

**REPORT ON VISIT TO CAMBODIA TO REVIEW SRI PROGRESS,
JANUARY 3-7, 2008 – Norman Uphoff, CIIFAD**

SUMMARY

This visit, part of a trip to Southeast Asia to interact with SRI colleagues also in Vietnam and Indonesia, was hosted by **CEDAC**, the Center for Study and Development of Cambodian Agriculture, an NGO established in 1997 that operates throughout the country with a combination of technical initiatives to improve farmers' productivity and of organizational strengthening so that individual and community capacities for development are increased. Its director, Dr. **Y. S. Koma**, organized the visit and spent most of the four days with me. In addition to his training and expertise in agriculture, Koma's deep knowledge of rural areas and his extensive organizational network have both contributed to the spread of SRI in Cambodia. He personally tried out SRI methods in 1999, to satisfy himself that what he read about SRI was correct, and from 2000, he and CEDAC staff have been promoting, monitoring and evaluating SRI on a wider and wider basis, joined by other NGOs and by the Government, even now by the Prime Minister and members of the Cabinet.

MEETING AT MAFF

The visit began with a large meeting at the **Ministry of Agriculture, Forestry and Fisheries** (MAFF) on 8 am on Friday morning, January 4. This meeting, to discuss what is the current knowledge and practice of SRI in Cambodia, was organized by the **SRI Secretariat** which functions within the MAFF structure, under the Department of Agronomy and Agricultural Land Improvement (DAALI). The Secretariat, established in 2005, like many things associated with SRI, was somewhat unusual. It was set up as a joint government-NGO undertaking, with the Ministry and CEDAC each providing a co-director for the Secretariat. Initial support came from, besides the government and CEDAC, the German development agency GTZ and Oxfam, another government-NGO collaboration.

My first meeting with the secretariat was in March 2005, when we had about 20 participants present, almost half of them from donor agencies. This time, there were about 80 participants, and although the number of donors had grown, including now FAO and HEKS, a Swiss NGO known in English as Swiss Interchurch Aid, the donor presence was not so prominent. **Heang Rattana** from the SRI Secretariat told me that there were Khmer staff present from all the country's provinces, plus some from universities. The government's interest in SRI, which seemed somewhat tentative in 2005, was not evident, since provision for SRI promotion was included in its National Development Plan in 2006.

The Minister of Agriculture **Chan Sarun** had planned to attend the meeting, even though Friday morning is the usual time for weekly Cabinet meetings. But come Friday morning, the Minister had to send his regrets – and the Undersecretary of State for Agriculture, **It Nody**, to chair the

meeting in his place – because ‘urgent business’ that preempted his plans. The Government’s involvement with SRI was very clearly communicated to all present.

The Director of Agronomy, **Penvuth**, opened the meeting with an overview of the situation, noting the iconic datum that SRI started in Cambodia in 2000 when 28 farmers working with CEDAC tried out the methods for the first time. That number had grown to about 80,000 now. Penvuth summarized the Secretariat’s activity in terms of numbers of training programs (emphasizing training of trainers), workshops, publications, extension materials, etc. The Secretariat works with all of the Provincial Departments of Agriculture (PDAs), and there is support from all the provincial governors.

Koma, as director of CEDAC, was invited to speak next, because he was sitting next to me and giving intermittent translation, I had no translation of his remarks, but I already knew much of what was reporting. One new fact for me was that about 5% of the rice farmers in Cambodia are now using SRI methods. Probably many more are using some or many of the methods, learning these from their neighbors, but they are not counted in the Secretariat’s numbers.

Then **Chou Cheythyrit**, director of the National IPM Program based in the Ministry, spoke next. Chou had attended the 2nd National SRI Symposium in India in October, and his program has been actively involved in SRI evaluation and promotion, as in other Southeast Asian countries. He also apologized on behalf of the Minister for the Minister’s absence and thanked the sponsors and people attending. He stressed the Government’s priority for agriculture within its overall strategy of development: to improve food security and nutrition, to boost the national economy, and to reduce poverty. Rice production has increased by 50% since 1996, so the overall food situation has improved, but production is still less than needed, especially in certain poverty-prone areas such as upland areas in the Northeast. (Fortunately, SRI methods, developed for irrigated production, are being adopted here and in other countries to upland circumstances.)

Then the meeting chairman, State Secretary **It Nody** spoke on behalf of the Minister. He said that this meeting was an important opportunity for discussing SRI, “We know that SRI has big potential. But still there is some slowness in adoption. How can we expand its use?” He said also, “There are many questions for researchers, for them to find solutions to any problems. Today’s meeting should bring fruitful results. Please pay attention and participate actively. MAFF is proud to host this meeting.”

Reminiscing a bit, the chairman recalled how while Director of Agronomy he had attended a meeting in Bali in 1992 on sustainable agriculture. There many of the same goals and methods as with SRI were discussed, particularly the use of more organic inputs to promote soil health and fertility. After that, the Ministry had begun working with HEKS on sustainable agriculture and they had eventually developed a training center. “This was difficult because of some different political views.” (A nice way of saying there was some opposition.) Some critics had said the Ministry was “risking food security” by working along these lines, he clarified.

But MAFF persisted with this effort, It Nody said. “We tried sustainable agriculture compared to the chemical approach. At the time, the soil quality at the training center was not very good, but it improved when we combined agriculture with animal husbandry. Now we are very proud to

see these ideas taking root [with SRI]. We need to develop agriculture by taking food security, farmers' income and environmental concerns into account. So, we welcome this initiative and are working with CEDAC to promote SRI."

He added that now there is an international trend toward organic production, with growing demand for organic rice. In Vietnam, they are exporting a lot of rice, but they depend very much on chemical agriculture. "We need to work on changing the attitudes of our farmers," he said. "This is not easy, because many are used to depending on chemical inputs now. For this year [2008], we need to work on SRI adoption and on adoption research. Before we were talking to farmers about organic fertilizer, but now we are talking to them also about single seedlings, wider spacing, etc." The Ministry will continue with demonstrations and training, he said, and he invited me to share my thoughts on SRI.

My topic was "Current Thinking on SRI," to update the way SRI is perceived and explained since, as was my first point, "SRI is a work in progress – is it not finished." I stressed that much of the modification and improvement is coming from farmer innovations, which seemed to be a welcome idea. In his summary later, Penvuth gave much emphasis on this. I said that SRI is not a single thing, but a diversifying phenomenon, now being developed for rainfed, unirrigated areas, and being extrapolated to other crops (wheat, millet, sugar cane, mustard, etc.) Our hope is that SRI concepts and ideas can improve the agricultural sector generally, not just rice production.

The pictures of SRI rice phenotypes – not just the size of the plants and their roots but also their resistance to drought and storm damage – had the usual visual impact. Pictures of different weeder designs developed by farmers, ranging from a simple home-made weeder resembling a push-broom to a more expensive model powered by a mounted motor – suggested some lines of innovation that could reduce labor time for SRI. I particularly stressed the value of soil aeration.

The basic message was that SRI should not be over-identified with certain practices, because this makes SRI very mechanical. Farmers should understand that the purpose of any changes in practice is (a) to stimulate the growth of larger, healthier, better-functioning roots, and (b) to stimulate more abundance and diversity of soil organisms, enhancing the life and fertility of the soil.

Instead of thinking in terms of SRI *extension*, we should think in terms of SRI *problem-solving*, finding ways to adapt the basic principles to local conditions so that farmers can get as much benefit as possible from the new understanding and new insights that are the essence of SRI. (SRI is better regarded as an adjective than as a noun, I said, although this may not have been an easy idea to assimilate.)

It Nody and Penvuth seemed to appreciate my comment (because they repeated it in their later comments) that there are two kinds of lawyers: can't-do and can-do; the first can give many reasons why certain things can't be done, while the second figures out how to work through and around constraints to achieve one's goal if at all possible. Similarly, there are two kinds of agronomist – can't-do and can-do. SRI needs the latter. While respecting the scientific knowledge that clarifies constraints in agronomic practice, one can use agronomic knowledge to

figure out what can be done in an optimizing way whenever maximization is not possible. (It seldom is.)

I told the group that SRI is spreading very rapidly in some other countries. A report in *The Hindu* newspaper in India (1/1/08) quoted the Minister of Agriculture of Tamil Nadu State as saying that 430,000 hectares, 20% of the state's total rice area, are under SRI cultivation this season. That is over 1 million acres. Similarly, in the two provinces of Sichuan and Zhejiang in China, there were 443,000 hectares under SRI when I visited last August. So, hundreds of thousands of farmers – in as many as 28 countries now – are using these new ideas and practices.

Cambodia, being a smaller country, cannot match these absolute numbers, it was one of the first countries where SRI was introduced, thanks to CEDAC, and the first country where the government officially began supporting SRI extension, thanks to the Minister of Agriculture. So I expressed hope that Cambodia could be one of the countries that benefits most from SRI.

I said how encouraged I was by the efforts that CEDAC has launched with hundreds of SRI to utilize more fully the productivity gains from SRI by diversifying their smallholder farming systems. Once SRI farmers are doubling or tripling their rice yields, they can take 40-50% of their rice land out of rice production and can use more of their land, labor, capital and water for other production – fish farming, fruits, vegetables, legumes, etc. This increases income and improves nutrition from the same amount of land, earning two or three times more income this way.

Fortunately, later in the morning, one of these farmers who as using SRI to diversify his farming system, Mey Som, the first SRI farmer in Cambodia, verified my statement from his personal experience when asked to comment. For details on Mey Som's diversified farming system, see pages 12-14 of my trip report from July, 2007, when I visited his farm in Kandal Province (<http://ciifad.cornell.edu/sri/countries/cambodia/camntrpt0707.pdf>)

After a break, there was discussion. MAFF Deputy Director **Lordeasmey** took over the chair because It Nody had to attend another meeting. The first question was from the PDA Deputy Director for Battambang: can SRI be used on a large area, or is it limited to smallholdings? I responded that SRI was developed for smallholders, who have limited land and little capital. However, being a biologically-based innovation (as contrasted with a mechanical innovation) it is scale-neutral. In India, one businessman who took an interest in SRI already in 2004, after one season to acquaint himself with the methods, organized production on 44 continuous hectares, and had a harvested average yield (from five different varieties) of 11.15 t/ha, according to the Andhra Pradesh extension department. In Zhejiang Province of China, where one-third of the rice area was under SRI methods last season, adoption has been most rapid among larger farmers (in the 25 ha range), because they have adapted SRI methods so that they save not only seed, water and cost but also labor.

Farmers in a number of countries, including Cambodia, are starting to try out direct seeding, instead of transplanting, to save labor, and this can be done successfully with the other SRI principles and practices. Or germinated seed can be broadcast at a higher rate than would be used with transplanting, and then the sown field can be 'weeded' in the usual SRI square pattern (with

perpendicular passes of the weeder) to thin out the crop stand drastically. A farmer in Sri Lanka who has pioneered this method sows seed at 25 kg/ha, instead of the recommended 5 kg/ha, but then at 10 days after broadcasting, he ‘weeds’ his field and eliminates 80% of the plants. By sacrificing 20 kg/ha of seed, he saves about 40% of his total labor, because he does not make any nursery and does not transplant, just broadcasting and then using the weeder as he would otherwise. I suggested that I expect SRI will evolve over the next decade toward direct-seeding also often with zero-tillage and raised beds. This reiterated the idea that “SRI is not finished.”

The PDA Director for Kampot asked whether SRI can be sustainable, because the plants are so much more productive and must be taking more nutrients out of the soil. Is putting organic matter into the soil enough? Won’t yields start declining in a few years? I said that the Madagascar farmer who has used SRI methods most successfully, getting yields over 20 t/ha, has seen his yield increase, year by year, over the past 10 years, with not decline. We can’t know how long this will continue, and since SRI is not necessarily an ‘organic’ methodology, if there are nutrient limitations developing, such as phosphorus, these can be remedied by inorganic amendment if organic inputs are not sufficient.

What we do know is that nitrogen is available through biological processes without limitation, provided that there is enough life maintained in the soil. Plants have been growing on the earth’s surface for over 400 million years, without exhausting soil fertility when natural cycling is taking place. We know that although there can be phosphorus and potassium limitations for crop production, these are limits in terms of ‘available P’ or ‘available K.’ Most soils themselves have 10, 20, even 30 times more ‘unavailable’ P and K, bound up in complex molecules or soil particles so that these macronutrients are kept out of the soil solution. But they can be mobilized through microbial activity.

Providing the soil with enough organic matter to maintain large and active populations of soil biota can address this constraint for many hundreds of years to come. The Madagascar farmer whom I referred to, being a small farmer, spends considerable time collecting biomass from any and all sources – his own rice straw, leguminous shrubs for N, an abundant weed that is a P- accumulator, banana leaves for K, also weeds, loppings from shrubs, sawdust from sawmills, all kinds of animal manure. He makes really good compost, in 5-ton batches, and applies these four times a year. Such intensification of management has enabled him to buy twice as much more rice land as he started with, tripling his riceland holdings. Possibly he will need to add some nutrients in the future, but in fact, if his land develops micronutrient deficiencies, it will be organic inputs that serve his soil better than will chemical fertilizer.

I cited the organic farmers’ motto: Don’t feed the plant – feed the soil, and the soil will feed the plant. This is relevant to all kinds of production, not just SRI. Our current agronomic theory is that we can get higher yields by increasing the supply of nutrients in the root zone. But in fact, plants are so evolved that they do not take up more of any nutrients that they already have in sufficient supply to meet plant needs; indeed, plants exude any excess nitrogen back into the soil. We have been treating plants like the geese that French farmers fatten up by forced-feeding, cramming food down their throats, so that they become fatter and have larger livers from which to make more *pate de foie gras*, a liver paste considered as a delicacy in France. It is said in America: *You can lead a horse to water, but you cannot make it drink.* Well, we cannot force

plants to take up more nutrients than they need. Instead of increasing nutrient *supply*, we should create the most favorable growing conditions for the plant, so that it has a greater *demand*. We need also to do what is necessary so that the soil system can meet this demand. But the supply-led strategy of agronomy is costly and inefficient, and ultimately less successful.

The PDA Deputy Director for Takeo then asked how SRI can be practiced under rainfed conditions, with water supply limited and unreliable, or under conditions of extreme flooding. Since much of the benefit from SRI practices comes from having aerobic soil conditions, I said, there are some conditions where SRI methods will not be very useful. However, I added that by making some adjustments in SRI techniques, it should be possible under most conditions to get some gain from the insights SRI gives about how rice plants perform best.

I described how an NGO partner in India, PRADAN, working with very poor farmers in the rainfed eastern Gangetic Plains states, where SRI use went from 4 farmers to 6,500 farmers within four years' time, has helped achieve average yields around 7 t/ha without irrigation, just using monsoon rainfall. Two innovations have been key. First, farmers under rainfed conditions try to hoard and hold their rainwater as much and as long as possible. They do not understand that this causes the roots of their plants to die back, so that when soil moisture is eventually lost, their plants have only shallow and degenerated root system. These plants cannot withstand water stress and perform poorly. Farmers need to manage rainfall so that their plant roots have enough water to grow but do not suffocate from continuous flooding. This requires some adjustment in the architecture of their fields. Drains need to be put in. Bunds need to be breached so let water run out. Farmers need to understand that under rainfed conditions, their primary objective is to grow large and healthy roots.

Second, because the rainfall comes unpredictably, it is hard to have seedlings at the best young age for transplanting if only one nursery is planted. But since SRI requires only about 10% as much seed per hectare as with conventional rice production, farmers are encouraged to save only 70% of their seed, not 90%, and to establish three nurseries, about 10-12 days in succession. They are persuaded to be willing to sacrifice two of these three nurseries in order to have one of them in a prime age for transplanting – between 8 and 15 days -- when the rains finally come. They can get 1-3 extra tons of yield for having properly young seedlings, so this more than justifies the loss of a few kilograms of seed and the work of doing these additional small nurseries.

Since soil and climatic conditions vary widely in the uplands, farmers need to do their own experimentation and adaptation to be successful in each particular environment. But these experiences have shown that SRI can be adapted to upland areas. In northern Myanmar, where farmers have no irrigation and yields are 2 t/ha normally, SRI farmers have averaged 4 t/ha even with partial SRI, and those using the full set of practices well get 6-8 t/ha. In southern Philippines also, we have seen yields of 7 t/ha without irrigation, using organic matter for nutrients and conscientious management.

Continuous flooding is a very different challenge, and there will be some areas where the soil is never aerobic enough to succeed with SRI methods. We must accept this. However, CEDAC has done some experimentation with floating rice, where plants are continuously inundated for long

periods of time, and the adapted rice varieties elongate to float on the surface until the water recedes. CEDAC has found that by planting the rice crop one month earlier so that the tillering is more vigorous and the plant is more bushy before the flooding begins, the plant can then elongate more effectively, and the yield can be 1-2 t/ha more, provided that traditional varieties (photoperiod-sensitive) are used. [Koma can improve this description] This underscores that SRI is not to be regarded as a fixed technology, but as a set of ideas to be understood and adapted.

Mey Som was then invited to speak. He began by saying that when he started with SRI in 2000, he was “not confident.” His soil was very sandy, and his paddy yield was 1 t/ha or often less. He wanted to speak to the question raised by the PDA Director from Kampot. He has seen his soil improve year by year with SRI methods, getting higher and higher yields. Before, the rice plants might not even grow up to his knee, and they had few tillers. The soil was very hard and compact. Now, some of the plants come up to eye-level. They have 20-30 tillers each, and yield can even be four times more. This comes from getting more organic matter into the soil.

May Som said that he has no irrigation, so his crop is rainfed. If the rains come late and his seedlings become older than desirable (behind 15 days), he has to use them. But he then plants his single seedlings closer together, about 20x20 cm instead of 25x25 cm. The younger seedlings do better if given more space to grow. He finds that now he doesn’t need to put as much organic matter on the soil as before and he can still obtain a high yield. This is partly because now there are large root systems for each plant, and these stay in the soil and decompose. He confirmed that he had reduced now his rice area and diversified successfully into other lines of production. He gave his cell phone number so that people could call him if they want to talk more about this.

Next, **Suon Seng**, formerly a CEDAC staff member but now working with the NGO ADRA, broadening the base of SRI activity and expertise, reported on a large-scale study underway on SRI adoption and non-adoption. They have 12 researchers, in three teams of four each, who are studying the experience of 320 SRI farmers in three provinces, and of 320 non-SRI farmers who are matched in terms of farm size and situation. This will be an important addition to our knowledge about SRI (and non-adoption of SRI) when it is completed.

Koma told me that they hope to have this study completed soon, with initial analysis done by March, when there will be a large national workshop on SRI. The field researchers gathering data are all recent graduates in agronomy, none of whom have been involved previously with SRI. So they should have no vested interest in finding positive results. Also, he added, this experience will give them an intensive and intimate acquaintance with SRI, which he thinks will be a positive thing for developing a better professional cadre of agronomists in Cambodia.

Koma told me also they are conducting a competition for ‘best SRI farmer in Cambodia,’ and more than 100 farmers have registered for the national prize. This will be awarded based not only on highest yield, but also their area under SRI, how chemical dependence has been reduced, number of other farmers whom the candidate has trained in SRI. Koma acknowledged that it will be difficult to make a selection with multiple criteria like this. I suggested they might give separate awards for the different criteria.

Suon Seng noted that a majority of the SRI farmers identified in the survey are not ones who were trained by CEDAC but rather, most of them have taken up SRI by ‘imitating,’ without formal training. This means that many do not have a good understanding of the principles and practices, and thus they often make mistakes, so that their SRI fields do not perform as well as those with good knowledge. Also, sometimes their crop has failed due to natural disaster (flooding or drought) and they then complain about SRI, when in fact, normal crops failed also. Also, they have found that some farmers who did get training do not use the full set of practices recommended, but they are considered to be practicing SRI. And conversely, there are some farmers who say they are not practicing SRI because they are not members of a CEDAC-sponsored farmer group when in fact, they are doing many or even all of the practices, but on their own.

All this makes the situation complicated and difficult to evaluate, but this survey will give a good empirical picture of the situation, in its different aspects. Suon said that in the study they are looking at village-to-village differences in adoption and disadoption. They are also looking for male-female differences in adoption, utilization of practices, and impact. Much of the differences can be attributed to who came to the training, whether the husband or the wife in a family.

Koma told me that his estimate of 80,000 farmers currently using SRI is based on CEDAC’s knowledge that there are 70,000 farmers who are members of CEDAC groups, who have had proper training, and who CEDAC knows are using most if not all of the practices. He figures that at least 10,000 more farmers are working with NGO and Provincial Department of Agriculture programs that are quite solid. But it is evident that SRI concepts and experience have been influencing the rice sector as a whole. To me, it sounded like probably at least 150,000 farmers are improving their production to some extent by the introduction of SRI ideas and methods.

SRI dissemination is proceeding in two parallel ways. CEDAC has followed an ‘intensive’ approach, trying to disseminate scientifically-based SRI knowledge in a systematic manner, doing the training itself and helping NGOs and PDAs to do the same. But at the same time, there is ‘extensive’ dissemination through observation and informal communication. There is nothing wrong with this as it may be the most cost-effective way to improve the performance of Cambodia’s rice sector. But it makes evaluating the use and impact of SRI very difficult.

Chou gave a brief report to the assembled group on what he learned from participating in the SRI symposium in India, initiated by WWF and co-sponsored by the Tripura state government, the Indian Council for Agricultural Research’s Directorate of Rice Research and the Central Rice Research Institute, the Ministry of Agriculture’s Directorate of Rice Development, the Andhra Pradesh state agricultural university, the National Bank for Agriculture and Rural Development, and the Sir Dorabji Tata Trust. He noted that there was participation from 26 states or territories all across India and was impressed that during the field visits organized on the second day, they met with a farmer who was doing 4 hectares of SRI, and in one village there were 400 hectares planted with SRI methods. These areas were larger than seen so far in Cambodia.

Chou’s powerpoint showed pictures of tractors used in field preparation for SRI cultivation, and he showed a weeder whose design he particularly like. He showed also how farmers in Tripura cope with the high rainfall and soil saturation by putting drains (shallow channels) across their

fields, even 8 rows. He also showed the yield increases for a wide range of varieties, averaging about 2 tons per hectare. The report showed Cambodians interested in SRI that while their country was one of the first to start with the new methods, other countries are ‘catching up.’ Penvuth made some summary remarks to conclude the meeting, already going beyond the noon adjournment planned. I could tell that we were agreed on most of the main concepts that I had tried to get across – SRI is not a technology, but a set of innovative ideas; SRI is a kind of ‘root revolution,’ emphasizing biological activity in the soil. He repeated the advice: feed the soil, and the soil will feed the plant. He underscored that SRI aims not so much at higher *yield* as at higher *productivity* -- of land, of labor, of water, and of capital -- and at higher *incomes* for farmers. He urged monitoring of SRI to ensure its sustainability, but noted Mey Som’s report that with SRI methods, soil fertility is not only maintained but can be improved. Penvuth reminded the group about there being two types of agronomists -- can-do and can’t-do -- and urged everyone to try to be the former.

The chairman, a Deputy Director-General of MAF, thanked everyone for participating and reminded them that agricultural intensification in general is a key strategy of the government. He noted that since the government made a decision in 2005 to support SRI dissemination, the Minister of Agriculture has been giving leadership in this effort. SRI is being implemented now by all Provincial Departments of Agriculture. The number of SRI users is now at least 80,000, 5% of Cambodian rice farmers. But SRI is “a work in progress,” continually being improved by farmer innovation. (It was good to hear this echoed by the DDG.)

Also, the chairman said that SRI is particularly useful “for the poor” -- who can rely on their knowledge and skill to raise production instead of on purchased inputs. He echoed my statement that SRI concepts and practices have the potential to transform the agricultural sector, and quoted a colloquial (though sexist) bit of advice that the Minister has given farmers, in Khmer: “Pay more attention to your rice and your rice fields, as if you were watching a beautiful woman.”

The DDG added that organic agriculture is going to become more important in Cambodia. There had been a meeting just the day before (Thursday) at which it was announced that an Office of Organic Agriculture is being set up under the Royal University of Agriculture (RUA). He mentioned that he had recently visited the Natural Agriculture shop that CEDAC operates in Phnom Penh with Oxfam support, to get better prices for farmers and healthier food for consumers. He was disappointed to learn that the whole stock of organic rice from the season before had been sold. So he hoped that production would expand quickly. On this note, the workshop adjourned for lunch. Since I had email work to attend to, I went back to the hotel for lunch, being picked up at 2:20 by Koma.

MEETING AT CARDI

We drove to the **Cambodian Agricultural and Rural Development Institute** a few miles outside of Phnom Penh, on the road to Takeo Province. There Koma and I met with **Dr. Ouk Makara**, Deputy Director for Research and Development, and **Hun Yadana**, head of the Planning, Collaboration and Business Office. CARDI was established in 1999 as a semi-autonomous institute with six departments under the Research and Technology Division headed by Ouk: Plant Breeding, Soil and Water Management, Plant Protection, Agricultural

Engineering, Agronomy and Farming Systems, and Socio-Economic Studies. Its mission is “Technology for prosperity.”

The overall strategy sounded quite ‘linear’ with research being done mostly on-station to develop and validate technology which was then ‘transferred’ to farmers through an extension process. There was, however, a farmer participatory program under the Socio-Economic Studies department, and Ouk agreed that this kind of work is best integrated into substantive programs, engaged with specific kinds of technological improvement, rather than being stand-alone and abstract. He said that the socio-economic staff do work in a more integrated manner than the organization chart implies.

In the past, CARDI has taken a negative or at least unapproving view of SRI, perhaps because it was influenced by the views of some IRRI scientists or its Australian advisor. Ouk assured us, however, that CARDI is indeed interested in SRI and is doing evaluations. Given the strong support given for SRI utilization by the government, from the Prime Minister on down, this more positive stance is surely advisable for the institute.

FIELD VISIT TO SVAY RIENG PROVINCE

Next morning, Saturday, January 5, Koma picked me up at 8:30 to drive to Svay Rieng Province, which took almost three hours. The most memorable part of the trip was the ferry crossing of the Mekong, quite well organized and fairly quick. With us was _____, CEDAC staff member who works in that province. About noon, we stopped at a lakeside restaurant for lunch with **Soeur Saram**, Deputy Director of the Provincial Department of Agriculture here. He has been working with the NGO known as PROLINOVA which promotes local innovation in agriculture, trying to ‘mainstream’ farmer participatory research methods. The PDA has focused this collaborative effort on SRI, involvng also the RUA and School of Agriculture at Kampong Chan.

The work started out with 10 farmers in three villages, two groups of five farmers each, who did various experiments within an SRI framework. We were scheduled to meet several of them after lunch. Some of these farmers had already built biodigestors on their farms to produce biogas fuel from manure and farmyard wastes. They were interested to see the effects of using the slurry from these digestors on their SRI fields, instead of using fertilizer or compost. Soeur Saram had a report with him to show us. Most trials on farmers’ fields still used two seedlings per hill instead of just one because farmers were not confident about resisting brown planthopper (BPH) attacks. But this was a large reduction in plant density. Spacing of hills was 25x25 cm.

The trials were monitored every 10 days by the Deputy Director, some PDA staff and farmers, recording number of tillers, tiller height, pest populations, etc. for 10 randomly selected hills. At 28 days after transplanting, tiller number was 14-18, at 60 days, 16-32, and at flowering, 18-33. The top yield, dried to reduce grain moisture to 14%, was 6.8 t/ha, which compared will with previous yield of 3.5 t/ha, almost a doubling. Farmers found that varying the amount of slurry applied, 3kg/m² vs. 2 kg/m², made little difference. Farmers saw that their plant management, such as not transplanting the seedlings deep and planting quickly and carefully, had more effect than this difference in the amount of nutrients. Also, they found that low-lying areas which accumulated a lot of silt from flooding did better than higher areas from which silt was washed

away. They agreed that this did not mean continuously low-lying and flooded areas were the best, however.

The farmers who got the highest yield, 6.8 t/ha, had had the highest yield before the program started. Most of the other farmers in the group had yields closer to 1 t/ha than 3.5 tons. The others got up to 4 t/ha, and one reached 5.4 t/ha with SRI and a different variety. Farmers “never saw like this before,” Soeur Saram said. The average yield for the whole area is 1.9 t/ha. All have seen that they can get more yield just by using younger plants. And there is less pest attack, he added.

We drove after lunch to the home of **Ouk Kongker**, about 15 minutes outside of town. His neighbor **Om Sovuthy** was there, and also **Khun Chan**. All three have biodigesters. They were later joined by **Orn Man Phat**, a woman member of the experimental farmers’ group. She lives in a different village and is the only member there. All four farmers had notebooks with them in which I could see they had recorded tiller number, etc. at different stages of growth, the data that had been aggregated in the report that Soeur Saram showed us.

We first inspected Ouk’s biodigester and saw the cooking stove and light that were fueled by biogas. I asked how much a biodigester costs, and was told \$320 last year, \$350 this year, for a 4 cubic meter capacity. There is a government subsidy at present that makes installation more attractive. I asked what are the main advantages, and Om responded: (1) women save time collecting firewood, (2) the slurry can be used for crops instead of fertilizer, saving money, (3) they can have good light at night, and (4) sanitation in the house compound is better now that all wastes are put into the digester. Are they happy with their investment? All said yes, and added that other villagers are seeing the impact of the slurry on rice yield. There are few or no weeds in the field when slurry is used.

In their SRI trials, they compared 15- and 21-day seedlings. The 15-day seedlings were definitely better, and they said all farmers will use 15-day-old seedlings next year. But they will keep experimenting with other variables. I explained to them the advantage we have seen in Nepal with using even 8- or 9-day seedlings, as SRI farmers can harvest their crop as much as three weeks earlier, while still getting doubled yield, compared with two weeks sooner when seedlings are 10-14 days, and just one week sooner when older seedlings (15-20 days) are used because of water or labor constraints. I got my laptop computer out to show them this table, and also the data we have from Nepal and Madagascar showing that the more soil-aerating weedings are done, with a mechanical push-weeder, the higher is the yield, even by 1-3 t/ha. This impressed them, as did the pictures of luxuriant SRI plants from various countries, including Cambodia, so that they said they would evaluate the effects of soil aeration too.

Om said that he had come back from Phnom Penh by taxi to meet us (his grandmother had died a few days before) so that he could get new ideas. He said he knows that they are still not getting the full potential out of their rice plants. Several of the farmers in this area visited Takeo Province, which has been the vanguard area for SRI in Cambodia, and when they saw what farmers there have done to improve their rice production and their farming systems, they all wanted to join the Farmer-Nature Network that CEDAC has sponsored, to create farmer-run organizations for local agricultural and rural improvement. As we were leaving I learned that

Om's wife is an assistant director of agronomy in the PDA office here, so he has more access to technical information. But this also means that 'as a real farmer' he can have some influence on his peers in the farming community.

Ouk brought for us a pot of Somalee rice that his wife had cooked up for us when he learned that CEDAC and CIIFAD are interested in promoting the production and sale, for a better price, of traditional ('unimproved') varieties, like Somalee, that have nice aroma and other desirable qualities. These make such rices more desired by consumers so that they command a higher price. This pot of rice had not been cooked quite long enough, so it was not as soft as well-cooked rice would be. But we could appreciate its fine aroma. Koma is looking for places in Cambodia where traditional rices are particularly tasty and desirable, given the soil and other conditions where they are grown. This will help to develop greater market demand for these delicious foodgrains, so as to raise their status and price generally. CIIFAD is working with CEDAC to improve such marketing opportunities.

With this light 'snack' of rice under our belts to departed, driving to the border with Vietnam, which adjoins Svay Rieng Province and visiting a duty-free 'shopping mall' on the border. It was dreadful for its dreariness, lassitude, and chemical odors, but it did have a huge supply of consumer goods that will some day be flowing through faster than when we visited. That evening we had dinner with ____[name]____, whose house is next to the restaurant where we had eaten lunch and who serves as _____ [position]_____ in Svay Rieng.

Next morning, we had breakfast at the hotel with **Thach Ratana**, provincial director of agriculture. There are 42 communes in the province, and SRI is being at least started in most of them. He estimated that 7,000 households are already using SRI, and their yields have averaged about 4 t/ha compared with the district average of 2 t/ha. The area under SRI is about 3,000 ha. He got some previous training in sustainable agriculture from the International Institute for Rural Reconstruction (IIRR) in the Philippines, an international NGO with which we have been working on SRI since 1998, when it sponsored the first presentation on SRI outside Madagascar by Association Tefy Saina, the NGO from which I learned about SRI back in 1993.

Thach said that last summer, the Governor of Svay Rieng province and a Member of Parliament who is a senior minister in the cabinet had participated in a transplanting ceremony for publicizing SRI. Now the Provincial Governor is himself doing SRI On 2 hectares, and he got a yield of 6 t/ha. So he is very satisfied. He wants to invite all the member of the Commune Councils in the province to come to a big meeting to learn about SRI.

We discussed the use of SRI methods with traditional varieties as well as improved ones. There is now a company owned by the government and funded by Australian aid that is producing and selling 'improved' seed. Farmers can get 5 kg of seed at a subsidized price, so this makes the modern varieties more attractive. (The purpose is to raise yields, but also to build up market demand for these seeds.) We discussed the merits of traditional varieties – flavor, aroma, texture, cooking qualities, etc. – and Thach agreed that they should be trying out SRI methods with some of these because, he agreed, they are more desired by consumers. The principle should be that farmers should be given more options, rather than fewer.

After finishing breakfast, we stopped at the Provincial Department of Agriculture office, where Thach gave me one of the Department's publications, THE POPULAR FARMER MAGAZINE, which had two beautiful color pictures of SRI on the cover. He also told us that they are expecting to begin getting some aid for SRI work from the Spanish government.