

**TRIP REPORT FROM VISIT TO VIETNAM, JULY 7-14, 2007,
REVIEWING SRI PROGRESS – Norman Uphoff, CIIFAD**

SUMMARY

This week of interactions with a range of government agencies, research institutions, NGOs and farming communities in Vietnam, including two field visits and a national workshop, showed that Vietnam is becoming one of the most active countries for SRI research and dissemination. The Vietnam Academy of Agricultural Sciences is taking an active role, now that the Ministry of Agricultural and Rural Development has officially endorsed SRI. It is joining the National IPM Program in the government's Department of Plant Protection, two major universities (Hanoi Agricultural University and Thai Nguyen University), and several NGOs, most notably the Centre for Sustainable Rural Development, in a multi-institutional collaborative effort. Oxfam America is playing an active role among donor agencies in mobilizing support for the work of this diverse set of actors, with the Japanese Volunteer Corps also taking initiative and becoming part of the national effort..

The System of Rice Intensification (SRI) has been introduced into Vietnam through several pathways, one of which I did not know about before this visit. From the government side, the first trials of SRI were through the **National Integrated Pest Management (IPM) Program**. Its director **Ngo Tien Dung** learned about SRI in 2002 from IPM colleagues in Indonesia. After some encouraging initial results in that first year, trials/demonstrations were undertaken in three provinces the next year. By 2006, the number of provinces was up to 17, although the total area was only 70 hectares. This year (2007), SRI has begun to accelerate as seen below. Also there were several introductions from university institutions in Vietnam. This pattern is different from that in most other countries, where NGOs played a leading role in the introduction of SRI.

In April 2007, Dung presented a report on three years of SRI evaluation to the Ministry of Agriculture and Rural Development through its Council for Science and Technology. SRI performance was assessed in terms of yield, water-saving, pest and disease resistance, and profitability. Given positive results on all these parameters, MARD designated SRI as a 'technology advance,' making it eligible for central government support of research and extension (see <http://ciifad.cornell.edu/SRI/countries/vietnam/vndungipmrpt06.pdf> for report).

After this April decision, the president of the **Vietnam Academy of Agricultural Sciences (VAAS)**, **Dr. Nguyen Van Bo**, invited me to visit Vietnam for discussions about how we might collaborate for Vietnam to accelerate the learning and benefit that it can get from SRI. Since I was spending the first week of July in Japan, hosted by the newly-formed Japan Association of System of Rice Intensification (J-SRI), making a visit to Vietnam was relatively easy and inexpensive. VAAS handled all arrangements for the visit, including setting up a national workshop for sharing experience among organizations already working with SRI and to establish a network for better evaluation and dissemination of SRI in Vietnam. When I arrived the evening of July 7, Mr. Du from VAAS briefed me at the hotel, having missed meeting me at the airport.

Sunday, July 8

This first morning, **Ms. Vu Thi Bich Hop**, executive director of the **Center for Sustainable Rural Development (SRD)**, and **Ms. Nguyen Thi Hoa**, SRD's deputy director who is also its program manager for IPM and sustainable agriculture activities, came to the hotel for several hours of discussion on SRI and SRD's status and plans as a newly-recognized indigenous NGO. SRD is the successor to a European-supported NGO, **CIDSE**, which had 28 years of experience working on rural development in Vietnam. Both planned to attend the workshop on July 11.

In the afternoon, **Prof. Pham Thi My Dung** on the faculty of economics and rural development at Hanoi Agricultural University (HAU) came to the hotel with her son **Hien**, who recently finished his PhD in agricultural economics in Germany. While My Dung has not worked with SRI, she learned about it in 2005 when we met at the *Deutscher Tropentag* (German Tropical Day) held at the University of Hohenheim.¹ We had a good discussion of SRI in Vietnam and elsewhere. My Dung said she would try to organize a discussion on SRI with HAU colleagues on Friday, even if only a few. Most faculty that day would be tied up with the national university entrance examination, she had told me. She also planned to attend the VAAS workshop on SRI.

Monday, July 9

Ngo Doan Dam, deputy head of VAAS's Department of Science and International Cooperation, picked me up at the hotel at 8:30 to go to the Ministry of Agricultural and Rural Development. Dam has a MSc degree from the University of the Philippines at Los Baños (UPLB), and is doing his PhD at VAAS. He had done a fine job in making arrangements for the SRI workshop.

Though we arrived a bit early for our meeting with **Dr. Bui Ba Bong**, Deputy Minister of Agriculture and Rural Development, he invited us into his office. Bong and I met on my previous visit to Vietnam in January 2006, and before that at an international conference on hybrid rice held in China in September 2004. So we were well-acquainted. He took an interest in SRI after first learning about it in 2002 through a mutual friend at IFPRI. Fortunately, the National IPM Program comes under his aegis, so he has been able to give some support to evaluation efforts. During our discussion on the status of SRI in Vietnam and elsewhere, I thanked him for his support. He said that he has been pleased to see the methods working well and will continue to give encouragement, especially now that SRI has official sanction from the Ministry.

Later that morning we drove to the **Vietnam Academy of Agricultural Sciences**, about an hour from the center of Hanoi, to meet its president **Dr. Bo** and other staff including its vice president, **Prof. Dr. Vu Manh Hai**. They described for me the large and complex organization which VAAS has become. The director of the Department of Information, **Dr. Nguyen Van Van**, joined us, saying that he would accompany me on the field visit on Tuesday.

Dr. Bo stressed that VAAS's interest in SRI is not just in raising yields, but even more in increasing factor productivity, showing an understanding of a key dimension of SRI. He said that

¹ Hien's advisor at Hohenheim, Prof. Franz Heidhues, has played a key role in disseminating knowledge about SRI since it was he who invited me to give a keynote on SRI to the 2005 *Tropentag*, a gathering of development professionals from all over Europe. And previously, in January 2002, he gave me an opportunity to make a plenary presentation on SRI to a large conference on sustainable agriculture and natural resource management in Southeast Asia, held at Chiangmai, Thailand, our first opportunity for international consideration.

Vietnam will have less and less arable land per capita with which to feed the nation given the expansion of urban and industrial land uses and Vietnam's continuing population growth. Water constraints are starting to become serious, and raising farmers' income is a government priority. VAAS staff have read many of our papers on SRI and have read carefully much of the material on our SRI web page. Several staff invited me to join them for lunch at the Institute dining hall before going to the **National Institute for Soils and Fertilizers**, one of the 10 member institutions of VAAS, for an afternoon seminar.

At the Soils and Fertilizer Institute, we were met by its director, **Dr. Buy Huy Hien**, whom I met in January 2006 when giving a first seminar on SRI there. About 15 researchers were assembled for the session, and good questions were asked. They took notes on the research agenda with which I closed the presentation. Several of the staff planned to attend the workshop on the 11th, where more consideration would be given to SRI experience and ideas.

When getting back to the hotel, I had an email message from **Dr. Zheng Jiaguo**, head of the Crop Research Institute of the **Sichuan Academy of Agricultural Sciences**. Zheng has been giving leadership to SRI evaluation and dissemination in Sichuan Province since 2002. He wanted to know whether I could re-visit Sichuan before the end of the summer season. As an incentive for the visit, he noted that this season the area under SRI in Sichuan is up to 67,000 hectares, making it one of the largest extents of SRI production outside of Madagascar.

Tuesday, July 10

At 8 o'clock, Ngo Tien Dung and Dr. Van from VAAS picked me up at the hotel for a field trip to Ha Tay Province, an hour's drive west of Hanoi. En route, Dung told me that the Minister of Agriculture, Hon. **Cao Duc Phat**, had visited Ha Tay province two days earlier, on Sunday afternoon, and had asked for an impromptu meeting with SRI farmers there, to view their fields and get their opinions. He was impressed enough by what he saw and heard that at his weekly staff meeting with heads of Ministry departments the next morning, he reported on the visit and said that MARD should help extend SRI in Vietnam.

I learned also that Oxfam America is assisting the National IPM Program in its SRI extension efforts, particularly in Ha Tay province. There are plans to have a large 'harvest ceremony' in September when the crop is ready for cutting, so that hundreds of people can see the results. Dung asked me to try to return for this event if I can, however, the exact date has not been set because this will depend on the pace of ripening.

We discussed en route a farmer innovation where the SRI crop is established by **direct-seeding** rather than by more labor-intensive methods of transplanting. A farmer in Mahaweli Sysem H in Sri Lanka, Ariyaratne Subasinghe, has started sowing germinated seed on his muddy paddy field at a rate of 25 kg/ha (instead of the usual rate of 5 kg/ha with transplanted SRI). Then when the young plants are 10 days old, he 'weeds' the field with a mechanical, rotating hoe. He cross-crosses it in perpendicular directions, just as if he had transplanted the field with single seedlings at 25x25 cm spacing. This drastically thins the crop stand, eliminating about 80% of the rice plants, usually leaving just a single plant, although sometimes 2 or even 3 plants, at the untilled intersections of this 'grid' that his weeding creates. If there are no plants at some intersections, surrounding plants fill in that space, so there is no need for filling in spaces.

Subasinghe says he gets at least 7.5 t/ha with this adaptation of SRI concepts for direct seeding, with a great reduction in labor time required. Prof. S. Ramasamy at Tamil Nadu Agricultural University in India when evaluating this methodology has calculated that there can be a 40% reduction in labor (as no nursery is made and managed; no transplanting needs to be done), with little or no loss of yield (<http://ciifad.cornell.edu/sri/countries/india/intnramasapster06.pdf>). This alternative methodology could be a very popular version of SRI.

Oxfam is working also in Nghe An and Ha Tinh provinces, Dung said, where rice farmers usually do not transplant but rather direct-seed. This method should be tried out there to see whether farmers find it advantageous. However, it can also be tried out by other farmers who currently transplant. Farmers are having to make some adaptations in their previous irrigation practices to use SRI in the rainy summer season, when rainfall fills up their paddy fields, Dung said. They make cuts in the bunds so that the standing water will drain out. This is quite a departure from the past, when farmers tried to retain as much water as possible. They are learning that this practice stunts and degrades their plants' root systems. So this is a big change.

We talked about the need to control weeds with SRI and about the value of using a rotating hoe that aerates the soil at the same time it churns up the soil and ploughs weeds back into the field. Dung said that farmers used such weeders 10-20 years ago; but over the past decade or two, their use has been forgotten as herbicides have been promoted for weed control. I said that we can try to send his IPM program a mechanical weeder from Sri Lanka, one that is well-designed and can be fabricated by local blacksmiths. Dung agreed that active soil aeration could possibly add 1-2 t/ha to their present SRI yields in Vietnam, as has been seen in other countries.

We reached the local office of the Plant Protection Sub-Department (PPSD) in **Dai Nghia** town about 9:30. After conversation with staff, we proceeded to the nearby farmer cooperative with the same name, meeting there the head of the cooperative, **Le Ngoc Thach**. He said that this is their third season of SRI practice, although the first season involved only small and very tentative trials. Oxfam America is now supporting SRI demonstrations and extension here.

Usual plant density here is 150-200 plants/m² – in 50 hills/m² having 3-5 plants each – whereas most SRI plots have only 25 plants/ m². This is a reduction of 6-8 times. SRI fields are not kept flooded, only moist. The one-month-old crop looked mostly quite good, with dark color and vigorous plants. I asked Thach what were the farmers' greatest fears when they started with SRI? They felt that so few plants could not possibly give a good yield. But now in this third season, everyone understands and believes it.

What about not flooding the fields? This is accepted, he answered; but farmers do not like the increase in weeds. I asked whether they know about the mechanical weeders that we recommend but which are not being used here yet. We know about them, Thach said. "We used to use this implement over 10 years ago," confirming Dung's comment. Dung, Thach and I agreed that giving farmers access to such weeders should be a priority for the Oxfam project.

I asked about pest and disease problems with SRI rice? "We are very happy that pests and diseases are reduced," Thach said. He said that they are still using urea on their SRI crop;

however, the amount they apply is 30% less and they are getting increased yields even so. Of the 178 hectares of paddy land in this village, 130 hectares are now under SRI, and soon all will be, he added. I asked if they have measured their reduction in water use? Thach says nothing precise is being done, but they figure that about 25% less water is required for SRI paddy production.

We walked past a number of small paddies where the farmers had set out a series of trials testing the effects of different fertilization applications on plant growth, health and yield. There are plots with zero, 2 kg, 4 kg and 6 kg of nitrogen per *sao* (usually 1 *sao* = 360 m²), and also plots with these different amounts of potassium. They were also testing five different varieties of rice to see which ones respond best to SRI practices. This kind of systematic evaluation is learned in the farmer field schools (FFSs) organized by Dung's IPM program. Of the 720 households in the village, 350 have gone through FFS training, Thach said; but 680 households are now working with SRI methods. So there has been significant spread beyond the FFS training.

I noted that some of the plots had rice that is taller, denser and greener. These were mostly plots with higher density of plants, less spacing between them, said Thach. I noted that since the plants are only one month old, by the time that harvest comes, the plots with presently thinner populations could catch up with and overtake the ones that look better now. Thach said that from his own observation, he prefers a spacing of just 16 plants/ m² (25x25 cm).

I asked whether SRI methods are increasing or decreasing farmers' labor requirements. He says that with SRI, labor inputs are probably about 15% less. I asked him: how do women like SRI methods? (After all, they must carry out most of the SRI operations.) He answered that they like SRI. But it would be better to a woman's perspective, and as it happened, once we had walked the width of the paddy fields, we came to a canal where two women sitting under the shade of some dense trees, with their conical straw hats doffed.

I asked them what had most surprised them about SRI? The question was not clearly understood because they responded: "At first we didn't like SRI, but now we like it." I asked whether SRI requires more or less labor from them for transplanting. Both said that it reduces their time. "But weeding is still a problem," they added. For that, I said, we need to help them get access to mechanical weeders. They liked this idea.

The women commented that by this stage of crop growth, normally they would have already begun to spray their fields with agrochemicals, but with SRI methods, there has been no need for spraying so far. This is consistent with the IPM Program's finding from its evaluations across eight districts that the major pests and diseases for rice in Vietnam – sheath blight, leaf blight, small leaf folder, and brown plant hopper – are 40 to 80% less on SRI plots compared with control plots nearby. Three seasons ago, this SRI method was only a small experiment, the women said. "Now all the farmers agree with it."

As we walked to our vehicles, Dung said that when he presented his IPM Program report to the MARD Council for Science and Technology, the president of VAAS, Dr. Bo, had challenged his finding that it was possible to get higher output by reducing plant population from 130 to 25 per square meter. Eventually, however, he accepted that the IPM Program data were correct, and now he is supportive of SRI (which I had learned already) Dung said that in Ha Tay province,

there are 3,000 ha of SRI grown in this season. “We can spread SRI very fast now that farmers have gained some experience,” he said. We agreed that the major obstacles are mental rather than not material, although getting rotary-hoe weeders in use would give SRI use a big boost.

Back at the PPSD office, we talked with Thach some more and with **Do Danh Kiem**, chief of the PPSD district office. Some farmers in Da Nghia village had previously done seed multiplication for MARD, so they were acquainted with the advantages of planting single seedlings. It is ironic that for a long time, agronomists have known the benefits of planting single seedlings to get healthier, more productive plants for seed multiplication, or when developing hybrid varieties and ‘the new plant type’ at IRRI. But this knowledge has not been extended to farmer practice.

Thach and Kiem agreed that in the first season with SRI, it is difficult to get farmers to try the new methods. “But farmers are now feeling easy with SRI, now that they have seen results.” I asked how much seed multiplication they had achieved with their conventional methods. One kg of seed can produce 330 kg, they calculated; with SRI they can get more than double this. I told them about a farmer whom I knew in Sri Lanka, who reported that from just half a kilogram of seed he had been able to produce 1600 kg, a ratio of 1:3200 ratio, almost 10 times what they have gotten before. Even if they get only half as much increase, there is still a huge payoff.

I asked: what is the largest number of productive tillers on a plant that you have seen? They said that 20 is a good number, but they have achieved up to 45 tillers on one plant. When I said that in Madagascar, the best SRI farmer had one year gotten an average of 70 tillers -- and one plant reached 140, they were incredulous. We agreed that the comparison could not be exact because they are using varieties with 100-day maturity, while Ralalason grew a long-duration crop. Still, there is obviously much more potential for farmers here to tap within the rice genome.

I asked further: how many grains can you imagine on a single panicle? They agreed that 200 grains would make a very large panicle. When I said that in Sri Lanka I had held in my hand a rice panicle with 930 grains on it (and had personally counted 300 grains on 1/3 of it), their frames of reference were greatly expanded. The farmer who achieved this was in his 10th year of organic farming, so his soil is tremendously fertile in biological terms; also this was his biggest panicle. But that season, Premaratna had had many panicles with 400 grains. This shows how soil fertility can have a very large impact on the expression of genetic potentials.

Kiem said that SRI has now been started in all 14 districts of Ha Tay province. The 3,000 ha are managed by 3,000 farmers who have been through FFS experience and another 3,000 who have learned SRI methods from FFS alumni, who are spreading the knowledge to others. So far, the yield increases have ranged between 10 and 80%, but with a reduction in both labor inputs and costs of production, making it attractive. The largest percentage gains have come on ‘poorer’ soils. A big part of the yield improvement has been the evident reduction in pests and diseases, which have become quite common on rice grown with conventional practices.

Toward noon, we took our leave and headed back to Hanoi, having lunch at a small restaurant along the way that is obviously a favorite of PPSD staff. I had the afternoon free for starting this report, email and for other writing tasks. That evening, **Abha Mishra** arrived from the Asian Institute of Technology (AIT) in Thailand, to participate in the next day’s workshop. She is

doing a PhD thesis on SRI based on greenhouse experiments at AIT under carefully controlled conditions and also including farmer-participatory evaluations of SRI, working with FFS groups in Prey Veng, Cambodia. VAAS had agreed that it would be useful for Abha to be able to contribute SRI experience from elsewhere in Southeast Asia to workshop deliberations.

Wednesday, July 11

Next morning, Abha and I were picked up at the hotel by Dr. Bo, VAAS president, to travel with him to the workshop at the **Food Crop Research Institute (FCRI)** at Gia Loc near Hai Duong, an hour and a half east of Hanoi. Arriving a little early, we visited some of the trials ongoing on rice-fish farming systems. By the time the workshop got started at 8:45, there were 40 participants, including representatives from Oxfam America and Oxfam Quebec. Ms. Hoa (SRD) and Dr. My Dung (HAU), whom I had met on Sunday, were there, and also the Japanese Volunteer Corps coordinator in Vietnam, Ino Mayu, who impressed me and everyone else with her fluency in Vietnamese language.

Dr. Nguyen Tan Hinh, deputy director of the FCRI, gave the welcoming speech, noting the accomplishments in the rice sector of the past decades. Vietnam has become the second largest rice exporter in the world. But the sector is losing fertile land area as the population continues to grow. Growth of urban areas creates more demand for rice at the same time it shrinks the rice-growing area (by 20,000 ha per year, as Bo told us during the drive to FCRI). Also, earlier rates of growth in rice yield have slowed over the last decade, as they have in India, China and Indonesia as well. “This is a challenge to Vietnamese society, not just to farmers,” Dr. Hinh said. “There is much need to raise the productivity per unit land.” He suggested that government and non-governmental organizations should all cooperate in meeting this challenge, for example, with SRI.

Dr. Nguyen Tri Hoan from FCRI gave an overview of the Vietnamese rice sector, showing the different concentrations of rice land in different regions of the country, particularly in the Mekong Delta in the south and in the Red River Delta in the north. Sown area, which was expanding the 1980s and 1990s, peaked around the year 2000 and has been receding since. The government invested heavily in expanding irrigated area in the past, but now the feasible areas remaining are not very many. Introduction of hybrid rice has helped keep production expanding, but yield increases have also been slowing since 2000. Improved agronomic practices are essential, he said, mentioning SRI several times along with integrated pest management (IPM), integrated nutrient management (INM), better water management, and other elements.

In summary, Hoan said that the main weaknesses for the Vietnam rice sector are:

1. Yield is still lower than the world average; only about 60% of the level in China and Korea.
2. Grain quality is still low (although that has not prevented a rapid expansion in rice exports).
3. Economic effectiveness (profitability?) is still also very low.
4. The environment is being degraded, with soil and water resources continuing to be eroded and/or polluted.

In my half-hour presentation that followed, I did not point out explicitly how SRI addresses each of these problems, assuming this should be evident from pointing out that SRI methods enhance yield, grain quality, and profitability, and also reduce agrochemical use and water demand.

In particular, I pointed out the difference in paradigms that frames the debate about SRI:

1. The Green Revolution paradigm, which has been very successful in the past, achieved its higher yields by (a) changing the genetic potential of plants, and (b) increasing external inputs – of water, fertilizer, pesticides, etc.
2. The agroecological paradigm which informs SRI does neither of these things. It works with whatever genetic potential exists, and reduces rather than increases inputs. It raises yields and factor productivity by *altering the management of plants, soil, water and nutrients* so that (a) root systems become larger and function throughout the growth cycle, which is different from rice grown under continuously flooded conditions, and (b) populations of soil biota are increased in size, activity and diversity.

The ‘integrated crop management’ (ICM) strategy that has been promoted by IRRI and others in a number of Asian countries derives from the first paradigm, thinking mostly in terms of genetic potentials, finding or breeding better varieties, and inputs, adjusting them to achieve some optimization. Little attention is paid to the potentials that can be mobilized within soil systems. I think most participants were surprised to see the pictures shown from Madagascar, Nepal, Cambodia, Cuba, India and Vietnam itself showing the potential productivity that exists within current rice genotypes, traditional as well as improved.

Next, **Le Minh**, regional program officer for the Food and Income Security Program of **Oxfam America**, reported on SRI experience in Cambodia. Oxfam has since 2003 been assisting the work of our NGO partner CEDAC in that country, which is the first to start ‘going to scale’ with government support. Minh said that the number of SRI farmers there is now up to 90,000, on 16,400 hectares (this is a country with mostly very small rice farmers, so the productivity gains are particularly important). SRI has been started in 2,685 villages in all 24 provinces, starting from just 18 villages in four provinces in 2002. SRI has been incorporated into the government’s national development plan for 2006-2010.

The benefits of SRI in Cambodia have been:

1. Yields increase by 50-150%, raising production from 1.5-1.8 t/ha to 2.5-3.5 t/ha with traditional varieties. Some farmers have gotten over 6 t/ha. (Actually, there have been SRI yields as high as 13 t/ha with best use of these methods in Cambodia, but such reports seem to evoke animosity from some quarters; it is best to focus on averages than on what is attainable.)²

² On January 13, 2006, I was invited by the Ministers of Agriculture and of Environment in Cambodia to attend an SRI award ceremony in Ro Veang, Takeo province, where they were giving out prizes to the most successful farmers using the new methods, with a TV set as the first prize. This meant that crop-cut measurements were watched carefully by hundreds of farmers and officials, with such a reward at stake. The winner in that commune was reported to have a yield of 14.7 t/ha, based on averaging three crop cuts of 2.0, 1.7 and 0.7 kg/m² which followed the standard method for assessing crop yield used by Department of Agriculture technicians. In Purulia district of West Bengal state of India, a rainfed SRI yield of 15 t/ha was measured by the team leader for an evaluation of SRI by the India programme of the International Water Management Institute (IWMI). He told me that because he knew that this would be a controversial statistic, he measured the field himself and himself weighed the paddy as it was brought from the field and threshed -- to be certain that there was no error. The yield he calculated and reported was thus a *harvested* yield, not one based on sampling. S. K. Sinha and J. Talati, *Impact of the System of Rice Intensification (SRI) on Rice Yields: Results of a New Sample Study in Purulia District, India*. IWMI-Tata Water Policy Research Report 47. International Water Management Institute, India Program, Anand, 2005.

2. Inputs are reduced: seed by 70-80%, and fertilizer by 50%, from 150 kg/ha to 75 kg/ha. Many SRI farmers have now moved to fully organic production.
3. Most SRI farmers have given up pesticides.
4. Net income per hectare has increased by US\$58-172, and increase of almost 200%.
5. Under CEDAC's marketing program, supported by OXFAM, increasing numbers of SRI farmers are producing rice 'chemical-free' and receive a 15% price premium.

Spin-off benefits that Minh listed were:

1. Increased self-confidence and self-reliance of farmers when they find that they can get higher production by using only their own existing resources.
2. Growing interest among farmers in other technical and social innovations, such as savings for self-reliance, collective marketing and purchases.
3. Evolution of SRI into SID (the system for intensification and diversification) as small farmers diversify their farming portfolio – feeding animals with rice surplus, converting part of their rice fields into fish ponds, growing vegetables, planting fruit trees, etc.

Now CEDAC with Oxfam support is enabling farmers to link SRI with a 'Saving for Change' program where farmer groups make regular savings deposits to build up their capital resources. Their collective funds are growing rapidly. Oxfam has started piloting SRI in Vietnam together with the IPM Program of the Plant Protection Department, starting in Ha Tay province (which I visited the day before). The program has documented 78-90% seed saving, 30% water saving, with 8-15% yield increase (still not doing soil aeration with a mechanical weeder, which can add several tons to yield), an additional \$120-140 income per hectare. Oxfam Quebec is joining with Oxfam America to support an expanded program in the Mekong River region for SRI and livelihood improvement.

Next, **Dr. Hoang Van Phu**, professor of agronomy at **Thai Nguyen University** (TNU), reported on TNU's work with SRI, starting in spring 2004 on university plots. He learned about SRI from the informal SRI coordinator in Thailand, Klaus Prinz, who was Phu's friend and mentor during Phu's graduate study for a master's degree at Chiangmai University. Those first trials showed as much as 20% yield improvement with less inputs, so next year, TNU's extension program began trials and demonstrations in Bac Giang province. These showed similar results on farmers' fields, so area has been expanding. From 0.36 ha in spring and 1.76 ha in summer in Yen Dung district, the area under SRI expanded to 50 ha in spring and 180 ha in summer of 2006, and is now 289 ha this spring season. In Phu Binh district of Thai Nguyen province, SRI use was 70 ha in spring 2006 and 160 ha in summer 2006, and now is 280 ha this spring season; in Dai Tu district, SRI started at 230 ha this current spring season. So, SRI is very well accepted by farmers. Yield increases have been in the range of 16-25% (as I would see on the next day's field trip, there is still no active soil aeration being done to stimulate soil organisms). This is better than most technologies introduced so far, and the reduction in cost and labor time is very much appreciated.

The economic analysis that Phu presented showed the following averages, in million VND/ha:

Unfortunately, controversy created by some skeptics over these maxima has deflected attention from the *average* yield increases, which are more important and more significant.

	Cost	Return	Difference
Non-SRI	9,236	16,650	7,414
SRI	8,153	20,820	12,667

Percentage changes are: -13.6% +28.6% +70.8%

Such profitability enhancement will surely encourage more rapid uptake of SRI. Phu listed the following advantages for SRI:

- Increased rice yield without increasing chemical inputs (benefit for poor farmers)
- Reduced costs of seeds, by 60% (suitable for poor, especially for any using hybrid varieties)
- Reducing labor for transplantation, by 50% (a benefit for women)
- Saving of water by 40% (making SRI more suitable for upland areas)
- Reducing pests and diseases (support for environment)
- Reducing methane emission (support for environment)

Phu proposed that SRI is particularly feasible for northern upland areas in Vietnam because:

- ‘Non-package’ approach is suitable for upland/fragile conditions
- Small plot and farm size
- Hard-working farmers
- Water saving
- Seedling making is feasible (nylon cover can be used over seedbeds to protect young seedlings against the colder temperatures in the uplands, Phu explained)
- Reduced seed cost is fitting for poor who have limited capital
- Extension network is developed

The difficulties he enumerated for SRI were:

- Need to determine optimum SRI practices on various land types
- High risk for young seedlings during spring season due to cold
- Lack of water means that farmers are afraid to drain their fields
- Degraded and poor soils in northern mountain areas
- Weed problems due to poor soil and lack of water
- Golden snails
- Water-logging makes some fields difficult to drain
- Farmers’ beliefs and habits on transplanting density
- Need to integrate SRI into the Department of Agriculture and Rural Development guidelines
- Lack of funds to support SRI research and extension

Follow-up slides suggested how each of these difficulties could be addressed.

In conclusion, Phu suggested that there should be research on:

- Long-term effect of SRI on yield stability and soil nutrient and other characteristics
- Methods of fertilizer application in SRI practice
- No-till cultivation possibilities
- Pest and disease dynamics
- SRI extension for other crops and farming systems

He concluded by saying that his university is eager for collaboration on SRI research in the upland areas, on SRI training courses and training-of-trainers, and in regional and international workshops.

Then **Dr. Son** from the Soil and Fertilizer Research Institute reported on its findings with site-specific nutrient management (SSNM), a methodology which derives from the Green Revolution paradigm, seeking through soil testing to evaluate very precisely what are the nutrient deficits and needs on a field-by-field basis, to then supply requisite and not any surplus nutrients to meet target crop yield objectives. While it is recognized that a large portion of available nutrients are mobilized by biological activity in the soil (one IRRI paper suggested that even irrigated rice plants fertilized with inorganic N derive 60-70% of their N from organic/biological sources/processes), SSNM adopts essentially a soil-chemistry perspective, assessing nutrient availability at a point in time and not assessing biological activity or impacts.

Dr. Son reported on 72 trials in 7 provinces, where SSNM, IPM and SRI were combined, with seedling population reduced from 84-180/m² to 16-35/m². Yield was higher by 11.8%, with a reduction in diseases, and net income increased by 16%. Following this, there was to be panel discussion (really a series of presentations), which I had been scheduled to chair. However, since the presentations would be in Vietnamese language and I would have to rely on translations, I asked that someone else serve as chair. My performing this role could be an impediment to free flow of discussion.

Ms. Hoa reported on perspective on SRI from the Center for Sustainable Rural Development (SRD). It has worked on rice IPM in Thai Nguyen and Bac Kan provinces since 1994-2002, and also on IPM for peanuts and tea. This provides a good platform for SRD to get involved with SRI, having good relations with farming communities and local governments in both provinces. SRD's methodology is to set up farmer experiments to change knowledge and traditional practices based on observation. It cooperates with researchers and scientists to develop a curriculum based on farmers' results, and organizes field days to sum up and disseminate the results widely, cooperating with other NGOs and government organizations to promote innovations at a national level.

Ms. Hoa's concluded that it should be easier to disseminate SRI where IPM methods have already been introduced through farmer field schools since farmers there know how to set up experiments and evaluations. SRI should be disseminated both from the community side and from researchers' side to change people's knowledge and traditional practices on rice cultivation, she said, with FFS as the most appropriate approach to SRI dissemination. SRD will start with IPM farmer groups in Phu Tho and Thai Nguyen provinces, cooperating with Oxfam America, Oxfam Quebec and the Plant Protection Department (National IPM Program) to share SRI experience. It looks forward to participating in a network of government organizations and NGOs to support farmers in taking up SRI.

After lunch, there was a report from **Mr. Tuan**, vice-chairman of the People's Committee for Yen Dung district in Bac Giang province, where Phu has been introducing SRI as reported above. Tuan explained that the area has diverse conditions, and about 17,000 ha of rice land, with 5,000 ha under HYVs. Experiments with SRI started on 0.35 ha in 2005, and they saw good results.

Using a new variety, they got 7 t/ha yield compared with 5.3 t/ha on the control plot. So now SRI has been expanded to five communes, with >400 ha. In 2006, there were actually 145 ha of SRI even though they had planned for 100 ha. The average yield was 6.9 t/ha, and one variety reached 7.5 t/ha, he said.

The number of communes in the district where SRI is used has expanded from 5, to 7, to now 11, with about 1,000 ha. In 2008, they plan to expand SRI to the whole district. They will have to be many demonstrations so that farmers can come and see for themselves. They cannot apply SRI where there is no water control, however. The local government wants to look at improving irrigation and also at introducing intercropping with SRI. “Active farmers and local leaders are the key to SRI spread,” he said. Also, they need a system for short-term training and monitoring. Sometimes farmers who don’t have enough confidence yet in SRI have added extra seedlings to their fields, but they know now this is not good practice.

Next, **Phan Duc Hung** from the Ha Tay provincial Plant Protection Sub-Department reported on experience there, saying that with SRI their pest problems are lower than in other provinces. They have known about SRI just since 2005. They do not have enough organic matter to use the methods fully, but they can use rice straw. Using one seedling, one per hill, low density of hills, gentle uprooting, all these things they now know are beneficial for rice plant growth. They have had more than 53 training sessions in 2007 and 3,000 ha are under SRI, although the methods are fully applied only on 180 ha; the rest of the area has less than complete SRI. There are more than 10 communes cooperating.

Efficiency of resource use is a main consideration. Farmers are reducing their seed rate by 70% and N fertilizer by 33%. There are less pests and diseases, so they don’t need pesticides. Total costs of production are reduced by 1 million VND per hectare (US\$60). Yield is up by 12%, so income goes up by at least 50%. “How to expand SRI? We need to build up confidence and beliefs in farmers and officials. This can be done through farmer field schools.” If they can train one-quarter of the farmers in a village to do experiments, the innovation can spread to all the other farmers. Oxfam America is assisting PPSD with support for such a strategy. Radio messages are also being used. They have mobilized support from the provincial government, and more will be received next year. While there are still some controversy about SRI in Ha Tay, this is receding.

Dr. My Dung from Hanoi Agricultural University spoke without a powerpoint presentation, so I did not get much of what she said. Mostly she expressed HAU interest in learning more about SRI. Her faculty is particularly concerned with the economics of SRI and its labor requirements. Will different transplanting methods require more labor? This is a very important consideration (In fact, farmers in many places are reporting less labor needed with SRI, but this should be studied.)

Abha Mishra then made a presentation based on her PhD thesis research for the Asian Institute of Technology (AIT) in Bangkok. She referred to the equation $Y = G \times E$ where *yield* is a function of the interaction between genetic endowment (G) and environmental factors (E). Whereas Green Revolution technology has focused mainly on manipulating genotype, SRI principles provide a basis for modifying plants’ micro-environment to get better yield in a sustainable way.

Since environments are diverse, so are rice production systems. Therefore, one can not make blanket recommendations about SRI practices. Rather specific applications need to be developed in farmers' fields through testing, evaluating and adapting SRI practices. This means that farmers have a key role to play in the whole process, not just being adopters.

SRI's focus on soil-plant-water relationship requires a better knowledge regime for farmers. This can be achieved through participatory action research bringing farmers, extension workers and researchers together. An example is collaboration between AIT and Cambodia's national IPM program, with funding support from FAO's Regional Vegetable IPM program, which set up a participatory action research (PAR) trials in Prey Veng province for two seasons. Farmers who have graduated from IPM farmer field schools (FFSs) are able to analyze and compare above-ground plant parameters and surrounding environment using Agro-Ecosystem Analysis (AESA).

This process was used also to compare below-ground plant parameters, particularly rice roots since SRI plants produce vigorous roots and to appreciate the healthier rhizosphere. By the end of the season, farmers were not only able to harvest more yield compared to the previous season, but they understood why they had gotten a better yield. Combining SRI principles with PAR approach provides unique opportunity for getting higher yields and profits along with imparting better knowledge regimes among farmers.

Abha also commented on the farmer participatory research that she and her husband Prabhat Kumar, also at AIT, are doing with CGIAR Challenge Program on Food and Water funding in northeastern Thailand (Roi-et province). Some of their on-farm experiments with farmers are evaluating the effects of intercropping SRI rice plants with three kinds of legumes as a cover crop – to reduce weeds and enhance soil fertility. This has contributed to a significant increase in rice yield. Although no conclusions will be drawn before results from a second season are in, this looks like a promising line of research and subsequent practice.

Next, **Mayu Ino** reported on experience of the **Japanese Volunteer Corps (JVC)** in Vietnam, her fluency in Vietnamese drawing murmurs of approval throughout the room. Volunteers had already been working with upland communities on organic farming and farmer-to-farmer exchange; now they are introducing SRI methods. These have not always been appropriately used. In some trials, older seedlings produced higher yield than younger seedlings, but this was because the latter were planted with very high density, farmers not believing that such small seedlings would grow sufficiently. Even with mistakes, results have been good enough that JVC wants to expand its SRI activities and to cooperate with other institutions and programs in Vietnam on this. It would like to see a network established with all stakeholders, including farmers.

Dr. Andre Dorr, program development advisor for **Oxfam Quebec (OQ)**, resident in Hanoi, explained that OQ is just starting its involvement with SRI. When it met with Oxfam America in the spring to learn about SRI, it became very interest and has entered into partnership with OA, PPD and SRD. Together they plan to support activity over the next three years in six provinces. He closed by saying that OQ was glad to part of “the great family of SRI in Vietnam.”

Dr. Van, director of VAAS' Information Department, then gave a brief report on our field visit to Ha Ta province the day before, and **Dr. Hien** from FCRI gave a concluding presentation on technological alternatives, emphasizing the need to consider risk factors because these weigh heavily on farmers' minds. I commented on this point that economic evaluations by GTZ in Cambodia and by IWMI in Sri Lanka have calculated a significant reduction farmers' risk with SRI, based on large-scale random samples of SRI users and non-users (N=500 in Cambodia, N=120 in Sri Lanka). At this point, the floor was open for general comments and debate.

Dr. Nguyen Thien Luong expressed some doubts about the SRI 'technology,' calling for more scientific evaluation of it. He was doubtful about the Ha Tay results reported by other participants and asked for modeling simulations to check out these yields reported. (Obviously he had read some of the articles critical of SRI based on crop modeling.) I pointed out some flaws in those analyses, which had used coefficients derived from rice plants that had been grown under flooded conditions so that a majority of their root systems were degenerated by the time of flowering. I doubted that such quantitative work could give appropriate predictions of yield potential for SRI plants which have a quite different phenotype, with larger and well-functioning root systems.

Abha amplified on this, citing her own research with seedlings and subsequently transplanted plants which showed that lateral root initiation was inhibited by hypoxic soil conditions. Luong said that he wasn't ready to accept Abha's explanation because it was "theory." However, Abha was reporting empirical, controlled trials and precise measurements; on the other hand, Luong's reservations were based, ironically, on what he was calling 'theory.'

Dr. Tran Van Khoi from MARD spoke up, saying that if SRI improves the efficiency of land use, this responds to a real imperative in Vietnam today. If it reduces costs, also this is good for farmers, and for the export of rice. He said that had visited Ha Tay province and had seen these results, and still wasn't entirely sure about them. But, he said, he was convinced by the evidence reported from other scientists, and he can support SRI.

There followed a lively debate for about an hour, all in Vietnamese. Little was translated for me because Phu was himself involved, citing his own multi-season data that supported the case for SRI. One scientist endorsed my suggestion that the term 'SRI' is better used as an adjective than a noun, he had appreciated this distinction. In general, the discussion was favorable to SRI. The strongest arguments for SRI from among the participating scientists were voiced by **Dr. Pham Quang Hà** from the National Institute for Soil and Fertilizer Research, a soil biologist trained at Louvain University in Belgium. He spoke vigorously about growing problems of soil degradation in Vietnam that are attributable to current management practices, and he endorsed my focus on root development and soil biota.

Dr. Bo asked me to make a few comments before he gave a summary presentation for the workshop. I expressed appreciation to the VAAS for organizing the event, complimenting it for "not being afraid of controversy." I observed that there are no significant financial interests behind SRI, no fertilizer or agrochemical companies promoting it, since SRI does not make any intermediaries rich, only the farmers. I noted that scientists in most other countries had also been negative toward SRI at first, but as more experience was gained and evidence was accumulated,

the attitude shifted. I reemphasized that “SRI is a work in progress,” so there are many opportunities for scientists to contribute to the development of SRI knowledge and practice, since it was originally developed quite inductively in Madagascar.

Dr. Bo made a powerpoint presentation, putting SRI within the context of ‘integrated crop management.’ He stressed that it is imperative for Vietnam to raise the productivity of resources it uses in the rice sector. Yield growth has been stagnating, and farmers’ costs of production are rising. As population continues to grow, there is relatively less land and water, and environmental hazards are also growing. There are a number of initiatives ongoing: IPM, INM, SSNM, SRI, AWD, and hybrid rice. The ‘3 Reductions, 3 Gains’ methodology developed in Vietnam has already introduced changes similar to SRI: 50% reduction in seed rate; fertilizer applications reduced by 20-30 kg/ha; and no pesticide spraying for the first 40 days; also using less water. 3R-3G has increased yield, grain quality and farmers’ profit, so SRI is no surprise.

In conclusion, Bo showed a triangular relationship among Varieties x Natural Resource Management x Management. “Management is the element that balances the whole.” He also added that “we should help farmers to learn rather than tell them what to do,” endorsing the strategy of participatory technology development (PTD). He proposed combining good agricultural practice (GAP), ICM and SRI into a strategy for improving rice productivity, saying that these concepts and principles can be applied also to other crops as well. He suggested forming a working group on SRI, and invited me to be an advisor for the emerging program. Oxfam America is already assisting an inter-institutional SRI group, and VAAS would be glad to join this. Bo closed his summary by saying that this had been a very useful workshop, very challenging to the mind, and stimulating healthy controversy.

After the workshop, Abha and I left with Phu in a vehicle sent by the Yen Dung district administration to bring us that evening to Bac Giang province. The most memorable part of the trip was a ferry trip across the Cau river at sunset, when a cool evening breeze mitigated somewhat the heat and humidity of the July climate, considered oppressive even by local residents. We stayed in a small hotel as guests of the district government, which has appreciated the introduction of SRI in their area by Phu and other staff of Thai Nguyen University.

Thursday, July 12

Next morning, at 6:45 we went for breakfast in the town at a favorite small restaurant of local officials, who were there to greet us, also having breakfast. **Mr. Thu**, director of the regional VAAS center for improving degraded soils, was there with many others. Abha and I passed up the embryonic duck eggs offered, but the rice noodle soup was good and nutritious. After a stop at a high school to meet up with a large assemblage of farmers and local officials, we joined a long caravan of motorbikes and vehicles to the village of Hong Giang in Duc Giang commune, several miles away, to visit the SRI fields there.

The spacing of plants was not as regular as recommended (farmers are still doing hand weeding, not having or using rotary-hoe weeders), and there was more standing water in the fields than I like to see (because of recent rains). Still, the young crops looked vigorous. We walked along the paddy bunds and stopped for a discussion with **Nguyen Thi Tham**, one of the first SRI farmers,

at her field, now 10 days after transplanting, having transplanted 7-day-old seedlings. Abha was quite satisfied with their progress, knowing better how to judge a standing crop than I can.

The neighboring field had plants transplanted at 16 days, 3 per hill. Phu commented that even if this is 'not SRI,' the influence if SRI practices is already being felt, as transplanting used to be at 30 days, with 5-7 plants per hill. Also, water application is less, even if not exactly alternate wetting and drying. In this village, 90% of the farmers are now doing some degree of SRI practices. When we inspected the roots of Tham's plants, they had more brown color than I like to see, but the plants were making good progress.

At the next village we visited, they were practicing the 3 Reductions, 3 Gains methodology mentioned already, which has many similarities with SRI. It is likely that there will be a hybridization of the two methodologies with farmers moving toward fuller use of SRI practices as they gain confidence in using younger seedlings, one per hill, regular and wider spacing, etc. Getting the rotary hoe introduced is probably a first priority for making further gains.

The whole entourage drove back into Yen Dung (Yên Dũng) to the Agribank branch, which had a large meeting room upstairs. A powerpoint projector was showing pictures of previous field visits by Thai Nguyen University staff, with an overhead poster linking SRI to 3 Reductions, 3 Gains. **Dr. Hien**, MARD district director, welcomed everyone and recounted how the first trials of SRI had begun in 2004 at Thai Nguyen University, with good results, and the methods were then brought here to Bac Giang province in 2005, with use expanding since.

While Hien spoke, a video was running that showed farmers talking about their SRI experience and holding up plants for comparison. He talked about how SRI plants had proved to be very strong, resisting pests and diseases, and giving more production. The video included interviews with both Hien and Phu. When it ended, I saw that it was made for the Ministry of Science and Technology and the Vietnamese Farmers' Association by Channel Two of Hanoi Television, the channel devoted to science and public education. Phu said that this program had been broadcast several times.

My powerpoint presentation had been stripped down to mostly pictures from which I talked since the audience was mostly farmers and some local officials. When I asked for questions, the first was from Ms. Pham, whose field I had visited. She asked about the benefits of organic fertilizer, which gave an opportunity to talk more about the contributions of soil organisms. A practical problem asked about was: If we are using biogas in our homes and put our available biomass into the converter, we can only apply bioslurry to the fields at long intervals, when the digester is cleaned. This is in fact a limitation, which we discussed. Other additional sources of biomass need to be identified or created to provide as much organic matter for the soil as desirable. I restated that fertilizer can be used with SRI methods if biomass supply is inadequate. In fact, bioslurry will be a very good intermittent source of organic matter for paddy soils.

One farmer was still amazed by the pictures of SRI plants that he had seen in the powerpoint. He said that they are getting only 7-12 tillers per plant in Vietnam. Could I give them access to these new varieties? I pointed out that most of the varieties shown were traditional ones, not improved varieties. They should be evaluating their own varieties under optimal SRI conditions to identify

which ones will give the best response under local conditions. Another farmer asked about compost recommendations, and I said that this was best assessed locally with the help of agricultural technicians and checked out by local experiments, rather than my offering any general advice.

In conclusion I commented that from the field visit, I would estimate that they are only doing about 'half or two-thirds SRI,' with no regular spacing and no active soil aeration (mechanical weeding) yet. Nor were they using as much organic matter as ultimately most desirable. This means that they should be able to get at least 50% more yield benefit yet from SRI methods to the extent that they can apply them under local conditions.

Abha gave a short presentation from her thesis research on nursery management and crop establishment. This showed that unflooded nurseries produce much more productive seedlings than flooded ones, and sparser rather than denser seeding rates in these nurseries gives better, healthier plants. Similarly, these same conditions apply for growth of the crop in fields. The scientific basis for SRI is starting to be assembled with rigorous testing of hypotheses, although this was probably of more interest to the MARD participants in the meeting than to the farmers attending because it is a 'technical' discussion.

After the meeting, the officials took us to a favorite local restaurant for lunch, which became quite a lively affair, with a lot of camaraderie and animation. The egalitarian culture of Vietnam comes through particularly at such opportunities. When lunch was concluded, Abha and I were driven back to Hanoi in a local government car, for her to fly back to Bangkok and for me to have time for working at the hotel on emails and trip reports.

Friday, July 13

At nine, a reporter for the *Wall Street Journal* based in Bangkok called for an hour-long phone interview for background on an article that he was researching, on future directions for the rice sector research in Asia. He had heard about SRI and wanted to know more about it, and how it compared or contrasted with other, more gene-centered or input-dependent approaches that he had been learning about. Although not an agriculturalist by training, he asked good and searching questions.

At 10:30, I took a taxi to the **Centre for Sustainable Rural Development (SRD)** to meet with its director, Ms. Vu Thi Bich Hop. She had not been able to attend the Wednesday workshop as planned, so we went over subjects discussed there and also SRD's plans to begin introducing SRI in two provinces where it has built up good working relations with farming communities and local government officials. SRD has funding commitments from Oxfam America to launch a pilot effort, adapting SRI methods to local conditions, beginning in August/September.

After a lunch with SRD staff, I went back to the hotel, where I was picked up at 2 by Dr. My Dung from **Hanoi Agricultural University**, almost an hour away. There I met **Dr. Nguyen Tat Canh**, a cropping systems specialist, and **Dr. Nguyen Van Dung**, a water management specialist. My Dung's discipline of agricultural economics complemented theirs nicely. Canh said he has just returned from the northeast, from the district with the highest mountain in Vietnam.

Our conversation started with Dung's work on pelleting nutrients for efficient and effective field application. He said that they could reduce the amount of chemical fertilizer applied by 33-50% without a loss of yield. The pellets were small briquettes that could be applied with a small hand machine right next to the plant to be benefited. Compressed organic matter (from crop residues, cover crop plants, or other vegetation) was enhanced with the addition of some urea. This gave me the impression that Dung and Canh were refining more 'organic' approaches for what was basically still an input-oriented approach to agriculture. As our conversation progressed, however, it became clear that this was an erroneous impression.

Eventually I learned that Canh was the first Vietnamese to start evaluating and using SRI. He learned about it through the **Institute for Development Enterprise (IDE)**, a Denver-based NGO that promotes entrepreneurial approaches to development. Most of his knowledge came from the SRI web page which he started reading in 2001, and he started trying to extend its use within Vietnam the following year with IDE support, focusing on farmers in districts that have high rates of poverty in the middle of Vietnam (Quang Tri, Quang Nam, Thu Thien Hue, Thanh Hoa).

Recognizing the great impact that SRI could have on poverty alleviation and environmental protection, Canh submitted a research project to the Ministry of Environment and Technology (MOET), which was approved. In 2005 he brought Dung into the collaborative effort as more expertise on water management was needed. Their results were disseminated on Channel Two of Hanoi Television, Canh said, so the program that was broadcast on Thai Nguyen University work in Bac Giang province had not been the only exposure of Vietnamese viewers to SRI.

Dung and Canh were clear that they are viewing SRI within a broad context: pressures from continuing population growth, increased agrochemical applications, stagnation or decline of rice yields, and the need to find ways to reduce remaining poverty in Vietnam. The rice price that farmers receive is going down at the same time that their costs of inputs are going up. This is itself sufficient reason to seek ways to reduce agricultural inputs. Also, water supply is becoming a constraint. In 1945, per capita water availability was $>15,000 \text{ m}^3$. The UNDP reports that this is now down to $5,000 \text{ m}^3$, and alternative and competing uses are growing rapidly. They were also agreed on the importance of soil biology, both for SRI and in general.

Canh and Dung showed me powerpoint pictures from their work, with vigorous rice fields, large grain panicles, and happy farmers. SRI panicles with >200 grains were frequent and appreciated. They calculated that SRI water-saving methods are reducing requirements from $602\text{-}720 \text{ m}^3$ per hectare per season to about 250 m^3 . They calculated that net income with SRI methods is 2,423,000 VND compared with 2,149,000 VND. Plus, they stressed, any reduction in water, fertilizer and pesticide use makes a contribution to having a better natural environment.

Getting farmers to accept the new methods, however, was "not easy." Young seedlings and wider spacing plus no flooding are not things that make sense to farmers at first. Getting farmers to stop burning their rice straw and to use it as compost or mulch instead took some persuasion. There has been a preference just to keep adding more and more inorganic nitrogen to paddy fields, despite the demonstrable loss of N through leaching into the groundwater and volatilization into the atmosphere. Fortunately, the Minister of Agriculture visited their trials

already in 2006, they said. This presumably helped persuade MARD, along with the results of the National IPM Program and Thai Nguyen University, to accept the validity of SRI methods.

Canh and Dung said that they read “from cover to cover” the proceedings of our first international SRI conference, held in Sanya, China in April 2002, which was posted on the SRI web page shortly thereafter. Once something is put ‘on the web,’ one never knows what impact it can have, often somewhere quite unanticipated. Their activities have now reached 10 provinces, and they now have gotten some funding for their work from Spain and Luxembourg in Europe. Additional funding from MOET is expected soon to expand their work.

Canh attended a workshop on SRI in 2003 held in Cambodia that IDE organized with CEDAC assistance. He showed pictures of himself with other workshop participants from other Asian countries and with Mey Som, the first SRI farmer in Cambodia (whose farm I had visited four days later), all standing shoulder to shoulder at Angkor Wat. Despite our far-flung and extensive flow of email communication, somehow this part of the worldwide SRI activity had remained ‘off the radar screen’ at Cornell.

I told them about the work of partner NGOs in a number of countries to develop ‘rainfed SRI’ (PRADAN in India, Metta in Myanmar and BIND in Philippines). They said that they are also adapting SRI concepts and methods to unirrigated conditions, not just unirrigated lowlands but to highland areas. They are getting 1.5-2 t/ha with their adaptations, which is about double the current level of production. Simply reducing seed density raises yield significantly. (Traditional rainfed rice production in Madagascar has involved planting a whole panicle, 20-30 grains; reducing this to just 3-4 seeds produces immediately much larger and more productive plants.)

When I described PRADAN’s strategy of getting rainfed rice growers to plant a succession of three seedbeds when the timing of monsoon rains is quite unpredictable, with the understanding that two of them will be abandoned and just the one producing young seedlings of the most viable age will be used, Tung said, “We have an idea like that too.” With this strategy, farmers are only saving 70% of their usual amount of seed (not 90%), but their enhanced harvest when using younger seedlings more than justifies the sacrifice of 20% of their seed.

Canh, Dung and My Dung agreed that they should establish a more formal multidisciplinary SRI group at HAU, since interest and activity should surely grow rapidly now that they have so much experience and evidence, and there will be more support from government and donor agencies. They asked whether I could come and spend a month at HAU with them, reviewing their six years of data and documentation, videos and pictures. I said this appeared difficult to do given the many other places where I should be spending time with SRI colleagues, old and new. They have a strong capability already assembled, although this also means that spending a week or two with them could be very productive. They share our network’s vision of SRI as a means to achieving a broader understanding and improvement of agriculture, not an end in itself for just growing more rice. They are concerned also with related economic and social aspects, looking beyond their technical specialties. So this afternoon at HAU was an inspiring conclusion to six days full of new ideas and new contacts for SRI work through the international network.

That evening, I had dinner at the hotel with **Le Minh**, Oxfam America's regional representative for food and livelihood programs, and her husband David. They will soon be relocating from Phnom Penh to Hanoi, given that OA's program in Vietnam is expanding, most notably through the Mekong regional food security initiative that will focus on SRI in six districts of Vietnam, with OQ and other donor support. Minh and I first discussed SRI in January 2006 during a visit to Phnom Penh. In the intervening time, SRI has progressed rapidly in both Cambodia and Vietnam. OA's initiative to work with the Plant Protection Department, Thai Nguyen University, and SRD has helped to give more coherence and sense of urgency to these efforts as a whole.

Now the Vietnam Academy of Agricultural Sciences is prepared to join and give scientific leadership within this emerging network, and Hanoi Agricultural University colleagues who have extensive experience over time and in many provinces are eager to join efforts. This is an opportunity for Oxfam America and other donor agencies to have quick and solid impact because there is a strong and diversified institutional base – government agencies, research institutions, and NGOs, all with links to local governments and farming communities, the kind of network that has been developed in other SRI countries. We do not want to work in a stereotyped way – remaining always flexible and adapting to each country situation as seems most appropriate – but this is a formula that has become a very productive across diverse institutional landscapes.

Oxfam America and PPD are planning a 'harvest festival' in Ha Tay province some time in September, depending on when the crop reaches maturity. Both asked if I could return at that time to join in the festival and in the satisfaction it will generate. That I could not at this point promise. (During this week I learned from our Japanese SRI colleague in Indonesia, Shuichi Sato, that the President of Indonesia, Yudhoyono, had agreed to preside at a SRI Harvest Festival in West Java on July 30, so such events are becoming a means of disseminating knowledge about SRI.) For years I have been hopeful that we could get an SRI initiative well launched in Vietnam because this country has some of the strongest organizational capacities for introducing developmental changes, reaching down to the community level. That launch is now very evident.

Saturday, July 14 -- Postscript

Actually, the week was not over. Friday evening while I was packing my suitcase, I got a call from Dr. Bo, president of VAAS, saying that he had been trying to reach me all afternoon to have dinner with me. This was no longer possible, so he asked whether he could send his car to the hotel at 5:30, instead of 6:00, so that we could have breakfast together en route to the airport. Such an invitation was very much appreciated.

Dr. Bo's apartment is only a few blocks off the route to the airport, so by 5:40 he and I were sitting down to coffee and splendid fresh fruits. Bo reiterated the interest of VAAS in collaboration on SRI and welcomed a return visit in September. His vision is not a narrowly technical one, but a broad one concerned with productivity issues and socio-economic impacts. So, with all of these different institutional interests and bases, it is clear that Vietnam can move to the forefront of 'SRI countries.' With the inputs and experience of Vietnamese scientists and farmers, we can expect a lot of evolution and adaptation of the original core concepts and practices, but that is to be welcomed.