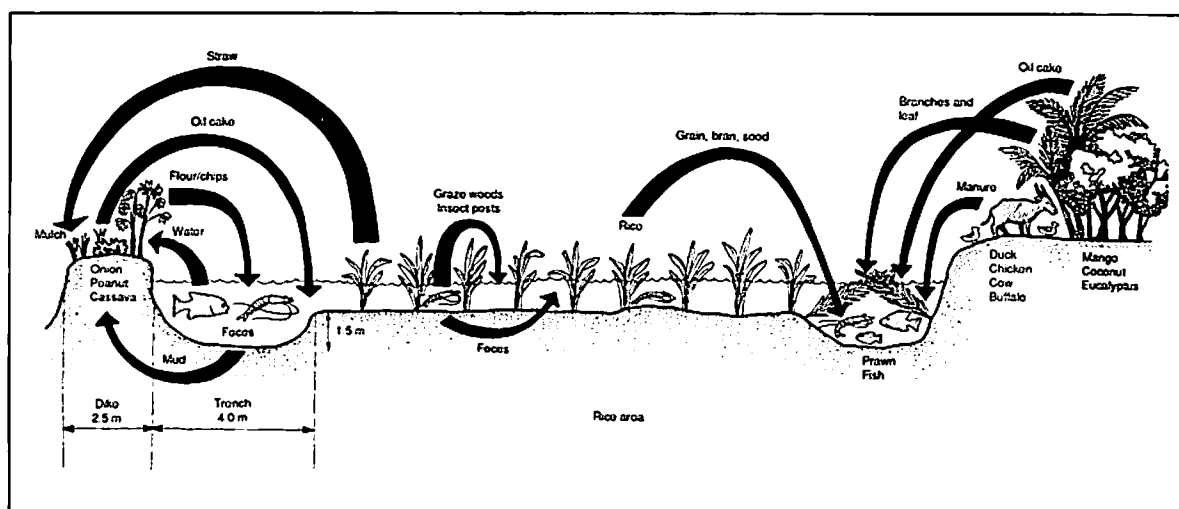


Fig. 1. Material flows in integrated rice-fish farming systems.

Targets in fish production and income when rice-fish farming is adopted over 5% of rice lands.

	Rice land* (ha) 1985-87	Fish production in rice-fish area (t)		Incomes derived from rice-fish culture (000 US\$)	
		Actual 1983	Targets 5%	Actual 1983	Targets 5%
Indonesia (@511 kg/ha) (@US\$1.36/kg)	8,504,540	49,544	217,291	67,380	295,516
Thailand (@1,044 kg/ha) (@US\$0.92/kg)	9,096,660	2,944	474,846	2,708	436,858
India (@450 kg/ha) (@US\$0.46/kg)	34,842,350	720	783,953	331	360,618
Vietnam (@300 kg/ha) (@US\$0.59/kg)	5,292,630	465	79,389	274	46,840
Philippines (@300 kg/ha) (@US\$0.72/kg)	3,014,880	0	45,223	0	32,561
Bangladesh (@300 kg/ha) (@US\$0.46/kg)	9,308,390	0	139,626	0	64,228

\*Rice land excludes upland rice area.

Sources: 1983 data from Spiller, G. 1985. Rice cum fish culture environmental aspects of rice and fish production in Asia. FAO/RAPA.

1985-87 data from IRRI Rice Facts 1988. (Yields at 1983 levels, Spiller 1985, or targets at 300 kg/ha)

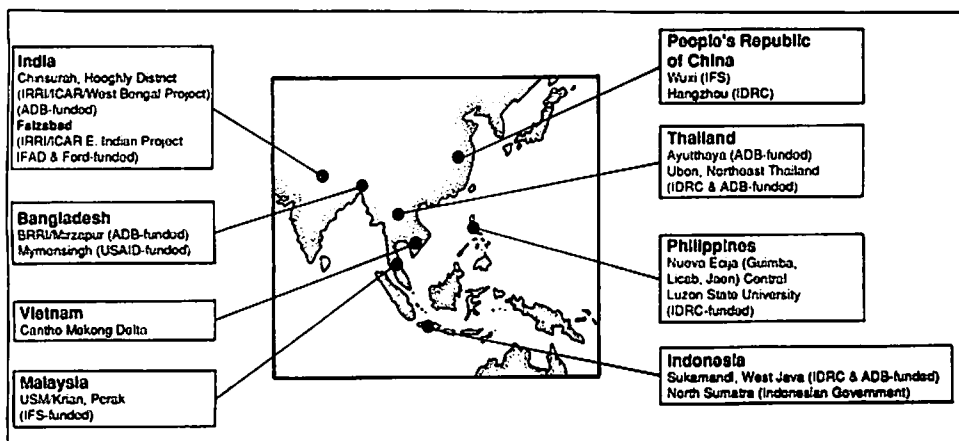


Fig. 2. Sites of rice-fish research in Asia.

of Agriculture has a policy to extend rice-fish farming in all seventeen provinces of northeast Thailand. In the Philippines, the Department of Agriculture is providing rice-fish research and extension support in four provinces.

### National Research Program Networking Needs

National research program participants in the ARFSN have made many recommendations in the areas of rice-fish research and extension during rice-fish workshops held over the last three years.

ARFSN members wish to continue research in the areas of:

- Improving fish breeding and quality of seed.
- Development of culture systems with improved water management and supplemental feeding.
- Rice breeding and agronomy compatible with fish production cycles.
- Mechanization of rice-fish systems.

ARFSN members have also identified common areas for collaborative strategic research with IRRI and ICLARM in:

- Integrated rice pest management.
- Floodwater ecology of fish culture in ricefields.
- Bioeconomic modelling.

ARFSN members have emphasized the continuing need for the network to assist them in:

- Identifying and setting national research priorities and agendas.
- Sharing information particularly on methods and research results.
- Analyzing their data, writing and publishing results.
- Training researchers on modern computer-based analytical tools.

ment of the array of economic and technical factors influencing extrapolation of rice-fish.

### Operational Framework for Integrated Rice-Fish Research

National research institutions, ICLARM and IRRI collaborate through the ARFSN. The Integrated Rice-Fish Group (IRFG) operates in eight countries undertaking a wide array of activities at different levels of effort (Fig. 3). The IRFG aims to support rice-fish research and development in Asia through national research, collaborative

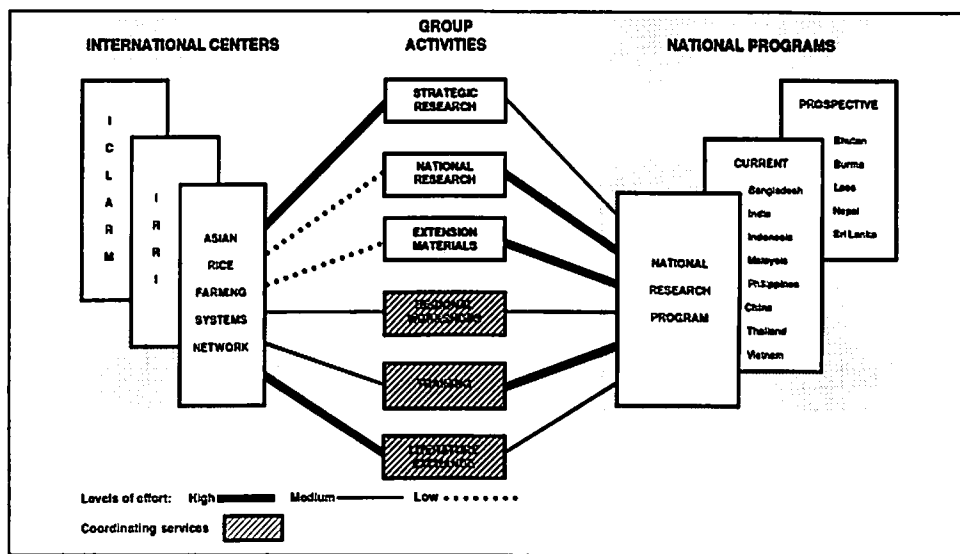


Fig. 3. Participants, activities and levels of effort in the operation of the IRFG.

### Issues for Collaborative Strategic Research

Integrated Pest Management research will provide an understanding of the interactions between rice and fish in weed, disease and insect pest management. Investigations will focus on the role of fish species in controlling specific rice pests. Experiments will determine if fish can significantly reduce the use of chemicals in rice production.

Rice floodwater ecology research will provide an understanding of the ecological interactions between rice and fish in nutrient cycling. Investigations will focus on the effects of fish (mainly tilapia and carp but also other finfish and crustaceans) and fish food organisms on the availability of fertilizer nutrients for rice growth.

Economics research will develop bioeconomic models for comparative analysis of integrated rice-fish systems for both regional comparison of the relative profitability of different systems, and for assess-

strategic research with international centers, training and information support.

National programs work on their own research interests, provide training for their own scientists and produce extension materials for their own farmers. Willing national institutions collaborate in strategic research for broad application of results. All national programs benefit from the IRFG's services in training, regional workshops and meetings, and literature exchanges. In addition, IRRI and ICLARM provide, when requested, guidance in national research prioritization, research assessment, policy making and production of extension materials.

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