

**REPORT ON A VISIT TO THE PHILIPPINES TO REVIEW SRI PROGRESS,
MARCH 2-9, 2006 -- Norman Uphoff, CIIFAD**

SYNOPSIS

This report on an 8-day visit to the Philippines got rather long because so much was packed into the itinerary and so many interesting things were learned during this time. The following comments summarize the main things observed and learned. For more details and more 'flavor,' a longer report follows that can transport readers vicariously through the same experiences that I had. Norman Uphoff

1. PUBLIC SECTOR RESPONSE: There is a more favorable orientation of the Philippine government toward SRI compared with 1 or 2 years ago. The Undersecretary of Science and Technology who keynoted the international meeting at the International Rice Research Institute (IRRI) which was the main reason for my visit commented favorably on the spread of SRI use in the Philippines. SRI got a positive reception at a meeting of the National Agricultural and Fishery Council's Subcommittee on Cereals, which oversees the Philippines rice sector. The National Irrigation Administration (NIA), which took an earlier interest in SRI than did the Department of Agriculture, because for NIA water-saving is a growing and acute concern, is moving ahead with SRI demonstrations and promotion. PhilRice is also now reasonably positive toward SRI.

2. NGO AND FARMER ORGANIZATION ACTIVITY: From the start, most interest in SRI has come from Philippine NGOs and allied farmer organizations. This report's summary of discussions at a Mindanao-wide forum on SRI and then at a national forum on SRI (minus Mindanao participation) shows that leadership for this innovation still rests with the NGO sector and its farmer organization allies. Also allied with this effort are faculty and students from a number of universities. Leyte State University is currently the most engaged, but UPLB involvement is growing, and other universities are taking up SRI work too.

3. WWF INTEREST: A most welcome development is interest and support from the World Wide Fund for Nature (WWF), on the basis of evaluations it funded and conducted in India. WWF now considers the spread of SRI to be potentially beneficial for many environments where the agriculture sector and particularly irrigated rice production compete with natural ecosystems and endangered species for water. Reducing demand for freshwater resources can countervail biodiversity loss, degradation of river ecosystems, and other adverse environmental consequences. Methods like SRI can contribute to these outcomes and at the same time enhance human well-being, a positive-sum outcome that WWF is seeking.

4. ROOT DYNAMICS: It is becoming clearer each year that the driving force behind SRI results is not so much the inputs made by farmers as their changes in soil, water, plant and nutrient management. The latter are conducive to greater root growth and activity which in turn is associated with more abundant, diverse and active populations of soil biota, which provide many services and benefits to plants. Where farmers do not manage their resources in such a way that root growth and soil biota are promoted, the potential benefits of SRI will not be realized. Unsatisfactory results with SRI methods appear to be most often associated with practices that do not induce more effective root growth and functioning. Farmers need to pay more attention to their plants' roots, and everyone should pay more attention to soil biodiversity. WWF and ICRISAT are currently engaged in systematic studies of soil biota, reporting some of their initial results at the international meeting that I attended at IRRI, March 7-8.

March 2: MEETING OF THE SUB-COMMITTEE ON CEREALS (RICE AND CORN) OF THE NATIONAL AGRICULTURAL AND FISHERY COUNCIL

Thursday morning, **Roberto Verzola**, coordinator for SRI-Pilipinas, met me after breakfast at a hotel in Quezon City to review the schedule that he had arranged for my eight-day stay in the Philippines. **SRI-Pilipinas** is a consortium/network of NGOs, farmer organizations and interested individuals, including some government personnel, who are evaluating and promoting SRI in this country. Obet, as Roberto is known, has a multitude of personal contacts throughout the country from his long-standing involvement in civil-society activities. This has been helpful for getting SRI known and disseminated.

With Obet was his wife **Flora**, who has played an important role in getting SRI started in the Philippines. When Obet first heard about SRI, he was head of the Philippine Greens, an NGO promoting, among other things, sustainable agriculture. Flora tried out the methods out on the family rice farm in her home village in Quezon Province, to see whether they worked as claimed. Both were very satisfied with the results, and Obet began working, voluntarily, to get SRI more widely known and used, having confidence in the methods from this personal experience. Flora has evaluated SRI practice with about 150 different traditional varieties. Farmer organizations in the Philippines have been both systematic and ambitious about identifying and preserving their country's indigenous rice germplasm.

Earlier, Obet was also working to gain acceptance of 'open-access' software in the Philippines, in preference to Microsoft's commercial offerings. Trained in electrical engineering, Obet has professional expertise in the software area and, like myself, had to educate himself on agronomy and soil biology to be able to explain SRI to others. These days Obet divides his time between SRI and an emerging civil-society watchdog network intended to ensure that nationwide local elections in May 2007 are free and fair. This aims to have 250,000 volunteer poll-watchers by then who can monitor the voting and vote-counting in every precinct across the country. Cell-phone technology, with picture as well as text and data transmission, creates new possibilities for monitoring and reporting on elections, provided there is good prior organization. Obet's first large-scale use of cellphones was in his SRI effort to give and get quick feedback from farmers.

Obet was pleased to tell me that two proposals he drafted for a World Bank-funded program called **the Development Marketplace**, which is funding SRI work in Nepal, got through the first round of screening for funding -- one for SRI, and the other for this other network, tentatively called NO-CHEATS (**N**etwork of **C**itizens for **H**onest Elections and **T**ruthful Statistics). He said that he may change this clever acronym because some consider it too provocative. It does, however, reflect the widespread conviction in the Philippines that there has been cheating in past elections, and that this must not be allowed to happen again.

Obet reported that the **Sub-Committee on Cereals** of the **Department of Agriculture's National Agricultural and Fishery Council (NAFC)** was, by coincidence, holding its quarterly meeting that afternoon. Its chair agreed to give us 15 minutes on the agenda for a short presentation on SRI. This body regularly reviews the status of rice and corn production and consumption in the Philippines, including the need to fill any gaps with imports, and it considers any initiatives by government to improve the performance of the cereals sector. All concerned government agencies are represented, as well as a number of NGOs that work on food security.

The **Philippine Rural Reconstruction Movement (PRRM)**, which has accepted lead responsibility within the NGO sector for logistical support of SRI promotion, regularly participates in the Sub-Committee meetings through its senior vice-president, **Gani Serrano**, and Obet, who serves as a part-time consultant for PRRM's work on sustainable agriculture. Before the committee meeting, we went to the PRRM office near the hotel to prepare a short powerpoint presentation for the occasion. Obet and I had lunch with PRRM's Management Committee, updating them on SRI work in the Philippines and other countries.

The Sub-Committee meeting, held that afternoon in the Department of Agriculture (DA) main building in Quezon City, was scheduled for 1 to 5. The chair, **Raul Montemayor** from the Federation of Free Farmers, welcomed us and apologized for the session would begin late. The government's coordinators dealing with cereals were both there: **Frisco Malabanan** for the GMA-Rice program and **Jesus Benamira** for the GMA-Corn program were both present. Gani explained the programs' names, which match the initials of the Philippine president, Gloria Macapagal Arroyo. The programs' Tagalog names mean 'Golden Bountiful Harvest.' It seems, however, that the similarity is not entirely coincidental.

Malabanan has been the main champion within the Department for the promotion of hybrid rice in the Philippines, and initially there was some opposition within the DA to giving support to SRI. The previous Secretary of Agriculture, Arthur Yap, however, was satisfied by November 2004 that his Department should begin giving some assistance for SRI work, diversifying its strategy for the rice sector. He appreciated that SRI methods are compatible with the promotion of hybrid rice since SRI boosts the yields of hybrid rice too. (In China, the developer of hybrid rice, Prof. Yuan Longping, is the most eminent proponent of SRI.) Indeed, by reducing farmers' seed requirements, SRI could lower one of the barriers to the adoption of hybrid rice seeds: their high cost. Probably the most important consideration is that the DA should have not have as its only strategy for raising rice production one that favors richer farmers. Because SRI does not require purchase of external inputs, it is more accessible and beneficial for poorer farmers.

Just before my arrival in the Philippines, PRRM received a long-awaited check from the DA to launch a **national SRI training effort** in conjunction with NGOs, farmer organizations, and local government units (LGUs). The grant of 800,000 pesos (\$16,000) was approved about a year ago, but it took a long time to get the grant processed and the funds transmitted. It will provide about 9,000 pesos for training in each province of the country (just \$180 each) to put on one-day programs on SRI for farmers, NGO staff and government personnel. This amount of funding will need to be augmented by local sources. Since not every province has significant rice production, there is some flexibility in the grant so that more than one training program can be conducted in provinces where rice is most significant, and training in some other provinces will wait for the next round of effort. SRI-Pilipinas expects that if this first round of training demonstrates enough success, more support from the DA can be justified and obtained.

The sub-committee meeting moved slowly because of the many questions and discussions that followed each report. The first report was on expected weather patterns that will affect the next cropping season. By tracking sea-surface temperatures and other climatological measurements, it is now predicted that the next La Niña weather pattern, which is emerging unusually rapidly, will

cause heavier-than-average rainfall in the months ahead. Just as the drought associated with El Niño can be harmful for the rice crop, so can a surplus of rain damage rice crops.

[In response to this information, in my presentation I noted that the larger and stronger root systems that are promoted by SRI methods give protection against the water shortages of El Niño if there is enough soil moisture to get rice started growing early in the season. SRI methods are less able to deal with the opposite effects of La Niña, needing well-drained soils for best results. However, if SRI crops can be gotten started in soils that are not yet continuously saturated, these plants can better withstand the wind and rain damage (lodging) that heavy storms usually cause.]

Benamira, recently appointed as GMA-Corn Program coordinator, is still responsible for the DA's National IPM Program, which has focused on reducing dependence on the chemical control of pests and diseases in rice production. He has thus been interested in SRI (also because national IPM programs in Indonesia, Cambodia and Vietnam are now involved with SRI promotion). However, since some of the less successful experience with SRI in the Philippines has been reported to him, he is not as persuaded of its merits as are most NGO proponents. A complete inventory of all the experience with SRI to date is being compiled by SRI-Pilipinas so that Benamira and others can have a full and balanced overview of the results.

It was difficult for me to talk about SRI for just 15 minutes, but pictures can indeed often convey each a thousand words. Pictures of huge SRI plants grown from single seeds got across the point that SRI methods produce more productive phenotypes of rice, from any existing genotypes. The images of large root systems also made clear this important phenotypical difference. The pictures that got the most attention I think were ones from India and Vietnam showing side-by-side comparisons of SRI and non-SRI fields after a typhoon had hit the rice crop. The latter fields were severely lodged, while the SRI rice was standing upright, having resisted the force of wind and rain. There was not much time for discussion and questions because our presentation had come just before the planned adjournment time. Obet invited people to contact him for further information and web address was given (<http://ciifad.cornell.edu/sri/>) for anyone wanting access to reports and documents on SRI from around the world.

March 3: MINDANAO FORUM ON SYSTEM OF RICE INTENSIFICATION

Next morning, we flew from Manila to Davao City on the southern island of Mindanao. Obet had contacted **Neth Dano** a month earlier when he learned that I would have a few days to spend with SRI colleagues preceding a workshop being held at IRRI, March 7-8. Neth works on sustainable agriculture issues for the **Third World Network**, an NGO active in the southern Philippines along with other places in Asia and elsewhere. It so happened that Neth and I met in April 2004 in New York, at the UN headquarters in New York during a meeting of the UN Commission on Sustainable Development, when an SRI consortium received an award from the **SEED Initiative** sponsored by IUCN, UNEP and UNDP to support entrepreneurial efforts that promote development and environmental conservation concurrently. We were embarking on efforts together with partners in Cambodia, Madagascar and Sri Lanka to support the production and marketing of indigenous rice varieties grown with environmentally-friendly SRI methods.

Neth put together a "Forum on System of Rice Intensification (SRI): Farmers' Experiences and Practical Lessons in Sustainable Agriculture," held at the Mindanao Training Resource Center in

Davao City. This was co-sponsored by the **Food Sovereignty Watch-Mindanao**, the **Go Organic, Mindanao!** network, and the **Third World Network (TWN)**. ‘Food Sov,’ as the first is called, is a coalition of NGOs, farmers and interested persons trying to ensure that food production in Mindanao remains independent of and outside corporate control. It is particularly opposed to the introduction of genetically-modified crops and is concerned about the dependence on commercial seed suppliers that use of hybrid rice creates. The leader of ‘Food Sov’ is **Corie Requiiza** who attended the first Philippine national SRI meeting held in Manila in April 2002. ‘Go Organic’ is a broader coalition of the same kinds of organizations and individuals who want to promote organic production methods in the region more generally. Its members are concerned with both human and environmental health. TWN works with both of these networks and with others on an even broader agenda of sustainable agriculture. The 50 some participants who came together for the forum from all over Mindanao were thus mostly agricultural activists from diverse backgrounds.

From the self-introductions I could see that over half of those attending were practicing farmers, many young and proud of their profession. Others were older, very committed organic farmers. The large Muslim population in Mindanao was evident from the ‘assalamu alaikums’ starting many introduction and from the names, one being Muhammad Ali, representing a farmer group called the Muslim Brothers (not the Muslim Brotherhood). There were also agricultural extensionists, the director of a government training institute, someone from Holy Cross College, the manager for an EU-funded upland development project, a radio journalist, and so forth.

The local official invited to give the welcome remarks was late in arriving, so I was asked to proceed with my presentation on ‘SRI experience around the world’ before he arrived. The questions afterwards were very good, enabling me to fill in some things there had been not enough time to mention in the talk. What about the time needed for ‘transition’ from chemical-dependent production? This is a big concern among organic farmers. With SRI, unless the soil has been heavily exposed to inorganic fertilizer and agrochemicals, as on some experiment stations, we have found that there is little or no transition time. Higher yields usually start from the first year of SRI use, although they generally can increase even more as soil fertility its built up through root exudation and the application of compost.

The response of rice plants to SRI methods depends heavily on the soil’s endowment of beneficial organisms, which may have been reduced by previous chemical applications. I pointed out, however, that SRI is not necessarily an ‘organic’ method of production, since its practices also increase yields when used with chemical fertilizer. As a matter of fact, factorial trials have shown that the best agronomic performance of SRI methods is with organic fertilization. Still, cost considerations or lack of availability of organic matter may make *inorganic* fertilization the best option for farmers. Also, if there are any demonstrable soil nutrient deficiencies, these can and should be remedied by soil amendments, organic and/or inorganic.

There was interest in how SRI methods work with traditional varieties compared to high-yielding varieties (HYVs) or hybrids. I said that in our experience, the latter have given the highest yields with SRI. However, indigenous varieties give very respectable SRI yields: 6, 8, 10, even 12 tons per hectare. We have seen an indigenous variety yield as much as 13.3 t/ha in Sri Lanka. Because most consumers prefer traditional rice varieties for their more desirable eating qualities, these

usually command higher prices in the market, two times and sometimes even three times more than HYVs or hybrids.

This means that with SRI practices, traditional varieties can be more profitable than modern ones. I reminded them of the picture in my presentation of a traditional rice variety being grown in Madagascar; it was as tall as the farmers in the field, with huge panicles and no lodging. I said that SRI should be seen as expanding farmers' options: if they want the highest yield, new varieties will probably be best for this; if they are aiming for most net income, their 'old' varieties may offer an advantage. Similarly for fertilization, SRI increases farmers' options.

The chairman of the Davao City Council's Committee on Agriculture, **Conde Baluran**, arrived during my presentation, and gave his welcoming remarks after this. He encouraged participants to make inputs to the City Council's plan for sustainable agriculture currently being formulated. (In terms of geographic area, Davao City is 'the largest city in the world'; it thus includes a lot of agricultural production area, so a sustainable agriculture plan is very relevant for this city.) Baluran invited everyone to come to hearings on the draft plan that would be held very soon. They should encourage the government to include SRI and other sustainable agriculture practices in the plan, he said. He picked up on one of the themes from my talk -- that *intensification* should be used as a basis for greater *diversification* of agriculture. This is something very appropriate for the Davao region.

Next there were two presentations on SRI experiences and lessons from farmers in Mindanao. **Jessie Magsayo**, president of a farmer group in North Cotabato province, spoke first. He is working with the NGO called **People Plants Research and Development, Inc.** PPRDI, according to its brochure, has the mission of enhancing agrobiodiversity and empowerment of farmers to attain food security and sustainability of agricultural production. It is funded by the Dutch government and FAO and has partnerships with the Centre for Genetic Resources, an NGO in the Netherlands, and with the Asia-Pacific Office of the International Plant Genetic Resources Institute. Participatory action research on SRI is one of its program focuses.

The systematic approach reported by Jessie of farmer groups conducting local research was impressive; however, their SRI results were not. SRI yield was only 4.44 t/ha, about 75% of the average for SRI production in the Philippines overall. Jessie said that all of the SRI practices had been followed -- 10-12 day old seedlings, 25x25 cm spacing, etc. -- but he noted that the rotary weeder had not always been used as recommended, since farmers did not like this activity. Jessie noted that land leveling had not been done very well, so farmers encountered some problems with golden snails in low-lying parts of their SRI fields and also with mole crickets in the higher areas. (Fortunately, we were able to visit the community where these trials were conducted, near Kidapawan City, the next morning and could get some insight into why these SRI results were less good than expected.)

Detailed records had been kept on costs of production, comparing SRI methods with standard ones and also with the practice of direct-seeding. Surprisingly, the cost per hectare of SRI practice was the highest, 14,630 vs. 13,500 for conventional cultivation and 11,400 for direct-seeding. Farmers' conclusion was that the yield increase with SRI was not enough to justify the additional cost and effort (for weeding).

One positive thing that Jessie noted was an interesting farmers' innovation in construction of their SRI seedbed. They used *sand* rather than soil because this made it easier for them to separate the young seedlings from each other when transplanting. Because young plants get most of their nutrients from the seed sacks attached to their roots, rather than from the soil, for up to 15-20 days they can grow quite well in sand. Jessie showed pictures of nurseries with nicely dark green color. This appeared to be a very useful innovation to share with SRI farmers elsewhere.

Alex Rendon from the **Technical Assistance Center for Development of the Rural and Urban Poor** (TACDRUP) explained as he started his presentation that the farmer who should have been giving the report was "on vacation" and could not come to the forum. Alex said that their experience with SRI was somewhat different. Farmers working with TACDRUP were getting a 50% increase in yield, and appreciated SRI. They had clearly seen that "with more spacing, rice grows better."

In the 2003 season (May-September), Mrs. Juliet Salisi had devoted 1 ha to SRI, dividing it into four quarters to evaluate optimum spacing. These were the results attained:

	20x20 cm	25x25 cm	30x30 cm	40x40 cm
Ave. no. of tillers	28	32	26	21
Yield harvested	1.6	1.8	1.45	1.2
Tons per hectare	6.4	7.2	5.8	4.8

SRI transplanting farmers found tedious and time-consuming, however, and they did not like the extra effort required to replace seedlings that did not survive due to flooding or golden snails. This report was not strongly very favorable for SRI either.

Then Noë Ysulat, director of the Department of Agriculture's **Agricultural Training Institute (ATI)** for Region XII in Cotabato province, have his report. He said he started SRI trials in 2001, after receiving a circular from ATI's national director, Edwin Acoba, urging ATI center directors around the country to consider SRI as an additional input into their rice training programs. Noë said his results were remarkable: "so fantastic that whoever hears them cannot believe... People think their director is getting crazy." He said that when he first heard about SRI, he had himself thought, "Who can believe this? But after reading a paper on SRI from CIIFAD, I got interested. I figured there was no harm to try."

Since that first season in 2001, he said he has had remarkable and consistent results "except when there are endemic infestations beyond the control of man." He was referring particularly to the dreaded tungro virus that can wipe out any crop it infects. Here are the results he reported:

Year	Season	Area (m ²)	Variety	Tons/ha.	Remarks
2001	1 st	5,000	Rc724	3.0	Traditional methods
	2 nd	5,000	Rc724	7.6	SRI – more than double
2002	1 st	5,000	Rc724	0.6	Drought hit region
	2 nd	2,000	Rc724	11.6	Harvested during Field Day,
		1,500	Rc82	12.5	October 24, 2002, with
		1,500	Rc18	12.0	visitors from around region

2003	1 st	5,000	Rc18	7.2	
	2 nd	5,000	Rc18	7.6	
2004	1 st	4,450	Rc18	1.6	Tungro virus hit most of crop
		550	Rc18	16.8	10% of field resisted attack
2005	1 st	5,000	Rc18	7.308	
	2 nd	5,000	Rc18	6.728	

Noë also had gotten three farmers in Mhlang in Cotobato to try SRI methods in 2004 on 0.6 ha each. Their resulting yields were: 8,065, 9,891, and 9,279 kg per hectare, respectively. In Bagumba, Sultan Kudarat province, four farmers who used SRI methods got 7,371 and 8,300 kg per hectare on larger (1 ha) plots, and 7,751 and 12,081 kg per hectare on smaller plots. “Many farmers are now adopting SRI in Southern Mindanao,” he said.

Noë described the various methods that have been used to disseminate knowledge of SRI: techno-demos, farmer training programs, field days, farmer-to-farmer spread, etc. He said that farmers need initially to be able and willing to devote additional labor and investment (for the weeder) to get started. The constraints seen were: limited access to farm machinery (weeders), asynchronous planting with non-SRI neighboring fields, pest and disease problems, and irrigation water control. His final powerpoint slide read: “Others said ‘Unbelievable, too good to be true.’ But, really it is. As we, ourselves, have proven it.” Noë’s endorsement of SRI methods was as confident as the two preceding presentations had been reserved.

Obet was then asked to give a report on national efforts regarding promotion and mainstreaming of SRI. He described **SRI-Pilipinas** as a “loose consortium” and explained the email and other kinds of communication used to share SRI experience and to make SRI information available to anyone interested. He had brought 15 copies of a DVD training video that he would sell for 50 pesos (\$1) apiece. (This video was produced by ADRA in 2003 for promoting SRI in Eastern Indonesia.) Obet said that anyone is free to copy it as often as they like. The money that he charges goes into making more copies to reach more people. SRI-Pilipinas is looking for funds to make a similar video in the Philippines that can be dubbed in Tagalog and Visayan.

Core NGO supporters of SRI-Pilipinas are PRRM, the Philippine Greens, and BIND (Broader Initiatives for Negros Development) and the farmer association known as PABHINI, he said. All are welcome to join. He gave his cell phone number (0921-250-5520) so anyone can call him to get more information. To join the electronic list-serve for information on SRI, one only needs to send an e-mail to: sri-pilipinas-subscribe@yahoo.org

Obet is maintaining a **national register** of SRI results from anyone who has used SRI methods for one or more seasons. SRI-Pilipinas is also constructing a list of local resource persons to whom potential SRI users can be referred for information or advice, and for possible problem-solving. The range of farm sizes on which SRI has been tried ranges from 50 m² to 7 hectares. The latter trial, by an Agrarian Reform community in Negros, gave an average harvested yield of 7.39 tons per hectare. This is more than double the current national average rice yield, 3.59 tons per hectare (figures from the NAFC meeting).

To date, Obet has information SRI use on a total of 47.7 hectares, with 294 tons of production. This works out to an average SRI yield of 6.16 t/ha, which compares favorably with the national average to date for hybrid rice varieties -- 5.85 t/ha was the figure given at the NAFC meeting, with a highest annual average yield so far being 6.2 t/ha. Obet underscored that SRI-Pilipinas is not claiming that SRI gives *higher* yield than hybrids, as these figures are within the statistical margin of error. But one cannot say, conversely, that hybrid rice is performing better than SRI. Also, such comparisons are only in terms of yield, not farmer income. Given that SRI costs are usually lower than cultivation with hybrid rice, SRI is proving itself to be more advantageous.

Obet raised an interesting question. For use of hybrid rice, the recommended practices include a number of practices that are the same as SRI – young seedlings, single plants per hill, wide spacing. So how much of the yield advantage reported for hybrid rice over inbred rice varieties (grown conventionally with older seedlings, multiple plants per hill, and closer spacing) is really due to the changes made in management practices, rather than to genetic superiority? He noted that the changes recommended for hybrid rice are essentially SRI practices. This should be evaluated, perhaps through thesis research projects, Obet suggested.

Obet said that SRI-Pilipinas is urging the government to support SRI, not *instead* of hybrid rice, but as something good for smaller, poorer farmers, who are not in a position to undertake the added expenditures necessary for growing hybrid rice, purchasing expensive seed as well as chemical fertilizer. Supporting SRI will give the government some backup strategy, not putting all of its ‘eggs’ in the narrow ‘basket’ of hybrid varieties, he said.

He observed that the spread of SRI depends mostly on the curiosity and initiative of individual farmers. Whenever he makes a presentation to 10 farmers, 8 or 9 of them will think of all kinds of reasons why they can’t practice SRI. But, fortunately, 1 or 2 will be quite eager to learn more, even calling him on his cell phone to get more information. If they succeed, their neighbors will begin to take SRI seriously, because they can see it close to home. “Indeed, at first, thinking that the secret of SRI performance is in the crop genes, neighbors may come and steal some of the rice for seed, not yet understanding that SRI is really a matter of changing and improving management.”

There was then an opportunity given by the chair for questions and comments from the group. One farmer lamented the “mindset” which has undermined the rice sector in the Philippines. He noted that the Philippines used to be a rice exporter and trained many rice experts from other Asian countries. “Now they are exporting their rice to the Philippines!” Several comments reflected the strong commitment of many present to organic agriculture as an alternative strategy, and also opposition to the promotion of hybrid rice varieties, to the exclusion of inbred lines. These are issues that are going to continue to be debated in the Philippines, and SRI is entangled in them.

Corie concluded the question-and-comment session by asking how many persons present had tried SRI or are currently using the methods. About one-third raised their hands. And how many are now willing to try it? Another third raised their hands. She said she was pleased to see that the forum had brought new ideas to so many people, who came to this meeting on very short

notice to take advantage of my visiting the Philippines and Mindanao. She said that the Food Sovereignty network will undertake SRI demonstration plots in a number of communities.

Neth Dano in her closing comments noted that in the Philippines, the home of the Green Revolution, “too many farmers have become passive recipients of technology.” Apart from whatever yield benefits there may be with SRI, it is important for trying to change this mindset, encouraging farmers to experiment and to innovate.

With this comment, the forum concluded. The clock was nearing 6 rather than 5, the scheduled adjournment time, so we gathered our things quickly to get on the road with **Edgar Caballeda** of PPDRI, since we had a three-hour drive ahead of us to get to **Kidapawan City**, where we were planning to spend the night. Traveling with us in the rented van were 10 farmer-collaborators working with PPDRI who had come with Edgar from south-central Mindanao for the forum.

March 4: FIELD VISIT TO ON-FARM TRIALS

The next morning, we left the hotel in Kidapawan City at 8 with Edgar and others to visit a farming community where SRI evaluations were underway. We met up with Noë Ysulat’s vehicle en route and learned that they had not reached Kidapawan City until 11 the night before, rather than at 9, because of traffic stoppages that our driver had been able to by-pass.

At 8:30 we reached the barangay (roughly equivalent to a village) of **Katipunan**. A banner announced that the fields we were about to visit were a joint project of PPRDI, the Peace Equity Access for Community Empowerment Foundation, the Center for Genetic Resources of the Netherlands, and the Farmer-Breeders Group of Katipunan. Also joining us was Ronald Cabalquinto who was one of the first Filipinos to start working with SRI while he was still with the Consortium for the Development of Southern Mindanao Cooperatives (CDSMC). Now he works with a large EU-funded rural development project in Mindanao.

Ronald and I had not met before, but we had corresponded several times by email back in 2000 and 2001, when CDSMC tried out SRI. I remember being disappointed that CDSMC’s first-year SRI yield was only 4.95 t/ha -- below the SRI yields that we were used to seeing in Madagascar. However, the farmers working with CDSMC were quite pleased, Ronald had told me, because their usual yields with conventional methods were only about 2 tons per hectare, at most 3 tons, and with SRI they were able to reduce some of their costs of production.

The not-very-encouraging SRI results reported by PPRDI yesterday had come from Katipunan. The SRI plots here did not look bad, but they were not as robust as we usually see with the methods. The panicles were not as many or as large as I would expect, so I asked whether we could pull up a plant to look at its roots. This struck the farmers as an unusual request, but Edgar pulled up and brought over a plant. From inspecting its roots, not very long or deep, and more brown than white, it was evident that the farmers here had not been practicing (or were not able to practice) good water control in their SRI plots.

The tillers where they emerged from the base of the plant were brown or black in color, not solid, healthy green; and many disintegrated when touched. Everyone could see that these tillers, with their relatively small panicles, had degenerated at their base due to flooding and hypoxia. This

made them very vulnerable to lodging if there was any wind or rain stress before harvest. Edgar commented that he now saw how important it is to evaluate the condition of roots. This was not something that PPRDI staff had been paying attention to, he said, but they would in the future.

We walked from the field to the barangay center, a large platform slab with a tin roof overhead. The decorations from a graduation ceremony for an ‘advanced self-defense course’ were still in place. Edgar suggested that we set up plastic chairs in a circle, and the two of us started this, but soon saw that others were setting up the chair in rows to create a typical meeting (or schoolroom) configuration. I asked that we rearrange them so everyone could see everyone else. “It is better to look at faces than at the backs of heads.”

Edgar introduced me saying that we had just made a diagnostic visit to the field. “Now we will find out whether we have passed the test.” I responded that since SRI is still being developed, there are not firm right or wrong answers, so nobody can be graded. We keep looking at results and trying to understand better how they were achieved, whether good or bad. “We are all still learning about SRI.” I said I was coming to learn from their experience and to share ideas, rather than to teach. We had a good hour’s discussion. Since there was no powerpoint projector on hand in the barrio, I could not share with the farmers assembled, the majority of them women, what I had shown at the forum in Davao City. But I did have some hard-copy pictures with me to pass around. Much of the discussion focused on roots and root health and on practices that enhance the life in the soil, which is critical for SRI success.

REGIONAL FORUM ON SRI

We left Katipunan about 10:30 and reached **Midsayap** in North Cotabato province about noon. This is where one of the three ATI centers that Noë Ysulat manages is located. We went to the home of **Ike (Ecclesiastes) Matunog**, who had attended yesterday’s forum, for lunch. Ike is manager for a large Upland Development Project funded by the EU, and he has himself taken up growing SRI rice in a serious way. Before lunch, we visited his fields. The roots on one of his SRI plants that I pulled up, with his permission, looked better than on the plant inspected at Katipunan, but they still were not as robust and vigorous as one like to see. Ike explained that neighbors have not kept their drains well-maintained, so water backs up and he cannot keep the soil in his SRI plots as well-drained as he would like.

Ike was also using ‘biodynamic’ agricultural methods being promoted by the Don Bosco Diocesan Youth Center in the region. This involves biodynamic preparations as well as other organic farming practices. The plants in his biodynamic field had good color, but their tillering and root growth was not very impressive, perhaps because there was more flooding than in his SRI plot. Ike gets enough economic return from his crop to maintain interest in SRI and other organic methods. He showed us half a dozen rotary weeders of different design, some for 25x25 cm spacing and others for 30x30 cm. We should get him the improved conoweeder designed by H. M. Premaratna in Sri Lanka, which operates very efficiently and could make farmers more willing to take up SRI.

After lunch under the huge spreading trees outside Ike’s house, we went to the **ATI Midsayap training center** about 3 kilometers away. About 35 persons had come for the forum, Department of Agriculture staff, farmers, and NGO personnel. My presentation was the main item on the

agenda, leading into an active question-and-comment session. There was much interest in seeing pictures of SRI practices in other countries and in the topic of roots.

The first comment was from **Nelda Sasi**, who described herself as an SRI farmer from M'lang. She has been practicing organic farming since 1985 and took up SRI once informed about it by PRRM. Initially there were some problems with the labor needed for careful transplanting, and then for the weeding. But now the methods have been mastered. She spoke very forcefully and enthusiastically about SRI. She had attended the Davao City forum and said that she was pleased particularly to have learned more about roots, not having paid much attention to them before.

Questions were raised about the best practices for establishing and managing an SRI seedbed. I described the mixture of growing material that Premaratna uses in Sri Lanka: one-third soil, one-third compost, and one-third chicken manure. This supports the seedlings nicely and allows for easy separation of seedlings from one another. Ike said he uses just 1 kg of seed for a seedbed of 20 m², and during transplanting operations he is careful to keep the soil around the roots attached to them so that there is a minimum of stress on the plants.

Ike and his family transplanted their first SRI crop themselves, he said, and they saw good results. But for their next crop, they contracted with laborers to do the work. "These people were in too big a hurry. They were less careful with the plants, and they planted too deep." (We advise transplanting at only 1-2 cm depth, or even just laying seedlings on the surface if they won't float or be blown away.) Ike finds it better to put his organic matter on the field rather than on the seedbed, since seedlings are mostly nourished from their seed.

There was a vigorous discussion about the use of organic vs. inorganic fertilizers. One young farmer was insistent that they should not be considered as equivalent, because "with chemical use, the soil becomes more acidic." Based on his experience, he strongly favors SRI practices, he said. Nelda said that everyone should always have their soil analyzed, to know what nutrients it possesses, and which are in deficit, so they can add any nutrients that are necessary. I cautioned that reliance on soil tests can give wrong impressions because standard soil testing only evaluates the chemical parameters of soil fertility. It tells us little or nothing about the soil's biological status, which is the most important determinant of SRI results.

Edgar suggested that it is possible to combine SRI with 'biodynamic' agricultural practices, because the latter is trying to enhance the biological status of the soil. "Both change the way that we look at soil. Everyone knows that the soil has three aspects: chemical, physical and biological. But the last is the most important." He took issue with anyone who advocates 'chemical-free' agriculture because, he emphasized, "every biological process involves chemicals. Some nutrients come from natural sources, and some from industrial sources, but all are chemicals."

He also reported on PPDRI's experience with SRI seedbed preparation. They have found that plain sand is a very good medium for seedling growth. This practice was developed by one of their farmer-cooperators, Jessie Magsayo (who spoke to the SRI forum on Friday). Edgar said that there is no need to fertilize the seedbed since young seedlings get their nutrients from the

seed sacks which remain attached to their roots for the first 15-20 days, a good point to keep in mind.

After Obet spoke about SRI-Pilipinas and how people can access its information or contribute to its data base, the municipal agriculturalist for Midsayap closed the session with some supportive comments. We drove from Midsayap to get to Noë's home an hour away in Kabacan, where another of his ATI centers is located, on the campus of the University of Southern Mindanao.

EVENING IN KABACAN

At his home, Noë provided refreshments for about 20 persons who had come from the Kabacan area to attend the Midsayap forum. They were interested to see Noë's own SRI field behind his house. This gave me a chance to talk with Nelda Sasi, who had been so articulate about SRI earlier that afternoon. She heads a women farmers' section of the farmers' federation in her home municipality of M'lang. She is herself married and has eight children, but the other members are all single women, widowed, divorced, or separated, who do their own farming. She has been working with them to introduce organic farming methods, now including SRI. They have been able to make significant improvements in household income and security this way.

Nelda's own training was as a health worker, and she is president also of the health workers in her area. She is someone obviously willing to take responsibility and someone to whom others are likely to entrust responsibility. Her own children are following widely varying careers, so they are examples in human terms of the diversification that she promotes in farming systems. Her farm includes a fishpond, mangoes, guava, and various other fruits and many vegetables. SRI has become a kind of productivity anchor for this diversified system.

After the visitors left for their homes, Noë took Obet and me to see his ATI center on the USM campus, where Obet and I were planning to spend the night. I asked Noë if, after his five years of experience with SRI, he would change anything in the basic guidelines or instructions that we present to anyone interested in SRI. We encourage them to make their own adaptations and adjustments in actual practice, of course, but it is important to monitor and reassess the 'starting points' that were developed by Fr. de Laulaniè in Madagascar.

Noë said that in his experience, the basic concepts and advice presented on SRI are correct. However, when I said that we are thinking about making some changes in the water management recommendation – intermittent wetting and drying during the vegetative growth stage, followed by shallow flooding (1-2 cm) after flowering – he agreed that this advice probably should be changed. There is no reason why intermittent water applications should cease after panicle initiation. All that is necessary is to keep the soil moist, meeting the plant's water needs; there is no need to start flooding for the reproductive phase as this makes the soil anaerobic. Changing our recommendation has been advocated by some Indian NGO partners working with SRI.

Noë commented that he has become "infected" with SRI. It is a benign 'disease' that has affected both Obet and myself and many others for some years now. Obet asked why other ATI regional directors in the Philippines have not become as enthusiastic and active on behalf of SRI as he, Noë? Noë said it is because they haven't been willing to try out the methods for themselves yet and to see the results personally. "They find all kinds of reasons to avoid actually trying the

methods, so they can maintain their skepticism and disbelief.” Noë said that he has talked to many large gatherings, such as seed growers or extension personnel. “Most are still able to maintain their indifference, having some kind of mental blockage. But this is gradually changing, especially as farmers are becoming excited about SRI.”

Noë told us how he had recently been visited by three agriculturalists, formerly consultants for IRRI but now retired. They said to him: “You don’t believe all of that stuff written about SRI, do you?” They insisted that only the main tiller and the six primary tillers that derive from it in the early stages of plant growth will become fertile, producing grains. Therefore, they said, SRI claims are spurious. Noë just happened to have a good SRI specimen handy, so he brought it out and showed it to them. This SRI rice plant had 40 tillers, all productive, 5 times more panicles than they had just told him were the maximum possible.

Noë did not know whether this physical demonstration had shaken their conclusion that SRI is a fabrication, but at least they might be more careful about making such assertions in the future. His story reminded me of a comment that the Director-General of WARDA, the West African Rice Development Association, once made to me in an email message, criticizing some of his own WARDA scientists for their opposition to SRI, not wanting even to test it: “Some scientists are not very scientific sometimes.”

When we returned to Noë’s home, we had nice dinner eaten in the open air under the trees and beside his fishponds. As a sideline activity, he is raising African catfish, which are becoming a popular fish in local markets and thus quite profitable. We had some of his homegrown fish for dinner, along with other good food. After spending the night at the ATI guesthouse, we left the next morning at 6 to return to Davao City.

March 5: VISIT TO THE ATENEO DE DAVAO

By 9:30 we were at the Ateneo de Davao, one of the two Jesuit universities on the island of Mindanao. (Two years before, I visited the other one, Xavier University in Cagayan del Oro in the north, when its Sustainable Agriculture Center organized a large island-wide forum on SRI.) We went to see **Fr. Albert (Bert) Alejo**, director of the Center for Mindanao Studies at the university. (He was surprised by my visit because during his graduate studies at SOAS in London he had read my book *Learning from Gal Oya* and had brought it back for his library.)

Fr. Bert is a leading campaigner for human rights in the Philippines and for ending corruption in government. The latter cause is providing some common ground for Christians and Muslims in Mindanao, as indicated by a recent invitation he received to visit the Autonomous Region of Muslim Mindanao (ARMM) to speak on this subject. It is encouraging to see Muslim political leaders inviting a Jesuit priest to help tackle this problem, which affects all Filipinos. Obet had come to talk with Fr. Bert about the NO-CHEATS effort he is launching, but Fr. Bert was also interested to hear about SRI. He asked me to revisit the university some time when he could organize a large gathering to learn more about this methodology.

After lunch in the refectory, we talked with a friend of Fr. Bert, **Ted Suazo**, an agriculturalist who freelances with various sustainable agricultural initiatives in Mindanao. Fr. Bert had phoned him to come by the Center and learn about SRI. Ted’s conclusion from our discussion was that

he should introduce SRI methods in some of the projects that he is involved with. That SRI was developed by a Jesuit priest was not a main consideration, but surely it adds to the attractiveness of SRI here. Obet and I got to the Davao City airport well before flight time that afternoon because we did not want to miss the last flight back to Manila that day, since we had a full and tight schedule for Monday.

Back in Manila that evening I had the great pleasure of getting acquainted with **Shuichi Sato**, leader for a **Nippon Koei** consultant team implementing a large, Japanese-funded irrigation improvement project in eastern Indonesia. Over the past three years, Sato has been evaluating SRI methods, supporting and monitoring more than 1,800 on-farm trials conducted on 1,363 ha. The trials have shown large increases in output with significant water savings. Sato has gained much confidence in SRI and has become an advocate for its use both within Indonesia and within the Nippon Koei, getting SRI tried out as far away as in Senegal. Sato was also invited to the water-saving irrigation workshop being held at IRRI March 7-8. We had arranged to stay at the same hotel so that we could meet beforehand, having had only e-mail communication previously.

March 6: NATIONAL SRI FORUM

The next morning, Sato-san and I joined a group of Filipinos from all over the country who convened at PRRM to get and exchange information on SRI. As participants in this forum introduced themselves, it became clear how broad a cross-section of the population this was: officials, farmers, academics, NGO workers, and persons with varied individual identifications. There were staff from the National Department of Agriculture (DA); the National Irrigation Administration (NIA), and PhilRice, the national rice research institute. Dr. Moroy de la Rosa had come from Leyte State University where during the last two years he has launched an active SRI initiative in the Eastern Visayas. There were farmers and NGO representatives from provinces all over the Philippines: Ilocos, Isabela, Nueva Ecija, Cavite, Pampanga, Cagayan, Aurora, Bohol, Negros, Pangasinan, and Tarlac, among others. (Nobody has come from Mindanao as the previous Friday's forum there provided SRI colleagues there enough opportunity to interact.)

One individual introduced himself as a returned Filipino overseas worker. Other participants included a trustee for the Organic Producers and Traders Organization in Negros Oriental, Bernie Aragoza, and a well-known actress and singer who has set up and heads the Mother Earth Foundation for environmental conservation, Chin-Chin Gutierrez. Also present were Sister Aida, who attended several previous national SRI forums at PPRM, and a former Undersecretary in the Department of Agrarian Reform, Efren Moncupa, now no longer in the government. He introduced himself as a lawyer by training but now, self-deprecatingly, "a failed SRI farmer."

We started with about 30 persons but the number kept growing. Roger Lazaro and Bob Mohammed, consultants with the Southern Philippines Irrigation Support Project funded by ADB, arrived. Roger learned about SRI in 2002 at a seminar in Bangkok and had gotten SRI trials started in the Eastern Visayas and Mindanao subsequently, with the support of Bob, his team leader. They hosted part of my visit to the Philippines in 2003. Tetsuro Miyazato and Chris Morris from the Asian Development Bank also arrived. Miyazato, a friend of Sato's, oversees the SPISP which Roger and Bob are helping to implement. Chris in his self-introduction said that he is overseeing a new project being designed for 300,000 ha in Indonesia, where water shortage

is an acute problem. They are considering including SRI there as a project component to reduce water demand.

My presentation to the group was my usual effort to communicate the core concepts and principles of SRI, based on our growing experience around the world. There was interest in how farmers elsewhere are applying these concepts and principles to other crops like sugar cane and millet. Sato's presentation was also well-received because the conditions he is working under in Eastern Indonesia are very similar to those in much of the Philippines.

Sato noted that in his project area they have not observed any 'disadoption' of SRI once farmers have become acquainted with it and its benefits. This has been an issue in some of the published literature on SRI which Sato thinks is insignificant. The lessons that he presented from his project's experience were:

1. SRI gives higher yield with less cost.
2. Labor requirements are still higher than with previous methods, but the higher returns give farmers a strong incentive to practice SRI.
3. Organic fertilization is "not a must," as they see that a 50% reduction in chemical fertilizers gives good results. (It was not clear how proponents of organic agriculture in the workshop liked this statement. The project has not had confidence that there is enough organic matter available, or that there will be enough farmer acceptance, to rely entirely on organic fertilization. If the favorable rainfall and temperatures in the region are used to produce sufficient biomass on non-arable areas, there should be scope for further increases in yield and productivity.)
4. Water saving is about 40%. (But one needs reliable sources of water to ensure that the smaller amounts of water required with SRI are always available when needed; this is the responsibility in large part of engineers and water managers.)
5. Involvement of local government offices and experts to give technical support and advice is essential for wider spread.

Sato further observed that SRI should initially be introduced only where there is good water control so that farmers do not get disappointed at the start. He suggested introducing SRI first in upstream portions of irrigation command areas since these have more reliable water supply and making water savings there will benefit downstream farmers, contributing to greater equity. He predicted that SRI's greatest acceptance and benefit will be with groundwater irrigation, where the costs of water are highest and control is greatest. Because of water shortages, officials in Eastern Indonesia had tried to halt rice production in the dry season, but with the reduced water requirements of SRI, they are now willing to sanction rice-growing in the dry season. "For the first year and a half," Sato said in closing, "I didn't believe. It was too different from my knowledge and experience. But now I believe."

Miyazato from ADB commented that if SRI rice can be grown certifiably 'organically,' it can get a price premium of 30%, which will add to the profitability of SRI. Bob Mohammed from NIA commented that they are selling SRI rice from NIA trials for a premium price. Roger Lazaro added that the rice grown with organic fertilizer has improved taste and quality. They have done blind taste tests confirming this. He added that this organic rice keeps longer -- and also makes better saké (getting a laugh from Sato and Miyazato).

Chris Morris asked why there seems to be a difference between the attitude of PU, the irrigation agency, and Deptan, the Department of Agriculture, in Indonesia toward SRI. Sato commented, going back to the previous discussion, that organic SRI rice grown in the Bandung area is getting almost double the usual price. He said that problems with Deptan are only at central headquarters in Jakarta. There is good cooperation with agricultural officials and technicians at field level. PU is interested in SRI at the top ministry level. “There are a lot of requests for training. The situation is changing and improving.”

Domingo Porte, a farmer-member of the PABINHI governing board, wearing a T-shirt given him by Cambodians who visited his farm a few years back, commented in Tagalog that there are taste and quality differences between rice grown organically and conventionally. As for hybrid rice and IRRI varieties, “people say they don’t taste very good.” Traditional varieties, on the other hand, “don’t grow very well with chemicals. But if the soils are not very good, we can use organic fertilizers or foliar fertilizers that we can make ourselves.”

Bob Mohammed commented that farmers have now accepted the concepts of integrated pest management (IPM) more easily than SRI, though both are similar in philosophy and a matter of changing practices. “We should remember that IPM has been presented by the DA for many years, and SRI is a new idea to most farmers. It may take still some time for SRI to be accepted.”

Rizal Corales from PhilRice spoke saying that his institute has a lot of experience with evaluating SRI. “From the scientists’ side there is continuous research.” He noted that their results (on-station) have been mixed, and we need to look at the negative side of SRI, e.g., weeding needs. He said they have designed a prototype seeder for direct seeding at wide spacing, and use a leaf color chart (LDD) to assess the need for additional fertilization beyond organic fertilizer. He said they wanted to work together with everyone on SRI because they have limited budget.

A farmer stood to say that he has had very good results with SRI. He said it was a matter of time and learning to adjust to the new practices and to reduce labor requirements. Laborers are used to narrow spacing of plants, and they find wide spacing difficult at first. Especially hired laborers are reluctant to change and need to be given some higher rates for SRI work as they prefer handling bigger seedlings. But this will get better of time, he said.

Moroy from Leyte State University said that they have the same problem in the Eastern Visayas. “There is need to educate.” Wider spacing is more advantageous, but counting out single seedlings is more difficult. “We need to unlearn what we have learned.” Shallow transplanting is necessary, and also good land preparation. “But once the small seedlings get started, they are even stronger.”

There were some discussions about the conditions and frequency for most effective (and easiest) weeding. Sato recommended weeding 2-3 times, up to 2 months after transplanting, by which time the canopy is closed and weeds are suppressed. “The first two years, progress and acceptance will be slow, but then from the third year on, it will be fast.” He showed his final slide: “SRI will contribute to mitigate present and future global issues of Food, Poverty, Water

and Environment.” SRI uptake in Java has been slower than in Eastern Indonesia, he said, but now that farmers have seen SRI resisting a big storm, “now they believe.”

A PhilRice participant commented that with conventional rice-growing practices, soil structure is destroyed by the land preparation methods, as large particles sink and only small ones remain on top. Farmers should put their organic matter on top of the soil, rather than incorporating it deeply, working it in 2-5 cm at most. A farmer responded: “Philippine farmers have destroyed the structure of their soil. We need to recondition the soil.” (Such dialogue between researchers and farmers would probably not occur as casually and easily in many other countries in Asia.)

Lito Tumbalo, president of the Kalikasan-NE farmer organization in Nueva Ecija recounted his experience. He said he started with a small portion in the middle of his 1 ha plot. Some of the weeds he encountered were edible, he noted, so they were no problem. “When I started SRI, because my plot was very near to the road, people thought I was crazy.” (Sato interjected, “Same in Indonesia.”) “After 25 days, people who had called me crazy started taking an interest in the field.” He said that his average number of tillers per plant was 45, and one had 65 tillers. “One SRI colleague reached 85 tillers.”

Regarding labor, he said “It is young hands who are hard-headed.” Older women he found easier to teach, but they are slow. “Twelve-day seedlings are 20 days old by the time they finish the transplanting.” (This prompted a comment about planting seedlings in a succession of small seedbeds over several days, to ensure young age throughout the transplanting phase.)

He noted that SRI methods had been evaluated in Ifugao, where massive and beautiful rice terraces have been maintained for about 2,000 years. (This area has been declared a World Heritage Site by UNESCO for its cultural significance.) Farmers are leaving rice production because it no longer is profitable given high input costs and low rice prices. He said that a farmer’s vegetable terrace was planted with a popular local variety using 12-seedlings with different SRI spacings. The former governor was involved and at the harvest, they got good results.

Obet gave the crop-cut figures, certified by six local government agricultural technicians: 450 grams/m² with standard methods, and 1,450 gram/m² with SRI (4.5 vs. 14.5 t/ha if extrapolated to a large area). The same methods were used for both, at the same time, so any errors in measurement or differences in moisture content of the grain should have been similar, giving SRI yield >3 times higher than conventional production. Obet said that he was disappointed that the SRI plants had only 13-15 tillers per plant, but the municipal agriculturalists were elated, because usually this variety has gives only 5-6 tillers. This was only a single trial, so more work needs to be done to try out SRI methods and evaluate them. But the first results are promising.

After a lunch break, Moroy reported on his experience introducing SRI in Eastern Visayas from a base at Leyte State University in Bay-Bay. After the director and associate director of CIIFAD visited in 2004, he became “infected” by SRI and started working with other LSU faculty and staff, local government units, NGOs, farmer organizations, even Benedictine sisters. Nine farmers started the first year. They did not try to make SRI entirely organic, but they emphasized not burning the rice straw, instead returning it to the field. They are blending SRI with the

farmer-initiated MASIPAG approach and local varieties. One farmer innovation is to orient the row planting in an east-west direction so that there is maximum solar exposure of the plants.

The first thing that farmers notice and like is the reduction in seed requirements. One farmer cut his seed needs from 11 sacks to 3. Some are also bringing in vermiculture to improve soil quality. Last year, they were up to 34 farmers experimenting. These are all good farmers who get much better than average yields using standard methods. The yield figures he reported from 2004 for 6 farmers were 7.84 t/ha for regular methods vs. 9.35 t/ha in the first cropping season and 8.49 t/ha in the second season with SRI, the latter yields coming with less cost of production. He added that they are seeing 'spill-over' adopters, neighbors who learn from farmer-cooperators. He gave yields for 8 of these, 3.81 t/ha with regular methods vs. 6.43 t/ha with SRI, almost twice more yield but with greater increase in profitability.

The labor can be "tedious," Moroy noted, and there is the risk that the small seedlings will be eaten by golden snail (*kuhol*). There can be uncertainty at first about getting a yield because the young transplants look so inadequate. And sufficient organic fertilizer may not be available. These are the inhibiting factors. But on the plus side, farmers see that they can use much less seed, and they get strong, sturdy seedlings that turn into robust plants. There is a 30-60% saving of water, which is important especially for those who pump their water. With bigger tillers, longer panicles and heavier grains, there is more yield.

The SRI plants resist lodging, Moroy said, referring to the pictures from India and Vietnam in my powerpoint presentation. Sheath blight is less, as seen in side-by-side plots. The yield increase is 2 t/ha or more. Cooked SRI rice tastes better. SRI is 'environment-friendly' compared to conventional culture. Cost-saving is substantial. (It sounded almost as if Moroy was reading from a script that I had written based on SRI experience in other countries.)

Next there was a report from the Southern Philippine Irrigation Service Project, led off by the Provincial Irrigation Officer for Negros Occidental, assisted by Roger Lazaro. They are experimenting with SRI methods in upland areas where corn has been the main crop grown and eaten. There is large demand for rice, however, so the ADB project overseer (Miyazato) approved some trials to see if SRI methods could be used in upland sloping areas. The results so far have not been as good as in other areas, but their SRI average has been 3.48 t/ha, which is about the Philippine average (from better soils and conditions for rice), and one yield reached 4.4 t/ha.

One mistake they made, Roger reported, was to remove the topsoil when preparing this 20 ha area for rice production, which should not be repeated elsewhere. The topsoil removed with heavy machinery should be returned. (Getting almost 3.5 t/ha yield on subsoil is actually a big accomplishment.) It was noted that Bong Salazar, previously a Regional Irrigation Manager in Mindanao, had gotten an SRI yield of 8.9 t/ha on one hectare when he first tried SRI methods. He has recently been appointed as an Assistant Administrator of the National Irrigation Administration, being brought to NIA headquarters in Quezon City, so likely he can give some leadership for SRI in that position.

At this point, Efren Mancupa, a former Undersecretary in the Department of Agrarian Reform, told about his first use of SRI. “My experience is not inspiring, but it is challenging.” He described himself a “a lawyer pretending to be a farmer.” He had 1.25 ha which he wanted to convert to organic production. He had used a soil inoculant (50 bags) purchased from Shell, which he did not recommend anyone else buying. His mistake was to take the instructions in an SRI manual too literally, not knowing anything about different kinds of soil and not realizing that his heavy clay soils needed to be managed differently from most others.

The instruction he read in the manual and took very literally was to ‘wait for the soil to crack’ before applying another layer of water. His neighboring farmers were “too respectful” to tell him that he was making a big mistake, because this soil would not crack. So the plants would become too dry. “There was good tillering at first, but then it stopped, and their growth became stunted. Still I didn’t give them any water. My neighbors said I should do so, but I was too hard-headed to listen. Finally I came and consulted people at PRRM, and I applied various fertilizers and organic materials, all by the book. But the soil was not suited for these methods. I got up to 50 tillers per plant in upper areas, but only 20 tillers in lower areas. Anyway, the grain production just wasn’t very good, and my first experience with SRI was a failure. But I will try again, now that I know better what I should do.”

Two organic farmers chided him for putting on too much chemical fertilizer noting that traditional rice varieties do not do well with much fertilizer. Rudy Carteciano from Mindoro commented that organic fertilizer doesn’t feed the plant but rather feeds the soil, which in turn feeds the plant. I elaborated on the problems for crop health that can arise from use or overuse of inorganic fertilizer according to the theory of “trophobiosis” proposed by a French researcher, Francis Chaboussou in his book *Healthy Crops: A New Agricultural Revolution?* (published by Jon Anderson, Charnley, UK, 2004), translated from the original 1985 edition in French.

Chaboussou proposes that most crop losses to insects, bacteria, fungi, even viruses can be attributed to imbalanced or deficient plant nutrition (or impedance of metabolism) due to use of agrochemicals that leads to excesses of amino acids and simple sugars in the plants’ sap and cytoplasm, not quickly and efficiently incorporated into proteins and polysaccharides that are more difficult for pests and disease agents to utilize. I said that this is a very encompassing but still controversial theory that corresponds with SRI experience but that should be tested more extensively and systematically in the Philippines and elsewhere.

Rudy observed that the problems encountered with SRI use derive not from the system itself but from the way it is sometimes managed. The system is very good, he said. He got 17 varieties from other farmers at the October 2004 SRI workshop at UPLB, and with SRI, their average number of tillers was 40. One plant even had 69 productive tillers out of 72 tillers total. But he could not replicate that this past season because there was less sun, and he got fewer tillers. “Based on my experience, I am convinced that SRI is really good.” At this point, Sato and I had to excuse ourselves to travel to Los Baños where we were invited to participate in an international meeting on water-saving methods of rice production for the next two days. The workshop at PRRM went on for some time after we left. Clearly it showed that there is now a very active and vigorous “SRI community” in the Philippines, cutting across all sectors and taking root in all parts of the country.

March 7-8: INTERNATIONAL DIALOGUE ON RICE AND WATER: EXPLORING OPTIONS FOR FOOD SECURITY AND SUSTAINABLE ENVIRONMENTS

Tuesday morning, this meeting began in the main conference room at the International Rice Research Institute (IRRI). As it turned out, most of the IRRI leadership and staff were this week away from Los Baños, so only **Dr. Bas Bouman**, head of IRRI's water management program, was there to serve as our host. The Philippine Rural Reconstruction Movement had also been invited to participate representing the NGO sector in the Philippines, so Gani and Obet were there along with Sato and myself, representing SRI experience as an 'option' for jointly meeting the world's needs of food security and sustainable environment.

The meeting had been initiated by the **World Wide Fund for Nature** (WWF) after an evaluation of SRI that it supported in Andhra Pradesh state of India during 2005, conducted by staff of the state agricultural university (ANGRAU), satisfied the leadership of its Living Waters Programme that SRI could help to mitigate the conflict between expanding demand for irrigation water and the need of aquatic and other ecosystems for sustained freshwater supplies. IRRI agreed to host the meeting and be a co-sponsor along with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) near Hyderabad, India, which hosts the WWF program, and also FAO, PhilRice, and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD).

The welcome was given by PCARRD director **Dr. Patricio S. Faylon**, followed by a keynote address by **Fortunato T. de la Peña**, Undersecretary in the Department of Science and Technology. It was a pleasant surprise to hear him say at the start of his talk that "SRI is now being used in the Philippines," noting that SRI was developed in Madagascar, and thanking me for "bringing it to the Philippines." (There was no opportunity to interject that SRI was actually brought to the Philippines by Justin Rabenandrasana, Secretary of Association Tefy Saina; In June 1998 he attended a national rice seminar, with CIIFAD help, at the invitation of IIRR, the International Institute for Rural Reconstruction, PRRM's parent organization.) De la Peña also discussed the contribution that indigenous knowledge and participatory irrigation management could make to resolving tensions between contemporary rice production and environmental needs. "Our challenge is to reduce the environmental footprint while increasing rice production," he said in conclusion, a challenge that we are certain SRI can help surmount.

After a message of greeting was read from the Director-General of IRRI, Robert Ziegler, who had earlier expected to be able to attend, **Dr. Biksham Gujja**, WWF policy advisor for global water issues and partnerships, who initiated both the SRI evaluation and this meeting, spoke on behalf of his organization. Gujja started by recollecting his early years growing up in an Indian village, where the introduction of IR8 in the 1960s had been a great boon to farmers and consumers alike. Now, he observed, "We face a new challenge, of a lack of water needed to continue expanding food production as before." In his village and in the world, he said, water shortages are becoming an ever-starker reality. "The scientific community needs to move boldly and innovatively to meet this problem head-on. How can we produce more food to meet the Millennium Development goals without further degrading the environment?"

There are a number of relatively simple methods for doing this that are not receiving the attention that they should from the scientific community, Gujja observed. He mentioned SRI, which he said “seems to be giving extremely promising results; farmers love it; politicians are promoting it.” He said that “We should look at farm-based methods to produce more rice with less water. SRI is not the only or last word, but WWF experience with it is positive.... Can we set and reach a goal of increasing water efficiency in rice production by enough to reduce water use in this sector by 20%? ... What are the appropriate combinations of agronomic, infrastructure, policy and institutional measures to make such a change possible? One needs institutional support for SRI methods and back-up.... Are we willing to take risks, maybe even reputational risks, to study these new systems? Not just SRI, but also other innovations?”

Gujja observed further that “The present agricultural research and production systems worked well in the 60s, 70s and 80s. But new challenges have been emerging since the 90s. WWF is primarily interested in these matters because of its commitment to conserving biodiversity. However, it is trying to contribute also to the larger picture, accepting the Millennium Development Goals.” He noted that nationwide trials have been done on SRI in India by the Indian Council for Agricultural Research, exploring this methodology in serious scientific detail. “Water crises are coming, and conflicts are emerging that can offset the progress made to date in improving food security.”

This statement was followed by a message from the Director-General of ICRISAT, William Dar, whom Gujja reminded everyone had previously served as acting Secretary of Agriculture in the Philippines and also as executive director of PCARRD. Dar noted the connection between drought management and food security, and that water supply and use is becoming a major challenge for rainfed agriculture. He said that ICRISAT is studying the impacts of SRI methods on soil biology. A mix of investments will be needed to solve the global water challenge. ICRISAT supports a partnership approach, and others can count on ICRISAT’s complete support for collaborative efforts to address reducing water constraints and improving water productivity.

When the session resumed after group picture-taking and refreshments, **Dr. Bas Bouman**, IRRI, led off with a comprehensive assessment of the relationship between water and rice. Rice feeds 3 billion people, 90% of them in Asia. It requires 2-3 times as much water per ton of production as wheat and maize, being the world’s largest consumer of freshwater supplies, between 17 and 28% according to different estimates.

Environmental impacts of irrigated rice production include production of the greenhouse gas methane (CH₄) -- 3-6% of global emissions (not 20% as some previous reports estimated). It contributes volatilized ammonia that contributes to acid rain and nitrogen deposition. There is often outflow of agrochemicals from irrigation water, and it affects ecosystems by raising the groundwater table. On the other hand, it does not contribute nitrous oxide, another greenhouse gas, which is more pernicious than methane, molecule for molecule. There is little nitrate leaching into the groundwater, and herbicide and pesticide contamination is low (little of the former is needed and most of the latter degrades rapidly). It can efficiently leach salts from the soil and, functioning as a wetland, it removes excess N and P from water flows. On balance, environmental concerns for irrigated rice may turn on there being too little water rather than too much.

Bouman raised the question whether downstream reuse of irrigation water flowing into drainage canals is not such that water savings at farm level really amount to savings at a system level. He discussed SRI as one of the options for water-saving rice production, noting that the aerobic production of rice can contribute to some increase in pests and pathogens (root aphids, nematodes, root fungus) over time, acknowledging that a dryer environment also has some countervailing factors inhibiting pests and disease. The balance between advantages and disadvantages needs to be weighed carefully, and over time because there can be problems (or benefits) emerging after some number of years.

Dr. Thierry Facon, senior water management officer for FAO, based in Bangkok, talked about infrastructure needs; followed by **Dr. Claudia Ringler** from the International Food Policy Research Institute in Washington, DC discussing economic incentives, and **Dr. Philip Riddell**, FAO and WWF consultant on water policy and management, speaking on institutional opportunities. Biksham Gujja then finished the morning session with a technical presentation on environmental considerations relating to the rice-water nexus.

WWF, Gujja said, wants to build a future in which humans are in harmony with nature, where we can stop the continuing degradation of natural resources and ecosystems. WWF has 5 million members worldwide, with offices in 56 countries, supporting activity in >100 countries. The concerns cover freshwater systems, forests, species preservation, toxics in the environment, and climate change. The problems for water can be summarized, as too much, too little, and too dirty. Since 1970, the number of freshwater species of all kinds is thought to have fallen by 40%.

The dialogue was intended to advance our knowledge and practice for helping the poor get enough food without damaging the environment. Gujja's presentation proceeded to focus on SRI. This system has appeared as one of the ways to help farmers grow more rice better, cheaper, and faster, he said. It should be able to help restore traditional water systems, reducing the 'thirstiness' of agriculture and reducing conflicts among people and sectors. In Andhra Pradesh state of India, rice consumes >85% of the water allocated for irrigation. Yet there have been growing water shortages in the state in recent years.

Seeing an opportunity to address this problem, WWF supported an evaluation of SRI use in 11 districts, on 212 farms with SRI production on >0.4 ha (>1 acre). Billions of rupees are being allocated presently to India. The huge Polavaram irrigation project in Andhra Pradesh if constructed will submerge 250 villages, many of them tribal communities, submerging an area almost as big as the command area to be served. If irrigation water could be used more efficiently for growing rice crops, both the financial and human costs of expanded irrigation systems could be saved, with less environmental impact.

By making water more productive and by reducing the requirements for seed and agrochemical inputs, SRI can enhance soil health and give higher yields. Gujja talked about the effects on root growth, on rhizosphere and soil ecology, and on soil fertility, noting ICRISAT research on these concerns. The WWF evaluation had quantified water saving as averaging 24.5% while yield increases averaged 21.3%. This represents a 63.4% increase in water productivity (rice produced per unit of water).

The main limitations that he saw were psychological constraints on the part of farmers, social acceptance, lack of social support, and water management. “SRI has great potential. If there is an appropriate support system, farmers will adapt it well. Further research is, however, needed to standardize the methods.” (He must have meant something other than trying to make SRI practice the same everywhere, since SRI is effectively diversifying to perform best under many different conditions.) Also, studies should be done quantifying the reduction in water use, at system as well as field level. “Farmers and politicians are ready for change. However, scientists are lagging.”

Donors are committed to the Millennium Development Goals. We need to increase investment in such methods. Gujja suggested endorsing a global target of 20% reduction in water used in rice cultivation. This should be attainable, if there appropriate agronomic, infrastructural, economic and institutional measures are taken on a large enough scale.

When Gujja finished, Bouman suggested that participants read an article on SRI by McDonald et al. published in *Field Crops Research* (2006) that he had included in their conference packets. His characterization of this article as “a very good, very objective presentation on SRI” elicited a quick response from me, since I knew how unrepresentative was the data base that these authors had assembled for their analysis in the article. (I had myself provided them with most of the data they used and knew also how much other available data they had ignored.) I commented that the article, though written by Cornell colleagues, was neither very good nor objective. I had (the night before) prepared a 2-page summary on the shortcomings of the article’s data base and analysis, which I suggested participants read before deciding what conclusions to draw from it. [This document was reproduced and distributed during the lunch break, and it is attached to this report as an appendix.]

K. V. Rao, an Indian farmer who is part of a farming group with which WWF is working and who was invited to the meeting to offer a user’s perspective, asked to speak. He was one of the first farmers to use SRI methods in Andhra Pradesh, and as he had served as president of the State Federation of Water Users’ Associations, he was accustomed to speaking in large forums. He started by describing the worsening water scarcity in the Krishna Delta where he lives, one of the largest rice-growing areas of India (1.3 million ha). He said that farmers have already learned that they can reduce their water applications by 30% without loss of yield, and that alternate wetting and drying give better results than continuous flooding.

In March 2003, he received a book on water-saving rice production from Bas Bouman of IRRI. In those proceedings from an April 2002 conference held here at Los Baños was an article on SRI by myself and our Madagascar colleague Prof. Robert Randriamiharisoa which he read and appreciated. At first the university and extension service in Andhra Pradesh would not give support, but he started recruiting farmers, and more than 200 came forward. They tried SRI on 4 acres of land. They saw more tillering and no lodging. The only problem was to do the weeding and for that they needed appropriate weeding tools. There was a problem with transplanting in square pattern, but for that they developed a roller-marker. Now they are getting fantastic rice plants with SRI methods. “Huge number of tillers, one plant with 150 tillers, and all are effective and all are the same size.”

After lunch, **Dr. Greg Fanslow**, IRRI environmental scientist, began by discussing IRRI's environmental agenda, starting with an acknowledgement that the Green Revolution had had a number of undesirable, negative impacts on the environment. "Chickens have been coming home to roost," he said, so IRRI and the rest of the CGIAR system are pursuing what Gordon Conway has called "the doubly green revolution."

As an example, Fanslow described the very different strategy that IRRI has pursued in recent years on the problem of rat control, moving away from chemical control toward integrated pest management. At one time, IRRI had 162 staff involved in rat control; today there are only 5. At the peak of aggressive measures, the budget for rat control was \$1 million; today it is \$12,000, as adjustments have been made in the timing of crops to minimize pest problems, and trap crops are used to take pest pressure off the crops that most need protection. IRRI's recommendations for chemical pest control have been dramatically changing over the last 10-15 years, reducing applications and seeking solutions more in the management realm than by relying simply on more 'inputs.'

Engineer **Benny Mejia** from the National Irrigation Administration (NIA) spoke on the status of irrigation in the Philippines, focusing mostly on the introduction and support of participatory irrigation management (my previous focus of professional work, before being 'hijacked' by SRI). He did comment that NIA is interested in SRI and is promoting its spread because "it saves water, and water is becoming a scarce resource."

Next, **PhilRice's** associate director, **Dr. Rolando Cruz**, spoke about water-saving in irrigated lowland rice in the Philippines. He also observed that water for irrigation is getting scarce and expensive and is threatened by pollution. Water-saving can be achieved without reducing yield. He compared alternate wetting and drying (AWD) with intermittent irrigation and controlled irrigation, saying that research has been done on these options since 1959, and the first article in the literature on this goes back to 1929. He said that PhilRice's studies have included SRI. But their on-station results have not shown SRI to be the most effective option. It has had, for them, higher costs of production and lower yields than other alternatives.

When Cruz was finished, **Dr. Kishan Rao** from the Andhra Pradesh NGO, Watershed Support Services and Activities Network (WASSAN), questioned the PhilRice evaluation of SRI, asking how they could have used 10 kg of seed, as Cruz reported? For 30x30 cm spacing which was also reported, they would have needed only 110,000 seeds, about 2.5 kg. What did they do with the rest of the seeds or seedlings? Or did they not plant with spacing as reported? Cruz was not sure how to resolve this disparity in his numbers, not having done the trials himself.

Gujja suggested, to avoid getting bogged down in technical details, that we agree there is need for more systematic research of the kind reported for evaluating SRI. I amended this agreeable statement by suggesting that SRI evaluations are best done on farmers' fields. On experiment stations, continuous and intensive rice monocropping can reduce the diversity of soil biota; with no rotation of crops, there is always the same root exudation in the rhizosphere; soil that has been continuously hypoxic will have mostly anaerobic soil organisms; and heavy use of fertilizers and

agrochemicals can have adverse effects on these populations. Thus we have usually seen lower SRI yields in on-station trials than on farmers' fields, the reverse of the typical situation.

Gani Serrano from PRRM then made a presentation from a 'community perspective.' He and Bas Bouman had become good friends from serving on some consultative committee together, so this led to an invitation to him to contribute to this international forum. Gani spent some time on the implications of regarding water as a commodity or as a right and reviewed some innovations that PRRM has been working with – alongside SRI -- diversified integrated farming systems, low external-input sustainable agriculture, and community-based coastal natural resource management. There were enough other inputs being made on SRI to the dialogue that PRRM did not need to be out front on this.

After refreshments, **Dr. Sura Subbiah**, acting director of the Indian Council for Agricultural Research's Directorate of Rice Research (DRR) in Hyderabad, led off the open forum for case studies, giving a paper on DRR's evaluation of SRI, starting in kharif season 2004. Comparison trials were conducted at 18 locations across India, looking at (1) normal transplanting [NT] vs. (2) SRI, (3) a set of practices known as Integrated Crop Management [ICM] which incorporates many elements of SRI but that uses more chemical fertilizer than recommended with SRI, and (4) direct seeding with a drum seeder. Three genotypes were used in all the trials, a high-yielding variety (Krishnahamsa), a hybrid (KRH-2), and a local variety as a control. In 11 locations, SRI gave significantly higher yield than NT, and at 3 locations better than ICM. Conversely, ICM yielded better than SRI is only 2 locations. (I did not again state my reservation that these were all results from on-station trials rather than from trials on farmers' fields.)

The next year, similar trials were conducted at 21 locations across the country. At 10 locations, SRI gave significantly higher yield than NT, and at 3 locations, better than ICM. At 7 locations SRI and ICM were comparable, and at no location did ICM yield significantly higher than SRI. It was observed in Dr. Subbiah's presentation that SRI may prove valuable in situations where transplanting is late due to delayed water availability.

Earlier on-station SRI trials done at the DRR center in Hyderabad in rabi season 2003 were reported: mean SRI grain yield was 16.6% higher across seven genotypes; 2 hybrid varieties gave 48% higher yields; 4 improved-variety yields with SRI were 5-17%; but the aromatic basmati rice variety used yielded 35% lower under SRI. (This is contrary to our experience with basmati rice grown in Sri Lanka, where SRI methods are giving 50-100% higher yield; this underscores the importance of soil characteristics, we think particularly in terms of soil biota.)

The conclusion that Dr. Subbiah presented was that: "Based on data collected from two seasons, SRI appears to be more promising in terms of grain yield, although gains observed were genotype- and location-specific. Further studies are required to confirm these results." The research issues identified were: (a) preferred plant type characteristics for SRI practice, (b) delineation of areas/zones best suited for SRI adoption based on soil type, (c) quantification of water saving with SRI, and (d) the roles of soil microbial populations in yield enhancement and sustainance. He closed with a quote from Pandit Nehru: Everything can stop but not Agriculture.

My presentation with an overview of SRI experience around the world was greatly condensed, partly because I wanted enough time for Shuichi Sato's report from Indonesia. Both were similar to the presentations at the Monday forum at PRRM. Sato spoke about how Japanese scientists had worked with young seedlings during the 1980s, and they established very clearly the physiological superiority of transplanting at 7-10 days of seedling age. He showed everyone a large book published in 1991 by a respected Japanese rice scientist reporting all this work, unfortunately for us, in Japanese. It should erase any doubt about why young seedlings are better, Sato said.

Sato also talked about how difficult it is at first to get farmers to use young seedlings. One of the pioneer farmers came to him, crying and lamenting that "people are saying that I am crazy." But the uptake of SRI is now proceeding very well in Eastern Indonesia with project encouragement. From 1.6 hectares under SRI in 2002, the area expanded to 15.3, 364.5, and 981.5 hectares over the next three years, and this year, they expect to have more than 4,000 hectares under SRI.

The first question to Sato was, can SRI be adapted to the wet season when there is flooding of fields from the monsoon? He said that in Indonesia, they have developed simple ways of putting in drainage channels within paddy fields, and even having raised beds, so that farmers in the middle of a field-to-field irrigation system can control water levels and use SRI methods successfully.

The next question was: how to help governments implement water-saving methodologies? He said that there is no significant extra cost to introducing SRI, but staff need to make an extra effort at first to get the practices tried out and demonstrated. Farmer-to-farmer expansion sets in from the third year, in his experience. Having effective water-user associations is beneficial for adoption of these methods. Billy Mejia from NIA said that water-saving methods are very welcome among farmers in the Philippines, and not just SRI. Sato suggested that water-saving is important among farmers not just to reduce the volume of supply used but to achieve more equity within irrigation systems, so that more water can be gotten downstream to tail-end water users.

Someone asked: who should be studying the mechanisms accounting for SRI plant performance? Biksham Gujja commented that this question was asked in Parliament, why are Indian scientists not studying SRI? Sura Subbiah pointed out that his Directorate had begun evaluations in 2003. Someone else asked: how can we come to grips with the high variability of SRI results? I said this was perhaps the best question, because those working most extensively with SRI are most aware of this fact of variability. This is associated, we think, with the very biological nature of the processes promoting SRI effects, with highly varying responses of soil biota to SRI practices, because of intervening soil, water and other conditions but also because of the initial biotic endowment. Most rice research has ignored the plant roots and has dwelt on physical and chemical parameters in the soil, neglecting the equally or more important factor of life in the soil. But SRI should not be regarded as "a technology that fits everywhere." There should always be initial trials and adaptive trials to see how far and in what ways the new ideas will be fruitful.

The discussion turned to what role(s) if any IRRI or other CGIAR centers should have in work on SRI. Claudia Ringler from IFPRI volunteered that if the advantages of SRI are becoming

evident empirically, and IRRI's job is not to do basic research, and SRI is getting disseminated, "what's the problem?" From an IFPRI perspective, the interesting questions would not concern SRI agronomically but rather what effective, if any, subsidies might have on adoption, for example, or why there is a difference between Asian and African uptake of the new technology.

The priorities of the CGIAR system apparently do not lead its centers to work on these questions, though it was noted that IRRI and ICRISAT had joined with WWF, FAO, PCARRD and PhilRice in sponsoring this workshop. Biksham Gujja observed that civil society and farmers would like to see IRRI doing research on SRI, to help establish a solid scientific understanding of its mechanisms and effects and to help optimize its performance. He noted that there is no consensus among scientists about SRI, and this is a question that has been hanging on for maybe 10 years now, and it is not going away. He suggested that perhaps a multi-agency panel could be established that would examine all the evidence and seek to formulate some consensus. It should not be limited to SRI but should examine all promising innovations in water-saving technology.

Sato suggested that there is need to address the question of incentives for water-saving adoption. SRI in his experience strengthens water user associations and cooperation among farmers (something reported also by our NGO partner in Cambodia, CEDAC). Vicente Vicmundo, NIA project manager in Tarlac, commented that there are many forms of incentive. If water saving can be implemented, maybe the command area can be expanded by 20-40% and that many more farmers, not now in the project, can get irrigation access. Or saving water can reduce pressure on the irrigation system managers who are their wits' end to meet all demands when water is scarce. Or the economic life of pump systems can be extended, or operation and maintenance (O&M) costs can be reduced, saving farmers some of their irrigation service fees...

Phil Riddell said that in his mind, the pivotal question is "whether agroecological approaches can feed the huge populations of Asia... or must we stick with industrial approaches?" I responded that the book which I have just finished editing, with assistance from co-editors including Pedro Sanchez, Jules Pretty and others, on *Biological Approaches to Sustainable Soil Systems* (CRC Press, 2006) with 20 case studies from around the world gives extensive evidence for answering that question in the affirmative.

Sura Subbiah said that for this dialogue to be fruitful "for the sake of posterity," we should assemble the proceedings and circulate them to FAO, ADB and various governments, so that they can see the urgency of the situation but also the hopeful opportunities of innovation. The alternatives proposed should be multiple, not just one, but we need to get moving. He noted that "civilizations depend on proper management of water, soil, etc.," reminding everyone of the fate of Mohenjodaro in the Indus River valley when it could no longer sustain its agriculture. With that 'big picture' view, the first day's session concluded.

The next morning, after some plenary discussion, participants divided into four smaller groups for intense group work, facilitated by Phil Riddell. The focus was on what three things can most fruitfully be done to promote water-saving in rice in the next three years? I will not try to summarize the different discussions, which will be reported in proceedings. In the afternoon, a process was agreed on for drafting a statement that would come from the group as a whole, to be presented to the 21st International Rice Commission (IRC), scheduled to meet in Chiclayo, Peru

on May 3-5. (I was already planning to attend, having been invited to attend as an observer by FAO which convenes the commission.)

Biksham Gujja's suggestion for establishing an international expert commission to review various water-saving technologies and approaches, including SRI, will be one of the recommendations presented to the IRC. There was widespread agreement that elevating water-saving in the rice sector as an international concern is warranted. Biksham's proposal that a 20% reduction is possible and desirable makes a lot of sense. But this will require some concerted effort from many institutions and disciplines, which hopefully this meeting will have launched.

That evening, there was an informal discussion among participants from India and myself on possible next steps to move SRI work forward in that country. Dr. Subbiah invited me to attend the all-India rice research conference scheduled to meet in Hyderabad mid-April, to make a short presentation on SRI, but that will not be possible given my schedule. He said that he would try to get a panel or some presentation on SRI on the program of the Second International Rice Conference planned to convene in New Delhi in early October.

Dr. Gujja was interested in having WWF work with DRR to put together a publication that summarizes SRI research and results across India, to be available by October for the International Rice Conference in New Delhi. It was agreed that this would be an important contribution to further understanding and use of SRI opportunities, and WWF will take the lead on this. WASSAN will continue developing effective communication and cooperation among NGOs and with government agencies and farmer organizations. K. V. Rao will encourage initiatives within the farming community to get government, scientific and other support for SRI utilization given the growing urgency of coping with diminishing water supplies and increasing uncertainty.

Whether much will come from the international-level initiatives remains to be seen. Many such efforts are made and not many result in much impact on the ground. But strengthening of cooperation among partners in India who have capacity to work at the grassroots could be one of the most specific and sustainable outcomes from the workshop. Our colleague Shuichi Sato had had to leave that afternoon for some Nippon Koei discussions in Manila, so he could not participate in the evening discussion. Obet was still there, and we left together early next morning to return to the Metro Manila area ourselves.

March 9: DEPARTMENT OF AGRICULTURE, AND SUSTAINABLE AGRICULTURE NETWORK OF NSSA/CBCP

We had an appointment to meet with the Undersecretary of Agriculture Segfredo Serrano at 9 this morning to discuss further government support for SRI. We arrived at the Department of Agriculture headquarters in Quezon City just on time and were joined by Gani Serrano (no relation) from PRRM. En route to the Undersecretary's office, we ran into DA Undersecretary for Finance **Edmund Sana**, who was leaving for a budget hearing. He reminded us that he had attended the field day (in 2002) when NIA's director for the Caraga Region in Mindanao, Bong Salazar, did a public crop-cutting of his first SRI crop. This gave an impressive yield of 8.9 t/ha, using entirely organic methods. (Salazar operates a chicken farm that produces large supplies of organic matter.) We discussed how the governor of Bohol Province, who also serves as president

of the Philippine League of Provinces, is now promoting SRI as part of his effort to move that province's agriculture sector toward fully organic production methods.

Undersecretary Serrasno, it turned out, had been called to an urgent meeting that had come up, so we could not meet with him. However, the visit turned out to be very productive because the two senior DA officials who have most responsibility for rice policy and strategy in the country, **Frisco Malabanan** and **Jesse Benamira**, were able to meet with us instead. They had been at the NAFC cereals subcommittee meeting the previous Friday and had heard my presentation on SRI, so no 'preliminaries' were needed and we could get right into useful discussion. Jesse's main responsibility is currently for the GMA-corn program, but he still oversees the Philippines' national IPM program, which focuses primarily on the rice sector, so he has a key role for SRI.

We discussed many aspects of SRI and of the rice and agricultural sectors more generally. While there was not agreement on every matter, but was considerable meeting of minds. Jesse said that the national IPM program plans to introduce SRI into its Farmer Field School in one of the provinces in the next season, developing materials and methodologies that can support wider SRI introduction elsewhere. Frisco expressed concern that the 800,000 peso grant made by the DA to PRRM and partners to initiate SRI training programs all across the country is too little for this large task. Obet and Gani agreed and said that they consider this as just enough to make a start, establishing collaborative linkages with local government units, NGOs and farmer associations. More funding will be needed and requested. That Frisco and Jesse were willing to spend two hours in this discussion indicated that they are taking SRI very seriously and are interested in cooperation.

After that meeting was over, we drove with Obet's wife Flora to Tagaytay, a beautiful city overlooking a large lake in the center of a dormant volcano two hours outside of Manila. The **Sustainable Agriculture Network**, which is supported by the National Secretariat for Social Action of the Catholic Bishops' Conference of the Philippines (NASSA/CBCP), was convening its General Assembly at Tagaytay. About 70 persons were attending from all over the country. The General Assembly meets once a year to exchange ideas and experiences that can make the agricultural sector more sustainably productive and self-sufficient. Obet had spoken to this group previously about SRI, so there was considerable interest, and some attending had already practiced SRI themselves. This was a very good group with which to share knowledge about SRI and the broader issues of agroecological development.

March 10: CONCLUSION OF VISIT: Friday morning I had a 6:50 am departure from Manila to the U.S. There were two hours after checking in that gave me time to begin writing up this report. As usual, my colleague Obet had put together a very full and productive program to complement the international 'dialogue' at IRRI on water-saving rice production systems. This was the fifth year in a row that I had visited the Philippines in March or April and had been able to meet with a variety of SRI partners, starting with PRRM, the Philippine Greens, UPLB colleagues, and the farmer organization PABINHI. The network was now many times larger, with more NGO, university and farmer colleagues involved. The biggest change from 2005 was that now the connections with government agencies are much clearer and stronger.

SRI has been a civil-society innovation from the start. While this put off some persons in the government and research sectors, it was something attractive to others in those sectors who began cooperating with NGO personnel and farmers in evaluating and then disseminating SRI. What were lingering reservations and doubts seem to be receding. There is agreement on all sides that SRI methods will not be ideal or even feasible everywhere. There need to be empirical tests and demonstrations for every new location, and more attention should be paid to assessing systematically the interactions of these methods with differences in soil conditions and in genotype (varieties).

In the Philippines there is considerable politicization and controversy in the agriculture sector, particularly for rice, the most important and central crop, regarding the role of external inputs – the use of chemical fertilizer, agrochemical crop protection, and (eliciting most debate) ‘modern’ seeds, whether hybrid varieties or transgenic (genetically-modified, GM) cultivars. For many Filipinos, consumers as well as producers, real passion gets aroused over issues of ‘organic’ food production. After decades of agrochemical promotion, there are well-established interests supporting use of external inputs, and many farmers are quite partisan in their favor. But others are even more convinced in opposition. Vehement resistance to GM agriculture was probably greater only in India, a much larger country than the Philippines.

In the next few years, we can expect that SRI will experience some buffeting from partisans on these issues, wanting to align it with one position or its opposite. Obet articulates a very thoughtful and well-justified position on these issues, consonant with the stance that we have taken elsewhere with regard to these controversies. These represent different strategies along separable continua: reliance primarily on inorganic/chemical fertilizer vs. some combination of organic and inorganic fertilization vs. completely organic production methods; and the use of any and all improved cultivars (inbreds, hybrids and GMOs) vs. rejection of GMOs but acceptance of hybrids and inbreds vs. rejection of GMOs and hybrids but acceptance of inbred varieties vs. rejection of all ‘improved’ varieties in favor of only indigenous cultivars.

SRI will get drawn into these debates because although higher yields can be obtained by using chemical fertilizer with its methods, the highest yields come with organic inputs. This is not in much dispute, but the issue gets muddled by pragmatic considerations of whether there is enough supply of biomass available to adopt a wholly or mostly ‘organic’ strategy of production. This is a separate and important issue, further complicated by the fact that nobody knows what would be the long-term situation for producing more biomass (at low opportunity cost) to move toward more organic fertilization if significant effort and funding were invested in finding ways to produce, process and apply more organic matter. Studies should also be done on the impacts of using inorganic fertilization on soil biota, and the net effects of this, some nutrient benefits are probably lost with the addition of large supplies of inorganic nutrients, many of which will not be efficiently utilized anyway. They could have suppressive effects on soil communities, but this interaction has not been investigated systematically.

Since SRI gives better yields, at lower cost, with both improved and indigenous varieties, it can be aligned with either side on this controversy. The highest SRI yields with SRI methods, all those >15 t/ha, have been with improved varieties or hybrids. But traditional varieties can produce up to 10 t/ha or even more with SRI methods, so their use can be more profitable than

growing improved varieties since market prices are higher for ‘unimproved’ ones. Farmers can make their own decisions. However, it is true that SRI methods can achieve much higher outputs from existing genomes, it can be argued that incurring the costs and risks of GM has become less justifiable. Either way, at least in the Philippines, SRI will be enmeshed in these controversies for some years to come. Our best response is to keep on generating and sharing as much systematic and objective data as possible on SRI performance – under various growing conditions and with various cultivars – so that farmers will have as much reliable and complete information as can be generated with which to make their own choices.

ANNEX: Why McDonald et al., “Does the system of rice intensification outperform best management? A synopsis of the empirical record” (*Field Crops Research*, 96, 2006) is a discredit to the peer-review process – Norman Uphoff, CIIFAD

This can hardly be considered “a synopsis of the empirical record” given the selectivity with which their data base was constructed and then analyzed. Indeed, it appears that *half or more of the data sets used in the article* did not meet the authors’ own stated criteria for inclusion in the study and thus should have been *excluded*.

- Even those criteria, not rigorously applied, required that *only 3 of the 6 recommended SRI practices* be used for a trial to be considered as ‘SRI.’ Since SRI specifies that mostly aerobic soil conditions be maintained for the sake of vigorous root growth and abundant aerobic soil biota, this means that most of the trial results considered did not really assess SRI. At least one-quarter of the trials, for example, did not undertake water control as recommended.
- There were no consistent criteria used for what constituted ‘best management practices.’ Indeed, 1/4 of the ‘BMP’ yield results considered were *below the world average rice yield*, and as low as 1.1 t/ha. The criterion for including these data seems to have been that the SRI yield reported was *even lower*, usually because aerobic soil conditions were not maintained.
- Almost half of the data sets included in the data base were from the four countries that had *the poorest SRI performance* as reported at a 2002 international conference assessing SRI, i.e., Bangladesh, Laos, Nepal and Thailand. No data from other countries from which excellent SRI results were reported at the Sanya conference were included in the data base. The authors say that data from these better-performing countries that met their criteria for inclusion were not available (pers. comm.); however, if they had followed those criteria consistently, they would have excluded over half of data sets they selected for their analysis.
- All the data sets from **Madagascar**, which did meet the authors’ criteria for inclusion and that documented superior SRI results, were *arbitrarily excluded* from the comparative analysis.
- The data from **Laos** (10% of the data base) were *rejected by the groups that generated them* saying SRI methods had not been correctly applied, according to email from Karl Goepfert, IRRI/Laos (May 23, 2003). Indeed, one of the authors when reviewing the table from which the Laos data were drawn (having forgotten they had included the Laos data sets negative for SRI and excluded the favorable ones) wrote to N. Uphoff (email, 23 May 2005): Laos SRI trials -- No description of control plot when used -- several didn't have check plots. Several of the check plots did better than SRI, and the one plot that did better for SRI did weeding but the check didn't. Hardly data we can use for comparing SRI and BMP.
- The data from **Bangladesh** included the one evaluation funded by IRRI/Bangladesh that had negative findings (N=20) but excluded the five IRRI-funded studies that had positive results for SRI (N=1093). So *the article considered <2% of the on-farm trials in lieu of >98%*. It is evident that these latter results, reported to IRRI/Bangladesh, were available to the authors because they cite the report (Hussain et al., 2004) in their references.
- The data from **Nepal** are contradicted by larger and better available data sets (replicated trials in 25 locations over 2 seasons) made available to the authors. These showed average yield for farmers’ practice 4.29 t/ha; for improved practices (fertilizer applications, standard water and plant management) 6.01 t/ha; and for SRI 8.28 t/ha (NEDECO, 2002, 2003). 2002 data from the National Wheat Research Programme at Bhairawa, unfavorable for SRI, were included, but not the NWRP’s next-year 2003 trials which showed a 33% yield advantage for SRI.

- The data used from **China** were taken out of context and ignored the fact that dozens of Chinese rice researchers who have been evaluating SRI for up to 5 years, including Prof. Yuan Longping, developer of hybrid rice, have reached a conclusion *opposite* to the authors’.
- The Chinese trials reported in Sheehy et al. (2004) and used by McDonald et al. (2006) did not represent recommended use of SRI practices, e.g., there was no active soil aeration, and heavy doses of N fertilizer were used (180-240 kg/ha). These applications were so heavy that the Hunan SRI trials unprecedentedly lodged, spuriously reducing SRI yield in those trials.
 - The Sheehy et al. article said that all trials received recommended fertilizer applications. However, there are no recommendations for such heavy N application with SRI. If the Hunan trials had not been overdosed with N, the SRI results would have been superior.
 - Even with the misapplication of SRI methods, the plots called SRI had *higher* average yield than did the BMP plots. The difference was not statistically significant, but the reported ‘SRI’ yields were higher; however, the article gives the opposite impression.
- The most serious problem with the article’s data base was that it did not include data sets from leading research institutions in China and India that have directly and systematically tested the authors’ hypothesis: do SRI methods outperform ‘best management practices’? With their truncated data set, selectively assembled, and with the exclusion of Madagascar data that showed a SRI yield advantage, McDonald et al. concluded in their article that *BMP has a yield advantage of 11% over SRI*.
- Data from the China National Rice Research Institute (CNRRI), the Sichuan Academy of Agricultural Sciences (SAAS), Acharya N. G. Ranga Agricultural University (ANGRAU, the Andhra Pradesh agricultural university), and Tamil Nadu Agricultural University (TNAU), representing over 1,500 on-farm trials supervised by research and extension staff, have documented an *SRI yield advantage of 27% to 40% over bona fide BMP* (see table).
- SRI was developed to benefit smaller and poorer farmers while saving water, although it can be and is used by larger, more prosperous ones. BMPs are out of the reach of most small and poor farmers, so SRI is not intended to compete with input-intensive production systems. However these evaluations in China and India show that SRI methods have a yield advantage and that the conclusions of McDonald et al. are seriously mistaken.

Table 1. Summary of results from SRI vs. BMP evaluations in China and India, 2003-2005

Province/state (research institution)	No. of on-farm comparison trials or area	Average BMP yield (t ha ⁻¹)	Average SRI yield (t ha ⁻¹)	Advantage in t ha ⁻¹ (% increase)
Zhejiang province (CNRRI)	16.8 ha of SRI rice (2 hybrid varieties)	8.8*	11.9*	3.1* (35.2%)
Sichuan province (SAAS)	8 trials, 0.2 ha each	8.13*	11.44*	3.31* (40.7%)
Andhra Pradesh state (ANGRAU)	1,525 trials; average area 0.4 ha and range 0.1-1.6 ha	6.31	8.73	2.42 (33.8%)
Tamil Nadu state (TNAU)	100 trials; SRI and BMP trials were each 0.1 ha	5.66	7.23	1.57 (27.7%)

* Chinese comparison trials were made using hybrid rice varieties and fertilizer with both.