

# 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.

## 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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# SRI method – retrospect and future prospects

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Whenever an alternative is put forth to the conventional high-input agriculture one is immediately questioned whether it will be feeding the growing population of the world. Feeding the people means addressing issues of not only what is grown but also how it is grown and who is growing it. Further one also needs to address the issue of what is food, which is deeply rooted into cultural and social fabric of the people. Hence, the implications of technological options in SRI method on the poor and feeding of the population can be and must be discussed. Though SRI has its origins in rice, it is now successfully implemented with other crops like sugarcane and *ragi* or finger millet; crops which exhibit tillering capacity and are irrigated.

## Shifts with SRI method

SRI method is an important shift in the way we look at agriculture because of two reasons:

- It's origins and energy of spread are from outside the established scientific institutions
- The traditional agronomical practices of the farmers were displaced by 'scientific knowledge' promising high yields based on high external inputs (seed, fertilizer, water, etc.). We can now assuredly say that this euphoria is short lived, viewed from the point of evolution of agriculture in the human civilization. These scientifically and externally prescribed agronomical practices have now been once again challenged, based on low external inputs of SRI method.

The paradigm shifts that we are looking with SRI method are:

1. The package of practices is not tightly cast to be conveyed to the farmer as in the present predominant one way agriculture communication/ extension.

2. In this sense, the farmers are not passive recipients of external knowledge. In fact, they are the founders and perpetuators of this knowledge. Where SRI method is to be taken into newer areas, it has to be in partnership with the local farmers who understand the principles and evolve appropriate methods in accordance with local needs and situations.

## The question of yield

The traditional varieties yielded well in the context of integrated practices of soil fertility management and provision of organic matter through various means. This scenario changed with Nitrogen entering the picture in the chemical form. The traditional varieties failed to respond (being tall, they lodged easily) to this external chemical N. This resulted in efforts to develop short and sturdy varieties that yield well making use of external inputs. This brought market economy into agriculture and the approach of chemically analyzing the soil and crops and making recommendations for doses of chemical fertilizers. This approach missed the fact that plants are living beings. SRI method brought back the importance of the living soil and the role of various beneficial soil micro and macro organisms. This beneficial aspect of the soil biota cannot be easily quantified and need not be quantified from the view point of the farmer. Like any living being, the soil biota need the following for their survival and proliferation:

- a. food, that is organic matter
- b. water
- c. air (except for some micro organisms that function in anaerobic conditions)
- d. appropriate temperature

SRI method provides all these situations for the soil biota. Further in SRI method, the yield potential is high owing to wider spacing, transplanting young and single seedling per hill and