

# VIETNAM





# Best Rice Practices Vietnam

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## **Purpose**

The summary of best practices in sustainable rice farming intends to demonstrate its importance to policy makers, researchers and extension workers. This paper provides for the basis of policy recommendations to change existing government policies and practices. Sustainable rice farming deserves more support and promotion because it is key to sustaining and improving rice production, and helps improve the livelihood of many farmers.

## **Context: General Issues of Rice Production**

Producers are treated as mere actors in the rice commodity chain and rice production is seen only as an economic activity. The farmers' livelihoods should be supported in all aspects considering that a large number of poor farmers depend largely on rice.

It is also important to note that production yield is not the only indicator of success in a rice-based farming system. Rice production should be considered as an entire farming system in the context of its socio-economic and cultural conditions. Most Asian cultures are rice-based cultures with underlying age-old practices of rice production.

## Farmers' seed management

The farmers were under pressure to buy seeds from external sources, abandoning control and management of their own seeds. This pressure did not come from the companies only but also from government researchers, extension workers and state companies who have stakes in the seed business. They believed that the development of the seed sector should follow the pattern of developed countries where matters of seed were almost exclusively left to specialized companies. These entities often operated in international markets where international seed trade is strongly regulated under the WTO.

Abandoning the practice of seed management, the farmers eventually lost their knowledge on, and control over their seeds. As a result of this, local rice seed biodiversity was slowly showing signs of erosion. Promotion of hybrid rice seed that was sometimes highly subsidized caused the farmers to abandon seed management as they can not multiply hybrids without external support.

Some people said that the consequent loss of biodiversity was compensated by the introduction of open pollinated High Yielding Varieties (HYVs). However, the supply of these HYVs was often erratic or insufficient, the quality was not reliable, and prices were usually higher despite the subsidized rate. The poor farmers had struggled paying for these.

The farmers in remote areas not covered by the HYV promotion continued to practice seed exchange with other farmers. HYVs were, sometimes not suitable for local farming systems and the promise of high-yield produce failed. The farmers preferred to continue with the good 'old' varieties they trusted instead of new HYVs that were frequently introduced. The farmers were not ready to try new varieties.

Researchers in Thailand<sup>1</sup> found that the farmers' selection of rice seed took into account a number of criteria, compatibility of the seeds with the farm conditions, like weather, soil, cropping system

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<sup>1</sup> 'Participatory modeling for managing rain fed lowland rice varieties and seed system in lower northeast Thailand' Chirawat Vejpas (Faculty of Agriculture, Ubon Ratchathani University, Ubon Ratchathani), François Bousquet (IRRI-Cirad-DOA Project, IRRI-Thailand Office), Warong Naivinit (Faculty of Agriculture, Ubon Ratchathani University, Ubon Ratchathani), Guy Trébuil (IRRI-Cirad-DOA Project, IRRI-Thailand Office), Nuanchan Srisombat (Office of Agricultural Research and Development (OARD) IV, Ubon Ratchathani)

and pests, and marketability, like cooking properties, taste, and cultural factors. These were a whole different process of seed selection compared to the practice of scientific breeders. There may be different ways of selecting varieties but these could be compatible, as long as the farmers were working on open-pollinated varieties.

The farmers' good practices on rice seed management existed and corresponding initiatives supporting these practices were implemented. Improving the farmers' system, projects assisting farmers to improve variety selection and upgrading, more professional methods of seed multiplication and breeding methods are discussed further in chapter III.

### **Seed trade**

Seed trade was increasingly becoming a part of global trade that led to moves to regulating it. Joining the WTO will result to adopting strict policies on Plant Variety Protection, seed quality control, and the like. The proposed measures were typically applicable for developed countries where seed trade is a highly professionalized and an internationally commercialized activity. Developing countries were forced to adopt regulations that are very far from local reality.

The farmers in Vietnam provided most of the rice seeds in local varieties and those that originated from the formal sector. Their practices of rice seed management and seed exchange were simply not compatible with the proposed regulations that seem to ignore the role of farmers. They were restricted with formal quality control requirements. Mainstream public extension services that recognize and support farmers' role in seed management are yet to be developed.

The heavily subsidized provincial state seed companies have a monopoly in the formal as well as illegal seed trade in most of Vietnam. Existing policies were unable to develop local, more diversified, and more informal rice seed sector that is necessary at this stage. Instead, the policies facilitated the establishment of larger, foreign or foreign-linked companies.

The public extension service helped promote and sell the seeds of provincial companies. The promotion of hybrid seeds together with agro-chemicals hampered the development of local, farmer-

based seed supply alternatives that were necessary for sustainable rice farming practices.

With the progress in international integration, Vietnam will be pressured to implement restrictive measures like formal quality control on seed trade and suppressing the development of its local seed sector. For example, the bilateral trade agreement with China will further enhance Vietnam's dependency on rice seeds supply from China. Provincial seed companies in areas bordering China were not interested in rice seed multiplication because they prefer importing seeds from China<sup>2</sup>.

This had implications beyond just the seed sector. Large companies were not just interested in rice seed. Having stakes in the seed market gave them greater opportunity to also promote use of other inputs and agro-chemicals that are sometimes linked to a variety. The farmers were dependent on input suppliers through credit schemes, processing services and marketing of rice produce. This control over the rice commodity chain has motivated these companies.

Meanwhile, most farmers who remained interested in Open Pollinated Varieties (OPVs) will not be able to make real profits on seed alone. They were reduced to mere contract workers in the rice chain, increasing their dependency on external inputs and credits, and limiting their options for sustainable farming practices. This trend will continue if companies succeeded in tying up the farmers to hybrid or even genetically-engineered seeds. The farmers will not be able to multiply seed at all, and completely lose their control over the seed sources.

Should rice seed development, in the current setting of an increasingly fast changing environment, be left only to scientists working in a seed sector dominated by the interests of large private enterprises?

### **Services: research, extension, and financial services in Vietnam**

Public research and extension policies focused on the “modernization of agriculture” that involved modern varieties or HYVs, hy-

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<sup>2</sup> Diagnosis of the Local Rice Seed Sector in Lang Son Province, E. Bergeron & Ng. Ngoc Thang, VECO Vietnam, March 2005.

brids, and possibly GE in the future. These were done through a top-down approach of bringing the technology to the farmers and they took the passive role of being just at the receiving end.

References like 'poor farmers are stupid' so their local farming practices and varieties 'backward' were not unheard of, and often used to justify their focus on better farmers who were more responsive to the technology brought down from research. A recent dialogue, however resulted to intensified extension packages for poor farmers that comprise the majority of farmers in the country.

However, the fact remains that the income of public researchers and extension staff depended significantly on the incentives that the private sector gave on their promotion of the input supply. Most policy makers do not see the problem that the private sector's interests had greatly influenced the direction of extension work.

This placed the promotion and adoption of sustainable agriculture in the least of their priorities. Research and on-farm testing of more sustainable, low-external-input rice farming practices were not part of mainstream research and extension practices. In on-farm variety trials or testing of chemicals, the main indicator was typically yield and not the benefits for farmers or farmers' adoption rates.

Further, most extension workers were not trained on participatory methods, their facilitation skills were poor and they largely ignored the value of the farmers' indigenous knowledge and experiences. The impact monitoring of extension work was also poor.

There was no mechanism in most places to make research and extension, in any way, answerable to the farmers and they were not expected to pay for these services. Thus, the important yield gap between on-farm and on-station yields was not addressed.

The same problems existed in financial services. Credits or subsidies were dedicated to external inputs and very little or nothing was available for training, exchange of experiences and participatory technology development.

However, it needs to be recognized that there was increasing awareness on deteriorating quantity and quality of water for irrigation and on the over-use of agro-chemicals. The challenge is to maximize this awareness toward seeking sustainable solutions and structural policy changes.

Some interesting initiatives that deserve to be recognized officially include the IPM/SRI program for which national funds were promised, Support to Freshwater Aquaculture (SUFA) project and Fisheries Sector Programme Support by MOFI-DANIDA (Ministry of Fishery-DANIDA) promoting fish-rice systems.

### **Community water management**

The management of local irrigation systems was decentralized towards community water-user groups. This enabled communities to adjust water management practices according to their preferences, following sustainable rice farming solutions of their choice.

### **Marketing**

A new and upcoming market for organic and tasty rice affirmed the importance of local varieties. Certain varieties from some areas developed a good reputation in the market and a potential for brand positioning.

This paper would not dwell further on marketing issues, like the marketing organization and the farmers' involvement, impact of international economic integration on the rice sector, particularly on the livelihood of small farmers.<sup>3</sup>

### **Methodology of collecting best practices in Vietnam**

Vietnam has countless interesting sustainable rice farming systems and practices that can be cited in the collection of best practices, e.g., rice farming as practiced along rivers or the flooded rice and upland rice. However, the best practices in paddy rice farming seem to be the most important, considering its potential to improve farmers' livelihood and reduce pressure on the environment. We chose to focus on System of Rice Intensification (SRI), fish-rice farming, rice seed management and stem borer control. These have great potential for widespread adoption.

Most of the data were collected through a network of professionals in Vietnam. Particularly important was the contribution of

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<sup>1</sup> For this we refer to 'Extortion at the Gate – Will Vietnam join the WTO on pro-development terms?' by Oxfam, 'Rice Market Liberalization and Poverty in Vietnam' (IFPRI research report 114), and the ADB rice chain study in Vietnam.

Dr. Ngo Tien Dung who deserved gratitude. He is from the National Integrated Pest Management (IPM) program and coordinator of BUCAP (Biodiversity Use and Conservation in Asia Program) project in Vietnam. He headed initiatives to introduce good practices related to IPM, SRI and farmers' rice seed management including upgrading and breeding.

This collection of best practices will not materialize without the help of Jacob Fjalland from the SUFA project of DANIDA that promotes the fish-rice system. Other data were obtained in Vietnam from The Vetiver Network Vietnam (VNVN/TVN), international NGOs SNV (spell out), VECO (Vredeseilanden Country Office in Vietnam), and FAO (Food and Agriculture Organization).

## **System of Rice Intensification (SRI)**

### **What is SRI?<sup>4</sup>**

SRI is a 'system' rather than a 'technology' because it is a set of principles rather than a fixed set of practices. It is a new way to produce healthy crops in which methods are to be adapted to local conditions. SRI includes new transplanting and irrigation practices with more emphasis on soil management.

The objective of SRI is higher productivity of land, labor, capital, water, not just higher yield. This is to be obtained in a sustainable way to benefit farmers, especially poor farmers.

Yield response with SRI was better where soils are of better quality. SRI farmers were inclined to apply SRI in fields with better condition and closer to the homestead.

A farmer obtaining 3,000 kgs/hectare with conventional practices expected to yield 4 tons/hectare with SRI. It was most productive when used with skill and care. It had a long-term advantage for labour-intensive small-holder production where limited land area demanded the highest possible yields.

SRI insights were developed from over 30 years of work of the farmers in Madagascar, assisted by the initiator, Fr. de Laulanié. He believed that SRI promoted human resource development charac-

4. From: "Mission to study the System of Rice Intensification (SRI) activities in SE-Asia and to make recommendations to FAO about future training and Participatory Action Research relating to SRI", consultancy Report, 30 March - 16 Apr. 2004, Max Whitten & John Schiller.



*Healthy rice plants with a well developed root system: more resilient against stress.*

terized by engaging the farmers as partners in development and farmer-to-farmer dissemination of SRI.

All SRI principles and practices can be reduced to one basic principle: A healthy rice plant is more tolerant to pests and diseases therefore, produces higher and more reliable yields. Derived from this are the other principles:

- promoting a ‘living’, aerated, soil improving root development because rice is not an aquatic plant
- early transplanting to keep up with the potential for tillering and root growth
- avoiding transplantation trauma by shallow transplanting or direct seeding
- wider plant spacing to enhance root growth, tillering, and avoid competition between plants at an early stage

SRI had the advantage of requiring little external input, such as, less seed, less disease, less risk yet more environmental benefits. Because of low cost of production, even poorer farmers could engage in SRI. Add to that the fact that yields could increase to 30-100 percent with best results in more fertile soils.

However, there were difficulties in introducing SRI as well:

- Labor requirements can initially increase, especially for the required early weeding. However it became labor-efficient when the practices were learned
- Water control was not easy to manage where farmers had no independent control over water. However, this problem can be solved in time and more farmers adopting SRI.

- Scarce organic inputs because SRI produced optimum results when the soil was in its best condition.

SRI could increase yield up to 100 percent but only on good soils and experienced farmers. Yield increase could be quite marginal in poor soil conditions but then the farmers had the advantage of saving money on inputs. They also have plants that are more resistant to extreme weather conditions or pests.

The FAO through the National IPM program supported farmers to promote SRI in Vietnam since 2002. The IPM program, carried out by the Department of Plant Protection and its sub-departments, worked with Farmer Field Schools (FFS) and farmers organizations. Searice/BUCAP was also involved in the program.

SRI is now practiced around Hanoi and in the provinces of Hoa Binh, Quang Nam, Thai Binh, Can Tho and Soc Trang. The latter two are in the Mekong Delta.

In the spring of 2003, the number of FFS on rice and vegetables in Vietnam was around 2000. The labor intensive, small-scale farm setting in the northern part of Vietnam, such as, Red River Delta provided more potential for SRI adoption.

### **Planting**

SRI practice recommended transplanting young seedlings of only 14 days old with 2-2.5 leaves in a 100-sq. meter plot size. The farmers learned that transplanting younger seedlings grew easily with less root disturbance. Wider spacing led to more tiller production, more grains per tiller and higher yield.

Fast growing of plants compensated delayed sowing and the harvest was not delayed. The farmers responded positively to the advantages of sowing less seed and reduced labor requirements during transplanting. The farmers followed the recommended practice of wider spacing for single plants at 1-2 slips, 20-30 centimeters apart and careful transplanting in square pattern.

### **Soil and water management**

Frequent draining during the growth process was recommended but water management became a problem. However, the farmers felt this was just a transition problem. They believed the other farmers



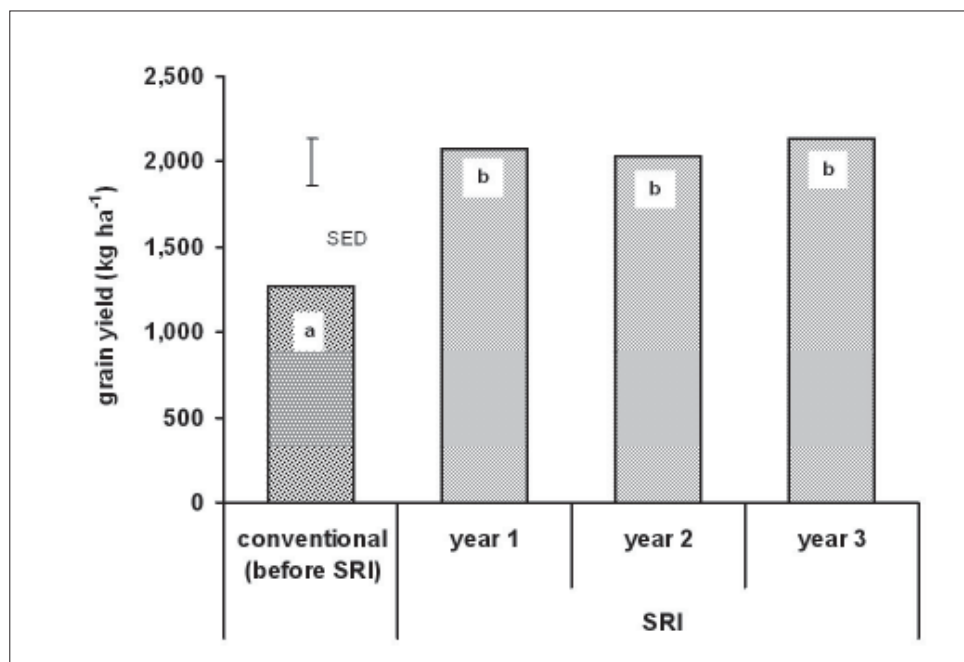
*Paddy land near the Red River; adjusting to a decreasing quality and quantity of irrigation water.*

would see the benefits of a new irrigation regime wherein they will be able to manage their pattern of water use.

Organic fertilizer was recommended in as far as it was available. Farmers used less chemical fertilizer because they developed the root system in areas where the soil was more fertile.

When they have the choice, they were more inclined to apply SRI on fields with a better soil quality. Likewise, farmers tended to apply SRI on fields closer to the homestead. They were able to look after their plants that resulted to better, more fertile soil quality.

Data obtained from other SRI farmers indicated a sharp increase in yields when changing from conventional practice to SRI (Fig. 1).



**Fig. 1 The System of Rice Intensification (SRI)**

These levels could be maintained for at least, three consecutive years. No adverse effects were expected in the medium term, at least. However, a potential risk of soil degradation that may require more fertilizer was expected in the long term due to soil aeration enhanced with SRI and sped up the mineralization of soil organic matter. In contrast, long-term trials established about 30 years ago under flooded conditions resulted to yields that were maintained at a fairly high level.

### **Crop management: pest and weed control**

Farmers followed the early weeding practice and pest and disease incidence and severity were less, especially root diseases in the spring cropping season.

### **Benefits and challenges**

Additional labour input of 25-50 percent for careful transplanting and weeding was compensated by yield increases of 50-100 percent and possibly by two or three times than the previous levels in some areas. Returns from labour input were very great since no purchases on inputs were needed.

The labour input decreased and eventually was nearly the same or less compared with conventional rice-growing methods as the farmers gained experiences in SRI. Households that grew rice but are constrained with the labour requirements can still use SRI methods on just a part of its landholding. The other part can be used for the production of other crops when labour is not available. Over time, various kinds of mechanization will make SRI suitable for larger scale production.

### **Integrated fish-rice farming<sup>4</sup>**

#### **What is a fish-rice farming system?**

In a fish-rice farming system, rice is grown in higher water levels, allowing fish to live with the rice plants. The integration of fish in the rice farming system was practiced traditionally in some parts of Asia including Vietnam.

5. Rice-Fish Farming in Tien Giang Province, Nguyen Van Hao, Nguyen Trong Hien, Pham Dinh Khoi, Nguyen Tho Dan and Don Griffiths (1999); with reference also to Middendorp, H.J. (1985).

The system started in the Mekong Delta. This system has the potential to integrate pig and/or duck raising into the farming system. It allowed recycling of animal manure thus reduced the need for chemical fertilizers.

It diversified the farmers' sources of income therefore, reduced the risk on their livelihood. The dikes required for fish-rice farming also provided space for growing of vegetable or fruit trees.

The system reduced the farm's vulnerability to pests and weeds. The fish ate the pests and uprooted the weeds. Higher water level also effectively suppressed the growing of weeds.

It motivated farmers to use lesser chemicals because it may damage the fish and it was less needed in the rice plant. This in turn produced more benefits for the environment. It also developed a larger population of wild fish in the water supply canals.

The fish-rice system has disadvantages although less perilous compared to rice monoculture. One of which is a higher risk of flood damage when the dikes are damaged. It also requires high initial costs to build the dikes and trenches and more use of water.

### **Soil and water management: ditches and ponds**

Fish-rice systems relied heavily on natural feed, hence the importance of fish spending more time in the rice field. Fish kept in ponds needs extra feeding unlike in the rice field where it was of immense use, reducing the pests and weeds damaging the rice.

But having fish in a rice field needed more spaces in the ditches and dikes. Ditches were typically just 20-25 cm wide and 20 meters apart. Higher dikes were often built in the Mekong Delta to keep the flood water out. Depending on the size of the field, 10-30 percent of the area was used for ditches and dikes in field areas of 6-10,000 sq. meters. For smaller areas of 3-6,000 sq. meters, the area for ditches was 15-33 percent. These were typically in flood-prone areas where ponds were rarely present.

But the space used for a dike could be occupied by vegetables and/or smaller fruit trees. Farmers with larger field areas had some advantages as the area for dikes was relatively low.

Proper land preparation was very important for the fish-rice system. The land should be very level. Fish-rice culture was not really feasible in acid sulfate soil areas, because of its pH content.

The fish species that did well in this system were silver barb, common carp, tilapia, and silver carp. They had stock densities of 0.5 fish/sq. meter in low-lying areas and 0.7 fish/sq. meter in flood-prone areas.

It was recommended to buy fry in March-April when it is relatively cheaper. Nurse these in refuge ditches and/or ponds until they grow enough to escape predators and release into the rice field area.

### **Water levels**

Water depth in the rice field and refuge ditch varied according to the agro-ecological zone, season, rice growth stage and financial capacity of the farmer to supply water. In general, the depth of water in the refuge ditches was 50 cm or more than the rice fields and 15-20 cm or even just 10 cm in some areas.

The water level in the fish-rice plot lowered after each rice harvest time and replanting. The fish retreated to the refuge ditch and/or the connecting pond. The next crop of rice increased the water level giving the fish access to the rice field area again.

The farmers with gravity-fed water supplies and had more experience with fish-rice culture gave the fish better access to the rice field areas. The fish spent 3-7 months in the field in a 10-month period.

But the farmers in lower areas were reluctant to raise the water level because it required additional pumping costs. Water has to be pumped out during harvest because it is difficult to harvest with fish in the field.

During the main winter-spring rice cropping season in December - March, the farmers were reluctant to allow fish into the rice field because of damages it caused on the rice plants. Towards the end of winter-spring, crop farmers had little control over the water level because it was supplied by centrally controlled pumping activities. Thus, they had to check the dikes around the field regularly to prevent the fish from escaping.

### **Planting and seed**

In principle, the varieties used should have a strong tillering capacity. It should be able to endure long-term water logging and higher

water levels of 10-12 cms., thus of moderate height of 110-130 cm tall. The stems should be stronger to withstand the damage caused by the fish. The variety should preferably suitable as a ratoon crop. And finally, the variety should be more pest resistant than usual because pesticide use should be avoided.

In practice, the farmers used hybrid varieties originating from China (Nhi uu 838). The farmers did not get optimum results because hybrids, in particular, were not pest resistant. These are usually selected to maximize rice yield using chemicals and more vulnerable to post-harvest pests.

Another disadvantage of hybrids was that the farmers could not reproduce the seeds themselves. The price of hybrid rice was not as high as other varieties and these do not sell well in the international market.

These seed issues should be addressed and find possible solutions. The farmers themselves were continuously working on alternatives. Many fish-rice farmers selected and screened the most appropriate rice variety for the fish-rice system.

The seeding rate was lower than rice mono-cropping. In the fish-rice system, row seeding was preferable, as it made the movement of fish in and out the field easier. The system has lower seed quantities needed. Row seeding needed only about 80 kg/hectare and 100-150 kg/hectare for hand seeding.

The ditches allowed reduced lodging of rice or draining the rice sometimes. Planting is only at a slightly lower density than in the rice monoculture with only 40-43 clumps/sq. meter instead of the usual 42-46 clumps/sq. meter.

### **Crop management: pest and weed control**

The typical 3-crop system in the Mekong Delta is not entirely suitable for fish-rice farming. Ideally the farmer switches to a 2 crop system with the 3rd as ratoon crop. It is also very suitable for the fish because they can be allowed to feed on the rice if the water is high enough.

Once the rice has gone well into the stage of tillering, the water level was raised to 15-20 cms instead of just 5 cms. Weeding became immaterial with such high water levels.

The amount of urea used was 15-20 percent less than rice monocropping. The decrease in fertilizer application was therefore, recommended. The length of the cropping season remained the same.

### **Pest control**

The farmers applied chemicals on several occasions because they used high-yielding varieties that are highly dependent on agro-chemicals. They used insecticide for 30 - 60 days when the fish were in the rice field area and when the rice flowers came out during the important winter-spring crop. Farmers reported fish deaths in tilapia and snakeskin gourami after they used insecticide. Pesticide residues from Regent and Padan caused fish mortality if the fish were allowed into the rice field area while rice is younger than 15 days old.

Nearly all farmers practiced IPM, although they also used disease protection chemicals in more flood-prone areas. They still encountered problems with some pests and diseases because of reduced application of pesticide and herbicide. On the other hand, the cases with poor fish survival rates were due to herbicide and pesticide used. Aside from flooding, the cases of fish escapes were also affected by the acidity level of field areas.

### **Benefits and challenges**

About 2 percent of the rice area in the Mekong Delta region was utilized for fish-rice cultivation and this practice was found to have significant potential. However, current extension work in the Mekong Delta focuses on the use of pesticides, inorganic fertilizer, broadcasting short duration rice varieties and low water levels that are not suitable for the fish-rice system.

To promote fish-rice farming, the entire extension package needs to be changed. An extension package for rice farming adapted to fish-rice system is yet to be developed in the Mekong Delta.

Rice production has significant implications in land preparation and should consider the building of dikes and trenches. The rice varieties most suitable for this system are currently not provided in the formal seed sector. Using manure and more split fertilizer applications for fertilization and the kind of pesticides used for pest management practices have to be addressed as well. The exploration of additional opportunities from pig and/or duck raising, vegetable/fruit

growing in dykes to maximize the fish-rice system should be recognized in the current extension work package.

Rice yield per unit area increased in the fish-rice farming system. However, the recommended fish refuge area of 5-15 percent of the total land area reducing the coverage of the field planted with rice. This compensated for the supposed rice yield increase so that at the end of the harvest season, the yield from the rice field remained the same or increased a little. Yet, the benefits of using fish to control the pests and weeds that damaged the rice instead of using chemicals and lesser rice seed requirements pointed to the system's optimum benefits on the farmers.

Trials in different agro-ecological zones in the Mekong Delta indicated that even higher rice yield was obtained in low lying areas with lesser chemical fertilizer and pesticides application and lesser rice seeds used. Rice yields in the fish-rice system varied from 5.6 to 6 tons/hectare while the rice-only system was from 5 and 6 tons/hectare. The loss in areas planted with rice in the fish-rice farming system lowered the yield to 10-15 percent.

However, the fish yields duly made up for the loss in rice. The best rice results were in the higher areas while better yields in fish were found in the lower, flood-prone areas. Fish yields over a 10-month culture cycle ranged from 300 - 400 kgs/hectare for the different agro-ecological zones. The mean net income from fish during this period was over 2mln VND/hectare.

Over the 10 month culture cycle, the mean investment was 1.3mln VND (94\$) and the net profit was 2-3mln VND (142-236US\$). Investments in flood prone areas were relatively higher because of the need for more areas for ditches and netting to prevent fish escape. However, the income from these areas was also more than double. Eighteen of the 20 farmers made profit from fish-rice culture.

Farmers identified the benefits as increase in income per unit area, job creation, and caring for the environment. The most important challenges, according to them were land preparation because canal digging was costly, required labor inputs, pest management without harming the fish, theft and transport problems, and the risk of flooding depending on the location. Pest management, particu-

larly and the search for suitable rice varieties and crop management practices, required more attention.

**Farmers' rice seed management and conservation:  
selection, upgrading, breeding, multiplication**

Many years ago, there were much more varieties of rice, but the introduction of high-yielding varieties and particularly hybrid rice seed by the formal seed sector (and pushed by government propaganda) has had a negative impact of rice seed biodiversity.

**Needs for farmers' seed**

The need to improve local rice seed systems was apparent in rural appraisals. The problems with rice seed supply appeared even during the project identification stage. More details on the relations between the farmers' seed need and seed supply also appeared in several local field studies.

In many places, especially in mountainous areas, the farmers' preferences of varieties to keep and use were different from seeds supplied by the formal seed sector. This was the reason why, the ASPS-seed project (MARD/DANIDA) and projects of NGOs like SNV, VECO, GRET (Groupe de Recherche et d'Echanges Technologiques), APEFE, CIDSE (International Cooperation for Development and Solidarity), ActionAid, CRS (Catholic Relief Services), aside from BUCAP, got involved in supporting farmers' seed production. Some NGOs put more focused on efficient seed multiplication, others gave emphasis on the development of a private, independent business of seed production, and others stay underscored the link of local seed production with sustainable rice farming. So far, the support for farmers' rice seed production covered about 20 provinces.

The farmers have their age-old practice of managing their rice seed but with some technical advice, this practice can be improved. This technical advice was based on formal recommendations for seed production, but did not necessarily follow all the standards that were required in the globalizing formal seed sector. It reaffirmed the farmers' practice by enabling them to develop varieties that were most

appropriate for their purpose, adapted to local agro-ecological conditions and farming systems and available to other farmers through the usual way of seeds in exchange for consumption rice.

### **BUCAP: Biodiversity**

The BUCAP project in Vietnam worked in 11 provinces and 91 villages. It was able to provide training to 88 farmers and the benefits reached more than 3,200 farmers.

These farmers selected 227 rice varieties and rehabilitated 108 varieties of the selection. Forty new varieties were further developed with the help of a number of farmers who went into breeding. The farmers' seed production covered 190 varieties and some of the selected varieties were not necessarily rehabilitated by the farmers but were already available from the formal sector. These were the varieties of acceptable quality but the formal sector was not providing anymore, or not providing in sufficient quantity or the price is already too high.

This intensified farmers' engagement in seed production also resulted to increase in rice varieties maintained in villages. A village kept about 5 varieties before the project was implemented and they maintained about 9 varieties after a few years.

This practice of developing and maintaining rice varieties was done not only to ensure biodiversity in the communities. The farmers chose the varieties because of the benefits of higher yields but less cost of production and therefore, better than the more conventional varieties of OPV and hybrids offered by the formal sector.

There were about 20 local seed producers in 14 villages in Co Lua commune (Ha Tay province, near Hanoi) and each has an area of about 360 square meters. The seed producers used to buy their input seed (Khang Dan, C70, and Q5 pre-basic) from the formal sector. This initiative of local seed production facilitated their access to better quality seed for a low price and much lower than the seeds provided by the formal sector.

The farmers appreciated the fact that they have better quality of seeds that were readily available. Their neighbors emulated the practice and so far, the local seed producers in Co Lua commune can hardly meet the demands for seed.

### **SNV: High value rice**

SNV supported farmer groups in Son La and Lai Chau and Dien Bien Phu through the Agriculture Extension Centre (AEC). Pilot areas on farmers' rice seed production were established in Yen Chau district, Chieng Pan and Chieng San commune. The groups received training on rice seed production and group management.

Everybody agreed on their roles to support local seed production. The groups committed to better quality rice production in a manner that is financially sustainable. The extension workers provided technical and organizational advice and even helped the farmers to find buyers for their produce. The District PC ensured extension services and farmer-enabling regulations of seed trade. SNV assisted with technical advice and funding providing the farmers with seeds for two seasons. After which, the groups need to be financially independent.

After two crops of one success and one failure, the farmers understood the benefits of rice seed production. They found out that the benefits per area were higher their previous practice. However, they need to improve on their marketing skills. The farmers relied on Agriculture Extension Services (AES) to help them buy seed input from Hanoi and this made their seed input supply unreliable. It can be a source of conflict between the seed producers and AES and/or SNV.

### **Stem borer control with Vetiver**

An interesting yet still being developed biological pest control method is the use of Vetiver grass to control rice stem borer. The grass is planted around the rice field.

It was developed and tested in Kenya for maize and was proven more effective than Bt-corn<sup>7</sup> and currently being studied in the Mekong Delta<sup>8</sup>. Vetiver zizainoides was planted three years ago along the 20 km dike (for dike reinforcement) in Hau Giang province, near the Cambodian border, along paddy fields.

7. Personal communication with Dr. Johan v.d. Berg, entomologist in South Africa - presented the first results in the 3rd Vetiver Conference in Khouangzhou, 2003, called it the 'push-pull system'. This was originally tried in Kenya with Napier grass (Guardian Weekly 16-10-03, Outlook p.25).

8. Personal communication with Dr. Lê Việt Dung, Can Tho University, Vietnam. Rice stem borer control with Vetiver grass (*V. zizainoides*) is under study in the Mekong Delta.

At first, the farmers were concerned that the grass would attract insects harmful to their rice crop. The dike department was concerned because stem borers were seemingly destroying the Vetiver panicle. However, the Vetiver recovered well, while stem borer infestation in adjacent rice fields was immensely reduced. Vetiver attracted the moth of the stem borer because the moths prefer Vetiver over rice. However, the larvae died when they ate the lower part of Vetiver because it was inedible.

The farmers who were initially reluctant eventually planted Vetiver grass around their fields. They observed that this practice has considerable impact and has reduced the stem borer in rice. Government resources for agricultural research & extension should focus on, or at least include - not ignore - these alternative, sustainable rice farming practices.

### **Lessons learned from the adoption of best practices**

Generally, Vietnamese farmers may not be aware of 'sustainable agriculture' so they did not understand the 'ideology' of organic versus mineral fertilizers, 'modern agriculture' versus biodiversity, etc. But they were concerned about their rice farming system, the long-term economic implications and risks of the different rice farming practices. They were also aware of the ways of management of the different practices and how it would fit into the entire farming system.

The farmers found in SRI that they were capable of assessing the impact of planting younger seedlings and wider spacing on root development and health of the plant. They learned about lesser root casualty in seedlings during spring crops in the north. They also discovered in SRI the incidence of insect herbivores and that the weed problems varied significantly from one place to another.

Farmers were prepared to experiment with water management and were open to significant changes from long standing traditional methods of water management if warranted for much better results, whether in SRI or in fish-rice farming system. The farmers were, before anybody, the experts at growing their own crops.

The SRI implementation in Vietnam was not just a farmer's best practice but brought about, hopefully, positive impact for the approaches in research and extension work. The farmers were the ex-

perts in SRI. They will play a major role and through their enthusiasm and skills, SRI can be further developed and adopted in other areas.

SRI required no particular external inputs. The role of extension workers and researchers to promote SRI would be merely to facilitate rather than to hand down pre-set recommendations. Extension workers who focus on input supply have no place in promoting SRI.

SRI challenged the mainstream outputs of modern research institutes that are typically focused on genetic improvement, input of synthetic fertilizers and pesticides. SRI can not be promoted through the usual rigid package of techniques with simple, promotional, mass media messages.

The SUFA project found that one of the motivations for well performing extension staff is giving proper recognition, offering them a more permanent position and farmers' appreciation of the impact of their work.<sup>9</sup>

These best practices challenged the notion that improving the livelihood of small scale farmers can not be fulfilled through the promotion of simple messages via the mass media as advocated by some researchers in International Rice Research Institute (IRRI). Looking at the mainstream extension messages regarding rice production, it is clear that much still needs to be done.

In the Mekong Delta, the extension package for rice in the fish-rice farming system was yet to be developed. The recommendations mainstream 'modern' rice farming involved too much use of pesticides, inorganic fertilizer, short-term varieties and water management that were not suitable for fish-rice system.

The motivation of extension workers to work for and be accountable to the farmers and not the input suppliers was a structural issue that deserved serious attention. Projects that more or less dealt with this issue on a temporary basis were not enough. More structural changes were needed to make sure that farmers were the clients of their services, determining what and how services were delivered to the farmers. The farmers' payment for services, however small and

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9. More on this problem in 'Agricultural Extension Services for the Poor, a documentation review' (Nov. 2003) by several INGO members of the VUFO NGO Resource Centre

symbolic, instead of paying for inputs, may be part of the solution. The best practices discussed in this paper gave sufficient reasons for all these.

One of the weaknesses was the glaring absence of a strong linkage between the country's research community and the extension/farming community. SRI, like IPM, or biological control of rice stem borer with Vetiver challenged the existing 'wisdom' in many aspects of plant production and protection.

These developments present good opportunities for closer collaboration between the farmers, trainers and researchers. It would be unfortunate if the rice research institutes in Vietnam adopt the negative and polarized attitude towards SRI as shown by some researchers from the international research institutes<sup>10</sup>.

### **Conclusions and future perspectives**

Positive insights for further promotion of SRI were identified in Vietnam. FAO highly recommended supporting SRI through the National IPM program but there are more ways of promoting SRI in the country. The farmers through farmers' groups or FFS will play a vital role in this.

Similar recommendations were drawn up for the fish-rice farming system that equally, has supporting projects and researches showing the benefits for farmers.

The realization of farmer-based rice seed production depends on Vietnam's future policies regarding the seed sector. The extent to which the government will allow WTO regulations to be applied even when it is not in favor of its domestic rice seed sector will greatly affect this initiative.

Last year, a decision was approved allowing the farmers to produce and sell rice seed, as long as it does not claim to be pre-basic or basic seed. But even with this decision that is hardly known in the local levels, many district and provincial authorities believed that farmers should not be allowed to freely take their role in the local seed sector. They said the farmers' seed is required to undergo quality control first. In the absence of technical or financial support,

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10. From the FAO report, see footnote 4

such control is hardly helpful, and can be easily abused to benefit government staff and keep the monopoly control of the provincial seed company.

The local policies have to change to scale up all the good practices reported in this paper. These policies should be geared toward more client-focused research and extension with the farmers taking the prominent role of defining their needs for these services. Only then will the necessary innovations happen and to further develop sustainable rice farming practices with solutions for current and future challenges.

