

Encounters, dialogues and learning alliances among farmers, scientists and others with the System of Rice Intensification in India

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Farmer First Revisited: Farmer Participatory Research and Development Twenty Years On
Colloquium being convened at the Institute of Development Studies, Sussex, Dec. 12 -14, 2007.

Abstract

How do scientists respond to ideas that emerge outside the formal agricultural research system? This paper considers answers to this question by reviewing experiences with the System of Rice Intensification (SRI), a contemporary grassroots innovation that has emerged from civil society and has been rapidly spreading among tens of thousands of farmers around the globe. Despite it being seen as a credible means by farmers for increasing food supplies with less input costs, SRI has met with hostility, denial and reluctant acceptance from the rice research community. Tracing the evolution of SRI in a big rice-growing country (India), the paper explores the challenges inherent for researchers when responding to a civil-society innovation and to an 'open system' such as SRI. The paper suggests that there are institutional means by which researchers can see themselves as part of the SRI innovation system comprised of farmers, extensionists, NGOs and administrators and thereby negotiate meaning and reposition themselves by moving from encounters and resistance to dialogue and learning.

The innovation history of SRI helps us in understanding why and where SRI has and has not spread and why farmers have been more open to acceptance of SRI than most researchers have been. The paper suggests that the ability of the research community to adapt to opportunities that SRI presents is related to having the 'openness to surprise' and willingness to engage in knowledge dialogues. 'Learning alliances' are suggested here as good institutional mechanisms for providing a level playing field for all knowledge actors. They can help build trust and create new knowledge and can also provide scientists space and opportunity for self-critical awareness.

Should self-critical epistemological awareness (not) be a part of good science?
R. Chambers (2002).

The new Indian obsession with growth rates is accompanied by an embarrassing agricultural stagnation incorrectly referred to as 'technology fatigue'. An unprecedented crisis in agriculture that has, according to official estimates, led to large-scale distress suicides of over 100,000 farmers in the last decade does not often figure in discussions on agricultural research.ⁱⁱ A speaker at a conference organised in December 2006 on the little-known Indo-US Knowledge Initiative on Agriculture (KIA) remarked that the agricultural research establishment had seemed to declare its independence from the farmers of the country. Another speaker wondered why the research community had no internal discussions or meetings to reflect on this major crisis, why is it so isolated?

It is not easy to talk or be hopeful about 'farmers first' or 'self-critical awareness' of agricultural researchers in such a situation. However, I would posit that the healthy spread of knowledge-intensive practices with widespread farmer participation such as the System of Rice Intensification is

creating new alliances among farmers, researchers and civil society that potentially promise better practices and policies where farmers could indeed be 'first'. Non-Pesticidal Management (NPM) is another such innovation that has witnessed an almost epidemic spread in parts of India.ⁱⁱⁱ

I propose that for this kind of reorientation, researchers need to shift their sites of inquiry from the larger narratives and perhaps overworked political games of knowledge production to the messy and playful encounters of everyday practice where farmers, scientists and civil society are engaging in an uneven but dynamic knowledge marketplace. I hope to suggest some simple mechanisms that can enable greater engagement of farmers, scientists and civil society organisations in creating new knowledge.

This paper is based on my ongoing attempt to understand and be part of the complex and continually-evolving architecture of the grassroots-driven innovation known as SRI. My engagement with SRI over the last four years has been one of learning, sharing, adapting and even innovating as SRI's open system of innovation has pushed me to redefine my own professional and personal boundaries.

My initial interest in SRI was prompted by a desire to appreciate better the politics of knowledge between formal and informal science, and how research and non-research actors are influenced and influence this politics. I however now feel a greater need to look at how the various SRI actors are adapting, innovating and redefining boundaries through their everyday practice and what might enable faster learning within this complex system. As a social scientist I consider myself lucky to have had access to, and to be part of, the growing SRI community. Apart from luck, I think I was fortunate to have learned very early in my journey as a researcher in science studies (or science, technology and society studies) that research can often bring you into situations where an analyst needs to be part of the case study he/she is attempting to study. My training, if it can be called that, in science studies has enabled me to explore the boundaries of disciplines that appear, at least in theory, rather rigid. It is this flirting with questions on the boundaries of professional disciplines and natural and social sciences that I think has enabled me to appreciate an innovation such as SRI. I came across lovely examples of 'reversals' with extension people and farmers taking a lead in research, and with on-station results often being less than those achieved by farmers on their fields – an unusual 'land to lab' yield gap.

SRI seemed to me to provide a good case study and a context for exploring some questions that I have found myself asking over the years. Questions on how innovation occurs at the 'margins'? How do those innovating at the margins select criteria and redefine axioms in their work and what could formal science and technology organisations and scientists learn from these experiments? Can historical studies help ongoing processes? What should be the role of academic institutions in ongoing debates in understanding a system? Alternately how could management professionals / generalists (innovation system analysts) enable knowledge and information flows in a system? More than anything else SRI has taught me to be more 'open to surprises' than I was. It is not often that historians get so quickly outdated with their data, analysis and insights changing with every cropping season!

I begin this paper describing SRI and highlighting it as an open innovation. I then explore the politics of knowledge surrounding the innovation globally and how this has shaped local debates. I then focus on the Indian experience which today has perhaps the largest numbers of researchers involved in SRI and explore the turbulent path through which SRI is taking roots in India. I explore the reversals in SRI that have occurred by some actors and the implications that these reversals have not only for rice and SRI policy in India, but for the fundamental question of whether SRI should be seen as a technology or a new paradigm. I conclude with some observations on how learning alliances and knowledge dialogues can help us to situate SRI, and how scientists and others, not just farmers can be 'first' in this newer paradigm.

Civil society origins of SRI and 'Rice Wars'

Conventional approaches to increasing food supplies to meet growing population needs have met with several roadblocks that include falling prices of outputs and rising costs of inputs, especially agrochemicals and irrigation water (contributing to farmer distress and suicides), reduced genetic potential manifested as stagnating and even declining yields, and increased evidence of climate change with variable rainfall. Transgenic innovations have been seen as a preferred strategy for the

second Green Revolution with strong transnational company interest reflected in new deals on agriculture such as the earlier mentioned KIA.

A new alternative, the System of Rice Intensification (SRI), has emerged in over 28 countries; enhancing output of a major food crop produced and consumed by a large percentage of the world's poor with the added advantage that the methods are environmentally-benign. Many researchers have greeted this innovation with disbelief and denial, despite increasing evidence that SRI methods raise the productivity of land, labour, water and capital concurrently (Uphoff, 2007).

SRI is a civil-society innovation that was first developed in Madagascar by a French Jesuit priest, Father Henri de Laulanié, who was surprised by the effectiveness of an accidental early planting of rice plants. His openness to surprise and systematic experimentations that lasted nearly two decades led to a system of practices that was particularly advantageous and was later termed as SRI.

SRI involves five principles that are rather different from traditional ways of growing rice. It involves transplantation of young and single seedlings with care instead of the conventional method of transplanting mature seedlings, with many in a single hill. SRI nurseries are managed like a garden plot, not flooded continuously as in conventional practice. SRI spaces rice plants more widely and does not entail continuous flooding of rice fields. It uses less seed and chemical inputs, and promotes soil biotic activities in, on and around plant roots through liberal applications of compost. Weeds in the moist, unflooded field are controlled with a weeder that aerates the soil.

These alternative practices, with lower inputs, lead counter-intuitively to improved productivity, with yields of 7-8 tonnes/hectare (t/ha), about double the present world average of 3.8 t/ha. The new set of practices greatly improved the growing environment for rice plants making it non-dependent on variety (Lines and Uphoff, 2005; Uphoff, 2007).

Norman Uphoff, while director of the Cornell International Institute for Food, Agriculture and Development (CIIFAD), collaborated from 1993 onward with Association Tefy Saina (ATS), the NGO that Fr. Laulanié established in 1990 with Malagasy colleagues to evaluate and later promote SRI in Madagascar. Since 1997 the innovation has spread rapidly around the rice world largely through the social entrepreneurship of Uphoff who in his words has 'passed on the benign [SRI] infection'. The remarkable spread of SRI to 28 countries in the past eight years with very modest investments presents an interesting case study on the potential of knowledge generation and dissemination through sharing and adaptations.

Scientists were, however, reluctant to accept SRI for two reasons. First was the very high yields of SRI in Madagascar including those that were above what scientists considered to be 'the biological maximum' (15 tonnes per hectare). The other was the commitment of the scientists to their own methods on increasing rice production which included among others developing the genetically-modified 'golden rice'. Modern agriculture has proceeded through making genetic changes in plants (and animals) that make them more responsive to external inputs.

Because SRI depended on neither kind of change, instead achieving its productivity gains by changing the management of plants, soil, water and nutrients, it challenged, the power, interests and mindsets of rice scientists. SRI questioned many basic beliefs about rice that was different to the views of the International Rice Research Institute (IRRI). SRI maintains that rice is water loving but not an aquatic plant; wider spacing and fewer plants give more and not lesser yield, transplanting young seedlings produces better results, etc.

Validating the knowledge of SRI presented methodological and epistemological difficulties. How to change not just one but six practices – all at the same time? Formal SRI experiments conducted on-station seldom confirmed the results reported from farmers' fields, and scientists naturally assumed that their results were the correct ones. They were reluctant to accept, or investigate; the explanation offered by SRI proponents that on-station soil conditions were less suitable for SRI methods, having had high applications of chemical fertilizer and biocides for many years. These reduce or inhibit the performance of soil micro-organisms that contribute to 'the SRI effect'.

The conflicting views about SRI reached a peak during the 2004 International Year of Rice sponsored by FAO, and they were reported in a feature article in *Nature* magazine (March 24, 2004) which

explored the controversy on whether SRI is 'fact or fantasy'. Later that year, Uphoff was engaged in a debate in IRRI's magazine *Rice Today* with Thomas Sinclair dismissing SRI as based on 'UFOs' - Unconfirmed Field Observations – with the assertion that it did not merit serious attention. The debates were termed 'Rice Wars' and this has shaped the way that many researchers have approached SRI both from natural and social sciences.^{iv}

The framing of the debate was problematic. It treated SRI as a technology (like any improved variety) and not as a system of practices. This circumscribed the debate to scientific disciplines, on the one hand, and economic field assessments, on the other. It ignored other players such as civil society organisations and innovative farmers who often provided multiple meanings to SRI. Much more is needed to assessing SRI as a process than single field studies that can neither prove nor disprove SRI claims by themselves. In fact, the reversal could have raised an interesting question for the scientists. Why was there a 'land to lab' yield gap? Scientists were confronted with the question, if they cared to think about it, 'If something works in the field, why is it not replicable in the laboratory?' (Shambu Prasad et al, 2005).

My initiation into the SRI community was thus through understanding scientific controversies and the politics of knowledge. Researchers on SRI were not many, and SRI carried the baggage of controversy that persists still today, even though there is now a greater exchange among the two schools of knowledge – SRI and, for want of a simpler designation, IRRI. Being part of technical conferences of scientists is useful for a social scientist. Science studies have helped me understand that 'the field' need not always be farmers' fields. Scientists too can and need to be studied as a community with their own rituals and protocols (Latour, 1987). Another profitable investment has been being part of e-groups of communities. That there are still debates between SRI and IRRI schools of thought was evident in August 2006 in the SRI on-line list-serve discussion group stemming from what appeared a rather innocent update on SRI.

Andrew McDonald, who was lead author for an article that undertook, in effect, to 'debunk' SRI –by analyzing a selected set of data from diverse comparisons of SRI with standard practices -- responded stating that their meta-analysis of SRI trials indicated "scant empirical evidence to support the promotion of SRI as a global model for rice production" (McDonald et al, 2006). Of the several responses within the group, I will call attention to one: the comment of Willem Stoop on how these controversies get addressed in design of research protocols used by scientists on SRI.

"How in the world can one make a serious comparison between two equally poorly defined and variably implemented (rice) production systems (SRI and BMP)?" BMP or Best Management Practices is what the scientists recommend based on their on-station trials and results. (In most Indian SRI trials, these are referred to as ICM, or Integrated Crop Management.) Stoop suggests that the rationale for such comparison is questionable and often unjustifiably assumed.^v

Even as many researchers were constrained by 'normal professionalism', farmers and civil society groups were not only freely experimenting with SRI, but were adding to the body of knowledge through their experiments and insights. Organic agriculture groups in particular have added their own innovations of bio-pesticides and fertilisers to SRI. SRI practice has pushed agricultural science to introduce new axioms for research protocols, one such is that if SRI has to be effective and assessed 'all trials should be on-farm rather than on-station'.

SRI researchers have also been keen to provide a stronger theoretical basis for their empirical practice by combining field-level empiricism with a dissenting view on history of rice technology. Conventional rice science could not explain SRI results, but older texts and experiments that described rice plant growth (in terms of phyllochrons, according to Katayama's tillering analysis published in 1951, only in Japanese) did. Japanese scientists found that many of the SRI practices had been used by the most successful Japanese rice farmers in the 1950s.

An interesting fallout of this knowledge encounter between 'SRI scientists' and IRRI scientists was the generation of new knowledge and discovering newer contexts and applications for older ones. The increased attention given to soil biology and its relevance to what is now being referred to as 'post-modern' or 'most-modern' agriculture is one such. Research on plants has favoured over the years studies on soil physics and soil chemistry, and research on the plant organs and environment above

the soil has received more support than those that address the complex processes and mechanisms below the soil (Uphoff et. al., 2006).

It is important to appreciate that the counter-intuitive nature of the SRI innovation presents problems not only for scientists but also for farmers. Innovative farmers trying out SRI methods meet with a lot of ridicule in the community until such time as an acceleration of tillering occurs. Newer knowledge often leads to newer practices that also serve as good extension methods. Farmers were encouraged to pull up SRI and non-SRI plants of the same age and to observe the visible difference in root growth, thereby gaining an appreciation of what produces healthier, more robust and productive plants. The visual appeal and difference has prompted some farmers to call SRI 'the root revolution'. Seeing strong, numerous tillers and healthy plants with large, white-coloured root systems convinces farmers more easily than extension agents' words.

The caricature contrasting SRI and IRRI scientists is perhaps overstated but it suggests the difference in understanding of knowledge and power and privilege that exists in the world today. Often we are surprised by the manner with which scientists are captives of their research protocols whereas civil society proponents experiment rather liberally with low or no budgets. It is not uncommon to find almost all trials with SRI by done researchers following the SRI - ICM – traditional / conventional method comparison. In our field visit in Orissa recently (September, 2007), we were stuck by the fact that an organisation that was involved in training farmers was carrying out experiments without any 'control' plot. In fact, in a small field of less than three acres, there were experiments with 26 varieties of traditional varieties. That the evaluations were motivated by different research questions and axioms in no way hampered the extension of their findings to farmers. A dialogue with farmers on principles is possible without controls! Yet some researchers are constrained to make their work more complicated because of conventions and institutions that privilege their communication with scientific peers over that with farmers.

Taking roots: SRI in India

India is one of the largest producers of rice in the world; however, rice cultivation in recent times has stagnated with additional problems of salinisation and water-logging of fields, increasing water shortages and stress (producing a kilogram of rice conventionally grown requires 4-5,000 litres of water), and a growing energy squeeze on the groundwater economy (Shah, 2007). The story (or stories) of SRI in India indicates a complex evolutionary process of innovation and development. In formal terms, official records indicate that the first SRI trials were started in 2000 at Tamil Nadu Agricultural University (TNAU) as part of an international collaborative project. T. M. Thiyagarajan of TNAU was the lone Indian representative at the first international conference on SRI convened in China in 2002 with results that were very modest.

There is, however, a parallel history of SRI with civil-society groups learning about and accessing information and experimenting with SRI since 1999, starting with a publication in LEISA magazine. These organisations and individuals accessed knowledge from diverse sources that included a Cornell alumni network, personal e-mails to and from Norman Uphoff at Cornell, and communication among international organic agriculture groups. In India today, SRI has been introduced in over 18 states, representing not only varied agroecological zones but also varied combinations of civil society organizations (that include farmers groups and non-governmental organizations, or NGOs), and state agricultural universities, research and extension agencies. In the initial years, in some states like Tamil Nadu, SRI was referred to by different names by the state, on the one hand, and by civil society groups, on the other.

The rapid spread of SRI started in 2003, and in this scientists like Thiyagarajan at TNAU and Alapati Satyanarayana at ANGRAU (Acharya NG Ranga Agricultural University) had important roles in backing the innovation with their respective state governments which were also experiencing drought and water stress. They were willing to go beyond the bounds of received wisdom and investigate the SRI phenomenon. Openness to new knowledge irrespective of its source is evident from the story of Dr. Satyanarayana and his first brush (literally) with an SRI plant. When asked to visit farmers' fields in Sri Lanka in 2003 to learn about SRI's potential first-hand the sceptical Satyanarayana's accidental brush with the sturdy leaf of an SRI plant (which cut his finger) got him thinking. This had never happened to him before. He could feel (literally) that SRI methods produced a different phenotype.

Satyanarayana subsequently reworked for himself the principles that led to the healthy growth of rice plants in SRI and later developed an easy-to-understand package of practices for farmers of Andhra Pradesh (AP). The reworking of knowledge that began in Sri Lanka later led to the co-creation of knowledge when he extensively toured farmers' fields. In one such instance, a farmer named Jagga Raju involved in seed production had started producing rice plants in well-drained flower pots with extensive tillering. Raju had empirically shown that rice is not an aquatic plant, and Satyanarayana's interaction with Raju provided the farmer with scientific justification for his practices, even as it built at the same time the confidence of the researcher in the emerging knowledge of SRI.

The innovation history of SRI in India shows several insights such as the one above and has been documented elsewhere (Shambu Prasad, 2006). Being open to the process of innovation and surprises shows several such 'encounters' or meetings of research and non-research actors in a dynamic and continuously evolving SRI innovation system.

SRI innovations in India have been led by civil society groups with extensive farmer innovations in implements such as weeders and markers as well as in the practices of SRI. Few innovations have sparked such enthusiasm among farmers as SRI has. Organic farmers and groups have often taken a lead in these experimentations as they are used to knowledge-intensive, as contrasted with input-intensive practices. Even if their initial experiments have not always been successful, their understanding of SRI as a system of principles and not as a technology that is invariant for all soil or agroecological conditions has been significant. One of the earliest SRI experimenters, Selvam Ramaswamy in the Cauvery Delta of Tamil Nadu, remarked that "SRI encourages farmers to think, whereas the Green Revolution treated them like children who needed to be taught". Another widely respected organic farmer, Narayan Reddy in Karnataka state, regards SRI as "an innovation of his lifetime" even as he continues to improve on the processes by introducing practices such as direct-seeding to SRI.

Another interesting feature of SRI has been the interest taken by some extension agencies. There are instances where 'extension' has led 'research' since research agencies have been slow to investigate SRI. The contributions made to SRI by extensionists, farmers and researchers from outside the rice research establishment, notably soil microbiologists and entomologists, to improve SRI practices in India has been considerable and has in fact then created conditions for interest from the rice research establishment.

The number of actors in the SRI innovation system is continually increasing with each cropping season and across newer regions. The last few years have seen a considerable spread of SRI in India. While no data are available on the number of farmers who have tried out SRI, even a very conservative estimate would put this figure well over 150,000. The small state of Tripura in north-eastern India by itself in recent estimates has had SRI practiced on 14,000 hectares with active governmental support for small farmers. Today over 70,000 farmers are using SRI methods; two years ago this number was 1,000.^{vi} Interestingly most of the recent spread has been among resource-poor farmers in largely rainfed areas, farmers who have not and might never receive the bounties of the Green Revolution package of subsidized irrigation water and agrochemicals.

Up-scaling knowledge-intensive innovations require closer attention to institutions or the norms, rules and patterns that govern behaviour of actors in an innovation system. How can SRI scale up if it has to move to more farmers beyond a few innovation champions? The models seem to vary in each state, but clearly there is a major role for the agricultural research establishment in this. Given their size and power their perceptions on SRI - positive or negative - can adversely affect the adaptation of SRI.

Partnerships, reversals and the growing SRI community

In India's SRI innovation history a novel partnership that emerged in 2004 has been particularly important. The open system of SRI always allowed for newer actors to participate and shape the system, bringing in different agendas, ways of working and different levels of accountability. Enthused by the initial success of SRI in AP, the World Wide Fund for nature (WWF) Dialogue Project on Water, Food and Environment based at the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) joined the fray. They were impressed by the immense potential of SRI for water-saving and WWF facilitated a major collaboration between a State University (ANGRAU) for which Dr.

Satyanarayana was the Director of Extension, and civil society organisations that could help undertake extensive SRI trials in the state. This was followed up by involving the central government's Directorate of Rice Research (DRR), an agency of the Indian Council for Agriculture Research (ICAR), in expanded SRI trials that were conducted on farmers' fields as well as (later) at ICRISAT.

The state of AP had become an important technical resource centre for SRI with several training programmes for agricultural officers across the country being held there. Around the same time, civil society organisations in the state started raising different sets of questions about SRI. The uptake of SRI on farmers' fields was not going very smoothly, and there were great difficulties with the weeders being supplied by the state university. An NGO WASSAN (Watershed Support Services and Activities Network), which had already created a very effective website/home page for SRI (www.wassan.org/sri/) organised a workshop on farmers' fields for developing SRI implements through a novel innovators' dialogue (Ravindra, 2006). This workshop brought farmers' experiences from across the state on implements such as weeders and markers even as it created new criteria for improving weeder design and newer weeders as well. The possibilities for knowledge creation and dissemination were demonstrated through the workshop, and weeder designs including detailed technical specifications have since been freely distributed through their website.

Work with DRR had the unexpected fallout of forming a small but emerging scientific community around SRI. While WWF had a focus on water, DRR was looking for ways to promote its technologies such as hybrid rice, whose uptake was not high. SRI could make hybrid seed use more attractive, offering farmers much lower seed costs. The growing interest in SRI emboldened a set of cooperating institutions to organise the first national symposium on SRI in November 2006, with financial support from WWF. The Hyderabad symposium attended by over 200 people across the country was a continuation of the dialogue process between farmers and scientists that WWF had begun in AP. The deliberations surfaced a fair degree of scepticism from some researchers who believed that SRI still needed to be evaluated.^{vii} Most of the NGOs represented, who had been working on SRI directly with farmers, presented very positive views of the new practices, and farmers participating in the symposium were the most favourable and outspoken of all.

From initial scepticism the growing SRI community began facing a different challenge. How should one shape the future agenda? Researchers were keen on continued field trials and demonstrations that would assess the validity of SRI in different zones. Others were keener on extending it on farmers' fields. Debates also emerged on whether SRI should be fully 'organic' or if chemicals could be used. Also, should SRI use be focused on indigenous varieties or hybrid rice? In the symposium discussions, each participant brought his/ her own values and priorities as well as experience and apprehensions into this open system of innovation, and this represented a newer dimension in the politics of knowledge.

The SRI debates at least in India were no more about 'Rice Wars' but on ownership and legitimacy of actors. The questions were not about whether but 'how to do SRI?' More organisations were involved in research but not all had a good understanding of SRI. Research protocols in many cases were still trying to establish some of the basics of SRI on seedling age, spacing, etc., and invariably all SRI trials were comparing SRI with ICM. Some of the earlier claims of farmers growing SRI in 100 acres and super-yields began to wear out as some of these farmers now seemed to be disadopting SRI. Policy support for SRI was increasing both from the research establishment and political support through chief ministers visiting SRI farms and announcing support. However, institutional capacities of agriculture department staff to carry out SRI extension were limited for scaling-up operations. They did not realise that SRI needed different ways of carrying out extension – an extension that allows for and encourages farmer innovation and participation. Government extension was also geared towards targeting 'progressive' (i.e., big) farmers and could not give priority to the poverty-relevance of an innovation (Ramanjaneyulu et. al, 2006). Extension systems in India are also designed towards delivering goods rather than conveying ideas, or promoting learning.

Amidst this churning of concerns was an invitation from Dr. Baharul Majumder, the agricultural research officer in Tripura who had spearheaded the dramatic expansion of SRI in this remote state bordering Bangladesh on three sides that was mentioned above, to visit their SRI fields and farmers. As part of a team assembled by WWF I was fortunate to visit Tripura in April 2007. Team members were fascinated and impressed by the large contiguous stretches and extent of SRI in the state. The large-scale adaptation of SRI by many small and marginal farmers, many tribal or from scheduled

castes, and through governmental extension agencies and democratic local government (panchayat) institutions, with no NGO involvement, seemed to open up new possibilities in SRI. Tripura experience added to, if not altered, the SRI imagination, and the team felt that Tripura should be the venue of the next all-India SRI symposium. This was held in Agartala in October 2007 with over 250 participants from across the country and even abroad.

The national symposium on SRI needs to be seen in terms of the nature of participation of non-research actors in conferences organized by agricultural research organizations in India. Participation of civil society organizations and even farmers is normally very low if not non-existent. A novel change in the conference format was to include a field trip with the mixture of actors -- NGOs, extension department officials, researchers and farmers -- being provided an opportunity to spend time together and reflect on the visit and their own SRI experiences. Despite an overload of presentations from research organizations and too few from farmers, and limited time for discussions, the variation of results from on-station trials and farmers' fields, at times in the same region, was apparent.

The open system of SRI does not allow for easy exclusions and filtering, but the politics of knowledge claims lie at the heart of much SRI discussions in future. In the absence of a level knowledge playing-field, there is likely to be a domination of the research agenda by a few players not necessarily in numbers but in design of research protocols. A closer look at the papers presented indicates three kinds of difficulties in the research trials. One is the continual need to evaluate SRI with existing research methods to validate often on-station. The second is the inability of researchers to raise different kinds of research questions. It was as though methods of conventional research were just being extended to a new 'technology' such as SRI. That SRI could surprise researchers seemed to be beyond the pale of scientific reporting. At another level, many researchers were unable to link up their own research work within the larger innovation system of SRI that included non-research actors including farmers. Farmers' viewpoints and constraints and adaptations were rarely reported.

One of the papers in the symposium by Ravindra (WASSAN) raised interesting questions on the mode of spread of innovations such as SRI, ones that are knowledge-based and not input-centric. Whose mandate is it to facilitate diffusion of these knowledge-intensive practices? Extension services are best equipped to promote innovations that depend on purchase and/or use of inputs. He suggested two modes of extension for SRI: one, a continuation of the farmer-to-farmer extension that would be slow and organic with greater role for civil society and a facilitative role for the state. The other was for SRI to become a dominant paradigm of rice production; this would necessitate positioning SRI within the context of the agrarian crisis and might require major public investments as drivers of change and scale. It would require reformulation of extension toward farmer-centred efforts, promoting farmer innovations and reconfiguring research toward systems improvement and collaborative on-farm research through alliances with farmers and civil society. Public policy would need to address how to ease constraints, enabling better management by farmers at the village level through communal sharing of tools and implements, reworking relations with labourers, and incentives for adoption (Ravindra, 2007).

The scenarios suggested by Ravindra addressed the heart of the matter on policy support for SRI, whether the policy support will be for establishing a new paradigm or for treating it as any other technology. For the first time, SRI has received tacit support from the Indian government through the recently launched National Food Security Mission that seeks to increase the rice production by 10 million metric tonnes in the next four years, with almost half of this through the introduction of SRI on 5 million hectares. The mechanisms for this massive scheme are being worked out, but initial indications are that the different paradigms of research and extension have not been addressed. Strait-jacketing of schemes entrusts extension to the delivery mechanisms of state government extension services and places little faith in innovations outside research agencies. Shifting attention to paradigm debates is the new challenge for SRI even as support is increasing.

Knowledge Dialogues and Learning Alliances

Complex interactions due to the diversity of actors can and has involved cooperation and conflict. An appreciation of features of the system architecture can lead to innovative institutional arrangements. I shall conclude this paper by sharing an experiment in which I have been involved less as a historian and an analyst but as an active facilitator. When we wrote the SRI innovation history we had come across evidence of SRI spread in parts of Orissa. Following and discussing with some of the actors

who received ideas from neighbouring states of AP and West Bengal we realised a small but significant spread of SRI in the rainfed tracts of Orissa with no support from the state. With a view to prevent two parallel systems emerging on SRI, as the state too would have to undertake SRI at some point or the other given the farming situation and the possible directive from the centre, we thought of creating a platform where the capacities of the SRI actors would be enhanced. With cooperation of the Director of Agriculture a state level workshop was organised in June 2007 that had 80 participants, a quarter of whom were agriculture department research and extension staff. The research agencies in Orissa were roped in to present their perspectives on SRI and this was followed by sharing of experiences from farmers of the state. Resource persons from AP and Tripura (Baharul Majumder) were invited to share and answer some of the key technical and institutional issues in SRI.

The workshop the first of its kind in the state generated a lot of goodwill with five partners contributing to the process each bringing and taking back something from the alliance (see table below).

Alliance partner	Contribution to meeting	Take home from meeting
Department of agriculture, Government of Orissa	Partial funding for venue, participation of staff	Access to SRI community, donor agencies and capacity building of agricultural staff
WWF Dialogue project	Financial contribution to meet resource person costs, sharing of WWF perspective and experience	Extension of SRI in a new state and poor producers in rainfed farming, learning from mistakes of earlier arrangements, newer collaborations with research and extension agencies,
Oxfam eastern region	Financial support, invite to partners	Ideas for agriculture scale up plan for future, access to SRI community nationally and internationally, learning platform for partners
Orissa Resource Centre of CWS	Organisation, logistics, partner participation	Access to national SRI system of innovation, upscaling possibilities for SRI in state, placing sustainable agriculture on agenda
Xavier Institute of Management	Facilitation, bringing diverse partners together, system design	Opportunity to contribute to SRI system architecture, greater legitimacy at state and national level, articulation of new role for academic institutions

The workshop had some unexpected fallouts. The agriculture department used the resources for its training programmes and actively contributed towards building an SRI farmers database in the state. The enthusiastic sharing of experiences was followed up with a request for a book that could take stock of and show case current SRI practice in the state without privileging and separating the research or non-research actors. The spontaneous response from participants was followed up by XIMB by recording farmers' stories and encouraging some to write their own. Most accounts were first time and farmers extracted and shared their earlier writings and experiments with titles like 'My love affair with photo sensitive rice varieties'. In this case the farmer had to go out of his way and persisted to get his experiences recorded in one of the rice research popular journals. Research organisations were supportive; some had veered towards the SRI rather than the IRRI view.

We called the volume *Towards a Learning Alliance* by the varied interest groups. Like in SRI we used the phrase at the workshop and practiced the concept being unaware of its genealogy. We later realised its significance and appropriateness to the context (Shambu Prasad et. al. 2007). 'A learning alliance is defined as "a platform where a range of stakeholders come together that share an interest in innovation and the creation of new knowledge in an area of common interest"'. Learning alliances contribute to healthy innovation systems by building bridges between islands of experience, helping to assess how these results were achieved and what others can learn from this experience (Lundy and Gottret, 2005). These alliances provide a platform for openly sharing knowledge, building trust and creating a shared language thereby increasing the efficiency of learning and dissemination – something that we tried doing.

The concept to us creates a level playing field for knowledge amongst the participating actors and can enable knowledge dialogues among different and even conflicting knowledge systems. The concept

attracted interest from others at the national symposium with newer actors keen on pushing similar ideas. A leading private Indian donor – the Sir Dorabji Tata Trust – has even incorporated this as a strategy for its countrywide SRI programme and has started an e-group among its partners to discuss and raise issues on SRI. It strengthened our case that as a late starter while Orissa has to learn from other states it could also contribute through institutional innovations such as these.^{viii}

Our SRI experiences enabled us to realise that current institutional arrangements do not have spaces for at least two kinds of activities. Firstly the lack of an open platform for scouting farmer innovations and giving it the legitimacy and respect that it deserves. We wondered why was it not possible for Pravash Satpathy to share his SRI experience in a journal of the rice establishment. Why is it assumed that it has to only be in a regional language for farmers? Can scientists not learn anything from Satpathy's experiences and experiments? At another level scientists too do not have spaces for 'self-critical epistemological awareness' where they reflect on what does it mean to say practice conventional science with increased environmental stress, with a large-scale farming crisis? Where are the learning laboratories and platforms where scientists can learn, reflect and report without always having the answers or often seeming to have the answers? How do we build greater openness to surprise amongst researchers – natural and social?

Facilitating learning alliances is better done by academic institutions than NGOs and this is a space that needs to be reclaimed and developed by the academia. In fact an interesting observation that emerged out of discussions was the question of where does knowledge reside. Is it in the laboratories or in the field? In fact knowledge dialogues opens up newer possibilities where knowledge perhaps emerges out of interactions in context. Questions get thrown up in places where there is a possibility of dialogue, not necessarily conflict. All of this might not solve the agrarian crisis but it would at least enable the Indian agricultural research establishment to break its shackles, learn from its own innovative and dissenting researchers and get out of its isolation. Practices like SRI need to be seen as opportunities for researchers to reclaim the respect of farmers and citizens.

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ⁱ I thank Norman Uphoff for his constant support, encouragement and useful comments on an earlier draft.

ⁱⁱ Latest figures suggest the number is higher. See Sainath, P. 'Nearly 1.5 lakh farm suicides from 1997 to 2005' in *The Hindu* <http://www.thehindu.com/2007/11/12/stories/2007111257790100.htm>

ⁱⁱⁱ Details on the KIA can be found in <http://www.csa-india.org/kiaworkshop/KIAMAINPAGE1.htm>. The CSA website also has details on the success and spread of NPM. For its implications for rainfed farming policy visit www.rainfedfarming.org

^{iv} Some of these debates have been termed as 'Rice Wars'. See <http://www.i-sis.org.uk/RiceWars.php> for more on that. Though there has been some change in a few researchers work officially there seems to be not much change in IRRI's outlook. The recent strategic plan of the main rice research institute IRRI based at Philippines (2008-2015) titled *Bringing Hopes and Improving Lives* has no mention about SRI despite increasing international evidence that SRI does precisely that.

^v Pertinent to this recent debate and the earlier SRI debate in *Nature* is the increasing importance of India. An Indian scientist, Dr Alapati Satyanarayana, supported SRI publicly in *Nature* based on his experimental trials and the Indian results were used as empirical evidence in favour of SRI.

^{vi} Reports on the Tripura success story and on SRI principles can be found in http://assets.panda.org/downloads/wwf_rice_report_2007.pdf and <http://www.sri-india.net/> (documentation section book titled *More Rice Less Water- Small State, Big Results*).

^{vii} Our own SRI work on the innovation history in India was released (Shambu Prasad 2006) and the session that I presented a paper met with serious objections from the chair when I suggested that conventional research was linear and that SRI seemed to present greater possibilities for research if scientists were willing to learn from farmers as well. Luckily the co-chair Dr T M Thiagarajan intervened and accepted that SRI did present an interesting opportunity for researchers to revise their relation with the farmers.

^{viii} This had to happen at some point. As a member of a very active SRI Nepal yahoo group I found at least two Indians listed and always wondered why not an Indian group.