

# SRI in context: lessons from the field

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The development of the System of Rice Intensification (SRI) over the past two decades has generated a variety of responses from farmers and scientists. These responses are illustrative of the gap that exists between the conventional policies and attitudes towards agricultural research and development, and the agricultural development taking place in the field. This highlights the need for scientists and development personnel to consider a much broader range of technologies than the conventional modern technological packages that are widely promoted as the only means of resolving the world food problem.

SRI has proved to be an important development which provides new technological options for many farmers. The efforts of Father de Laulanié in Madagascar to improve rice farming provide an illustration of the enormous potential of a very modest, yet well-focused agricultural development effort. However, as De Laulanié showed, there is much more to development than just introducing a new technology or a different practice. His views, presented more than 20 years ago, remain highly relevant. For example, he considered that the transition from a traditional (i.e., a closed, internally-focused) society towards communities that are more open, and therefore externally-oriented in terms of knowledge and trade, involves a slow and long-term process of development. He also recognised that sustainable development requires a major emphasis on education in a broad sense, including an exposure to the principles of biology (crops and animals), the environment (climate, water and soils), and of child and health care. Lastly, he stressed the diversity in people's aptitudes towards, for instance, agriculture. His estimate was that around 80 percent of the rural population carry out agriculture on a traditional, routine basis. For only a minority of farmers is agriculture a full-time "profession". It is only this small group that is initially inclined to experiment, closely observe the crop and to adopt new practices. Responses to the System of Rice Intensification in Madagascar show the importance of taking these points into account.

SRI is often presented as a very sophisticated and labour-intensive approach, requiring strict water control (irrigation as well as drainage), well-levelled fields, ample supplies of compost or manure, and much labour to ensure timely transplanting and frequent weeding, both of which are the most critical field operations. The realities in the field, however, differ quite substantially from this presumed "ideal" image.

## Farmer responses in Madagascar

Field observations and discussions with Malgache farmers have repeatedly confirmed that SRI indeed has the potential to produce extraordinary grain yields (above 10 tons/ha), provided the farmer has mastered the techniques, and in particular the timing of operations. In addition to increased grain yields, farmers emphasise two other major advantages: large savings on seed (SRI requires as little as 10 percent of the usually amount) and a greater tolerance to drought compared with recommended conventional and traditional technologies. This greater drought resistance is due to the larger and better-functioning root systems of plants grown under SRI.

SRI farmers have won all the prizes in all the rice-yield competitions held over the last three years (22 regional and one national). This has convinced the Minister of Agriculture, and even the President, to give full support to the promotion of SRI.

Yet, many farmers are not adopting SRI, even if they are aware of the possibilities. Field interviews showed a number of reasons why the SRI approach is not being practised more widely, in spite of its obvious potentials. First of all, traditional rice farming in Madagascar is a centuries-old practice, closely interwoven with many traditional and cultural beliefs. Changing traditional practices is not readily done. Most farmers adopting SRI therefore show some common characteristics which the non-adopters lack: they are highly motivated, better educated (some having completed tertiary education), take a keen interest in observing their fields and are efficiently organised. In short, they are very interested in farming. The majority of these farmers keep cattle close to the house and produce ample supplies of farmyard manure and compost. In all cases, their SRI plots were located relatively near to the house, making close observation and timely management possible. By contrast many non-adopters live in the towns, have no cattle and visit their fields only occasionally. They face time and labour constraints, excessive weed problems, and no or inadequate control over irrigation water.

Thus, it is not merely the agronomic potential of SRI itself that influences farmers' decisions about uptake. Many other aspects, ranging from technical, cultural, psychological and even political considerations also play an important role in the equation.



Photo: Edwin van der Maaden

Although weeding means extra work, it contributes to higher yields as one of the key components of SRI.

## SRI and agricultural development policies

SRI practices have a significance that goes beyond the immediate benefits in productivity. They point to important, so-far under-exploited, potentials in crop production. Occasionally, SRI crop yields have been recorded that far exceed what are believed to be yield ceilings, derived from theoretical crop modelling efforts. These models are based primarily on photosynthetic rates, translocation of nutrients within the canopy and other above-ground relationships. The soil environment and root development factors, including the possible contributions of symbiotic soil organisms to plant growth and health are generally ignored by these models. However, high SRI yields have been recorded with modern varieties as well as with traditional, full-season, local varieties, many of which are characterised by the research establishment as inefficient and unable to respond effectively to intensification practices.

Comments by farmers, development personnel and scientists confirmed that SRI should be considered mostly as an empirical approach which is largely based on field experiences rather than theoretical understanding. However, to fully exploit its potential, including effective dissemination and adaptation to other agro-ecological environments, it is imperative for researchers to clarify the biological and ecological mechanisms and processes involved. Observations on farmers' fields indicate that the potential of SRI is rarely fully exploited. This may be due to the use of available rather than optimal varieties, sub-optimal water and fertility management, or inadequate plant spacings.

The potential of SRI can be better realised if it is integrated into a long-term development effort in which research, together with education and participatory learning –through, for example, Farmer Field Schools– play a vital role. Small farmers have developed an empirical package of practices for rice that in many ways run contrary to conventional wisdom (introducing single plants, wide spacing, very young transplants, and intermittent drainage rather than continuous irrigation). This in itself should be of considerable interest to agricultural scientists. To seize on this obvious opportunity, researchers need to match the agricultural professionalism shown by some Malgache farmers and increasingly by farmers in other parts of the world. ■

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## Beyond technical solutions

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The majority of farms in Tamil Nadu, India, are less than two hectares in size, and the family depends on successful rice production for food. Therefore, risk is central to many aspects of rice cultivation and "risk aversion" plays a major role in the farmers' decision-making processes. These small farms are especially vulnerable to unexpected changes and unstable conditions, and the increasingly limited availability and irregular supply of water is a major problem in crop production. As the System of Rice Intensification (SRI) requires less water than conventional rice cultivation, it is an interesting option which could help to resolve the problems of water availability.

Farmers in Tamil Nadu have started to try out SRI. The level of adaptation will depend not only on its technical feasibility but equally on its social viability. In 2004, a study was undertaken to analyse the social suitability of SRI. Farm surveys were conducted in the Tambiraparani river basin (Tirunelveli and Tuticoring districts) in Tamil Nadu; interviews at Government departments, field visits and literature research provided additional sources of information.

### Risk and uncertainty

The farmers who tried out SRI for the first time were generally surprised and positive about the method and its results: higher yields with reduced water usage. Despite these positive reactions and awareness of the advantages, relatively few farmers practice SRI or are motivated to fully switch over to SRI. They remain sceptical, and perceive SRI practices as relatively difficult compared to conventional rice cultivation practices. Most farmers say that they are not familiar enough with the SRI technique to practise the system independently. They feel insecure about the practices and fear that poor implementation of the practices could lead to crop failure. At the same time, they are highly skilled in the conventional system and know what to expect from it. It may be expected that large, wealthy farmers with a good education level are likely to be the first adopters of SRI, as they are better positioned to deal with a certain level of risk. If SRI is seen to be effective and successful, without increasing the risk of crop failure, then the majority of the smaller and poorer farmers may follow.

### External influences

The government extension service works with selected progressive farmers, as they find it impossible to reach all farmers directly. In practice, many small and marginalised farmers are unreachable. The quality of the extension services differs greatly between and within regions, although communication between farmers and extension agents is mostly one-way (top-down). All these conditions mean that farmers are often not as well supported as they could be.

When the System of Rice Intensification was introduced in Tamil Nadu, it encountered a different social-technical environment from the farming environment of Madagascar where it was originally developed. The influence of the Green Revolution is clearly visible in Tamil Nadu, whereas in Madagascar it is not. As a result, several adjustments to the system have already been developed and implemented, such as the introduction of the nursery mat, mechanical weeding in combination with line and square planting and direct seeding techniques. The main focus of interest in SRI in Tamil Nadu is its potential to reduce water usage. The other practices are of lesser interest but are necessary to achieve desirable results. In Tamil Nadu, SRI practices are a combination of those developed in Madagascar with the Green Revolution practices already existing in the area. Initial experiments and field trials suggest that this combination offers promise for Tamil Nadu, combining increased yields with less water use.

### A promising option

The System of Rice Intensification is a promising option for addressing the problem of limited and irregular water availability for crop irrigation in Tamil Nadu. However, any solution needs to consider more than just the technical aspects. The study showed that successful introduction of an innovation like SRI goes far beyond the technical level and is closely interwoven with the socio-technical environment which significantly influences uptake and therefore must be given equal consideration. ■

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