

SRI – A grass-roots revolution

However we look at it, the System of Rice Intensification, or SRI, is a major success story. Over the past decade it has helped millions of family farmers, notably in Asia and Africa, to improve their food security and food sovereignty. SRI methods simultaneously raise the productivity of the land, labour, water and capital employed in irrigated rice production. The approach is now being applied to other crops, such as wheat, maize, millet, sorghum, vegetables and tubers, and is proving equally effective. While the research establishment is still debating the relevance of SRI, more and more people are getting to know about it, and more and more farmers are practising it.

Willem Stoop and Edith van Walsum

SRI derives from the life's work of Henri de Laulanié, a French priest who worked with small-scale farmers in Madagascar. It is a fascinating case study of innovation from below. The idea developed completely outside the rice research establishment. It is a civil society innovation and has mostly been propelled by "champion" farmers, NGOs and farmers' organisations, supported by a significant number of people in universities, research institutes and international organisations. And although built on farmers' experiences, SRI also challenges the idea that the knowledge of farmers by itself can provide a foundation for further agricultural advances. The emergence of SRI shows that, for thousands of years, farmers have not been growing rice in the optimal way. SRI has come

about through farmers' willingness to experiment with different approaches in co-operation with researchers and the results show the benefits of such experimentation.

The dissemination of SRI, from Madagascar to the rest of the world, and from rice to other crops, is equally fascinating. Early articles, such as Justin Rabenan-drasana's "Revolution in rice intensification in Madagascar", were taken up by people like Ramaswamy Selvam, the current President of the All India Association of Organic Farmers and Narayana Reddy, a pioneer organic farmer from Karnataka, India. They took up SRI practices, came to view SRI as "the innovation of our lifetime", and took on the personal mission of disseminating it. Other farmers, extensionists and researchers began to champion SRI. The role these people have played in bringing SRI to the attention of others cannot be over-estimated.

Agronomic adaptations SRI is not a fixed package of practices but involves a set of interdependent agronomic principles. It is a *system*, and scientists are now looking at the fundamental plant physiological processes that can explain the SRI phenomenon. The practice of spacing single plants more widely enables plants to create more and stronger tillers and roots and become much more efficient in their uptake of water and nutrients and in utilising solar radiation. The result is a crop that is more resilient to droughts, pests and diseases. Moreover, the combination of aerobic soil conditions and the use of organic fertilizer creates a favourable environment for interactions between roots and the soil's micro-organisms – a factor that has been seriously neglected by modern farming methods and research. These recent findings imply that SRI is not merely a "niche technology" whose relevance is limited to groups of poor smallholders. The spread of ongoing innovations that build on SRI principles shows its importance for family farmers around the world. It is obvious, however, that SRI requires adjustments in response to locational context and farmer-specific conditions. Thus *flexibility* is a key characteristic of SRI – and yet it is this flexibility that is



Ms Maya Aboudoulaye, one of the new SRI "champions" in Timbuktu, Mali. Photo: Erika Styger

often used to criticise SRI as a vague concept.

Interestingly, the plant physiological processes mentioned above can be used to develop a set of relatively simple agronomic guidelines on how SRI principles can be adapted to specific circumstances. These guidelines provide leads on how farmers can optimise these practices through simple experimentation.

Two paradigms While many farmers, NGOs and scientists have embraced SRI, the rice research establishment is very slow in coming around to appreciate its merits. What is holding them back? It is more than a superficial difference in the interpretation of facts, it is about a clash between scientific paradigms.

One paradigm is based (often implicitly) on the thinking and practices that have shaped conventional Green Revolution research and development, which views knowledge as something developed in scientific institutions and passed on to farmers.

The other paradigm is grounded in the idea that technologies need to be developed and adjusted locally. Farmers are key actors – not just passive recipients – in this process of technology development, in which knowledge is jointly constructed by farmers and scientists.

There are huge vested interests behind the conventional paradigm. The seed and agrochemical industries and the actors associated with them have little to gain from processes that empower farmers and give them more knowledge while also reducing their dependency on costly inputs.

Breaking the barriers Farmers show little interest in this debate. At the Global Farmers Forum in Rome in 2012 a year ago one Cambodian farmers' leader said: "We have experienced that SRI works, so why should we bother about scientists who do not believe that it works?" Yet, there are many other barriers to overcome. Traditionally, farmers sow their rice at high densities and after a couple of weeks the paddies appear reassuringly green. Understandably, farmers are initially alarmed when they see the

early growth status of an SRI field. Farmers, as well as scientists, can experience a severe psychological barrier when first confronted by SRI methods as these undermine much of what they thought they knew. Good training and support of farmers, especially in the initial stages, is crucial for the success of SRI.

Equally important is the role of knowledge networks and movements around the world, which are catalysts in upscaling SRI and other complementary approaches. A strong synergy between many different actors, ranging from farmer champions to scientists and politicians with global influence, will help this grassroots revolution reach its true potential.

Finally, one exciting aspect of the still-unfolding SRI movement is that in today's world of electronic communication, new ideas spread fast, provided that they work. SRI may well be generating a shift towards a new scientific paradigm that focuses less on genotypes and more on phenotypes. This the more so since SRI principles are also shown to be effective for crops as diverse as sugarcane, finger millet, wheat and tef. These ideas may prove to be particularly beneficial in rainfed agricultural systems, which are the ones most vulnerable to future climate change related shocks.

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SRI, a set of six interrelated practices

- Transplanting very young seedlings – between 8 and 15 days old – to enhance their potential for tillering and rooting
- Planting single seedlings very carefully and gently, rather than plunging clumps into the soil together, which can invert the root tips
- Spacing seedlings widely with gaps of at least 20 x 20 cm and in some cases even 50 x 50 cm
- Using a simple mechanical hand weeder ("rotary hoe") to aerate the soil as well as to control weeds
- Keeping the soil moist, but not continuously flooded, during the plants' vegetative growth phase, up to the stage of flowering and grain production
- Use of (preferably) organic manure or compost to improve soil quality