

Drawing Pictures of Integrated Farms Helps Everyone: An Example from Vietnam*

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Introduction

More and more scientists are of the opinion that inappropriate technologies are developed because farmers do not participate in the research process. Demonstrating research station-developed models on farms is not enough. This argument has been used to account, in part, for the lack of widespread adoption of integrated farming technologies. Integration of agriculture and aquaculture should play a significant role in sustainable farming. Therefore, researchers must find ways for many farmers to participate. Achieving the right kind of farmer participation, however, is very difficult. At least that is the experience of those contributing to the recent literature. Participation improves and becomes easier when farmers are involved at the beginning of the research process. We demonstrate here how much they know about integrated farming systems and how useful their participation is to research, extension and other farmers.

Vietnamese Farmers Participate: An Example

During a visit to the Mekong Delta, Vietnam we met farmers practicing inte-

grated farming. Apart from growing fish and prawn in their ricefields they were raising animals, vegetables and trees on the dikes. We asked a few of them to explain how all these enterprises were linked together.

We gave them paper and pens and suggested they start by drawing a profile of the fields - dikes, ditches and paddies. On to this profile they sketched a cartoon of each enterprise. Then they connected the enterprises with arrows to show the material flows between them. Thus, an arrow from the water to the vegetables represented vegetable irrigation. It only took our group of four farmers one and a half hours to draw their pictures.

Some farmers, especially illiterate ones, shy away from pens and paper. We have found that marking the ground with a sharp stick or tracing arrows with wood ash is more popular. Really creative farmers will

gather seeds, cereal brans and fruits to represent their various enterprises.

The pictures farmers drew showed 2-m wide dikes, some covered with trees and others cropped with vegetables, bordering some 1.3 ha of ricefields. Buffalo and cattle graze under the trees. Adjacent to the dikes run trenches which are about 4 m wide and 1.5 m deep. Fish (*Puntius gonionotus*), freshwater prawn (*Macrobrachium rosenbergii*) and ducks swim in these water-filled trenches.

Arrows connected water from the trenches to irrigated vegetables. Trench mud, regularly dredged onto the dikes, is connected to the dike and rice straw is linked through mulch to the vegetables growing on the dikes. More arrows linked chicken and cattle manure which is placed in the trench immediately after it is built to buffer against acids and raise phytoplankton populations. Prawns are fed during their first two months with germinated rice grain, cassava flour, and rice bran and so were connected together. Prawn feeding continues with coconut and peanut oilcake, and trash fish from the irrigation canals. Also connected to the trenches are mango and eucalyptus branches. These branches not only keep out cattle and poachers, but also provide prawns with an undisturbed habitat, some food from decaying leaves, and a substrate for algal foods to grow on. One by one the linkages, shown in Fig. 1, provided a composite picture of how farmers integrated their agriculture and aquaculture enterprises.

How Drawing Pictures of Farms Helps

Everyone, farmers, extensionists and researchers can use farm pictures.

While drawing the pictures one farmer learns from another of new linkages or new ways for recycling to reduce external inputs. Some farmers say that prawns and fish eat grass weeds so much that weeding

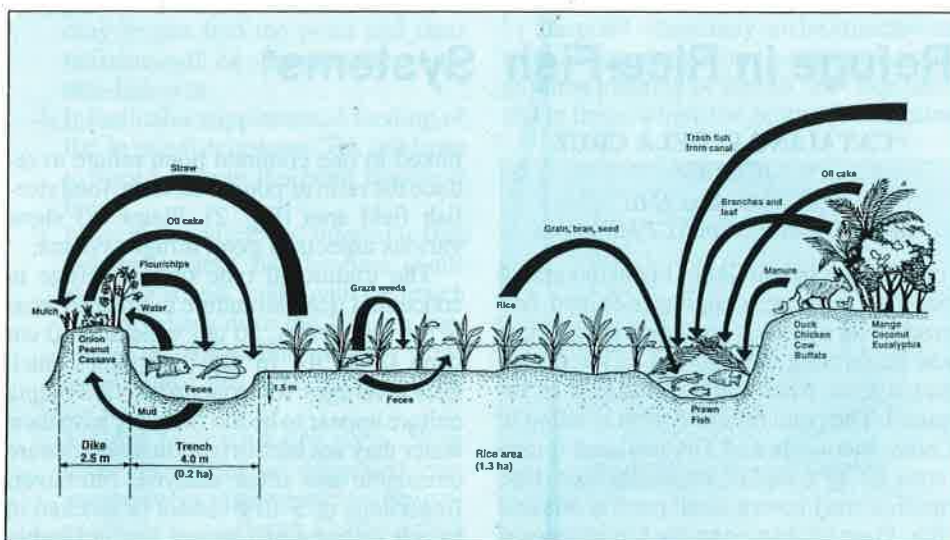


Fig. 1. Linkages in integrated farms of the Mekong Delta, Vietnam.

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A farmer concentrating hard on his drawing.



What a visitor to a Mekong Delta farm sees.



Farmers proudly display their drawings.

expenses can be reduced by about one-third. So a US\$50/ha weeding bill becomes only US\$33.40. NPK fertilizer application can be reduced by 28% from 209 to 192 kg/ha without reducing rice grain yield. Even if rice production falls because trenches take up 15% of the rice area the high value of prawn at 20,000 VN Dong/kg (about US\$5) compared to rice (282 VN Dong/kg) still makes integration profitable. Incomes from prawns can be two or three times that of rice.

Such pictures are of greatest help to the farmer who now sees how fish, or any other enterprise, can fit into his or her farm. In this way farm pictures become valuable extension tools as well. Extension workers can use them to show other farmers how to

integrate fish or vegetables or trees into their farming systems.

Researchers are helped by farm pictures not only because they help them understand farming systems, but also because they provide a framework for formal analysis. The picture tells researchers what data to gather for their input-output analysis and farm budgets. Ecological box models can be constructed when data are gathered on the standing biomass and rate processes shown. Indeed such pictures should preface any farm system modelling exercise.

Readers wishing to learn or exchange their ideas about participatory methods for integrated agriculture-aquaculture farming systems research are invited to write to the authors.

Further Reading

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The Pond Refuge in Rice-Fish Systems*

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Small fishponds on irrigated and rainfed rice farms, whether isolated from the ricefields or connected to them, can be a highly productive asset for farmers. The concept of a small pond as a 'pond refuge' for fish that forage for part of their growth period in the ricefield, for breeding or nursing fish, and for holding fish after rice harvesting results in much higher production. For growout operations it also produces larger fish at harvest and permits stocking of small fingerlings (5-10 g): a most attractive proposition. Such a pond

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refuge allows great flexibility in integrated rice-fish farming: coupling rice and fish production cycles as and when appropriate and decoupling them to suit different culture cycles when such flexibility is required. The pond refuge system is found in China, Indonesia and Thailand and is currently being tested in the Philippines. One ricefield may have a small pond at one end (Fig. 1), or depending on the topography of the farm, two or more ricefields may be

linked to one common pond refuge to reduce the ratio of pond area to the total rice-fish field area (Fig. 2). Plates 1-3 show various aspects of pond refuge systems.

The traditional type of fish refuge in concurrent rice-fish culture in irrigated areas is a small trench, 50 cm wide and 40 cm deep (Plate 4). In the Philippines, such trench refuges for concurrent rice-tilapia culture appear to be too risky because their water may not last: irrigation schedules are unreliable and often delayed. Moreover, fingerlings of 5-10 g cannot be stocked in trench systems and grown to marketable size with short duration rice crops.

Aquabyte