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# A New Conceptual Framework for the System of Rice Intensification (SRI) for Research and Practice

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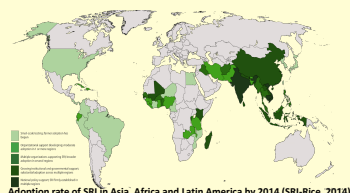
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## Introduction: "The plant is your teacher"

The System of Rice Intensification, or SRI, is an agro-ecological and climate-smart rice production methodology that allows farmers to increase yields by 30-50% or more, while using 90% less seed, 30-50% less irrigation water and significantly reduced, or even zero, chemical fertilizers and pesticides.

SRI was empirically developed by the Jesuit priest and agronomist Henri de Laulanié working with a group of young farmers in Madagascar during the early 1980s. Taking "rice as their teacher", their goal was to create the best growing conditions for rice plants to express their production potential. The two entry points were 1) to take advantage of the tillering ability of rice (by planting young, single seedlings, widely spaced), and 2) to create a conducive soil environment to support plant growth (by intermittent irrigation allowing for soil aeration), resulting in doubling and even tripling of yields (de Laulanié, 1993).

Since the late 1990s, farmers have successfully adapted SRI to different rice systems and climate zones in more than 50 countries, benefiting from healthy, resilient and highly productive rice plants.

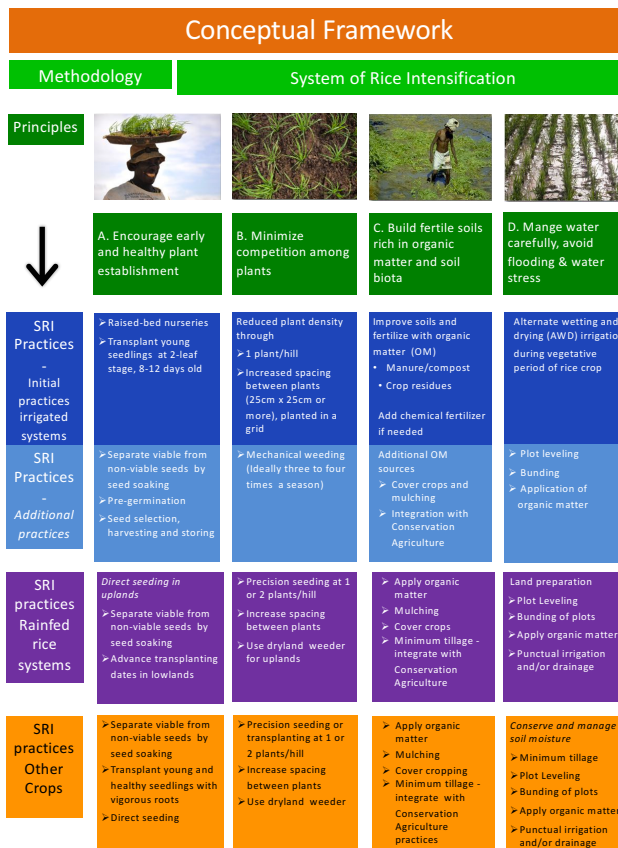


The interpretation of what SRI "is or is not" (focusing mostly on narrowly-defined practices) has often varied considerably and at times has led to heated controversies. This was seldom productive, as it countered and ignored the innovation processes with SRI at the farmers' level (Styger, 2013). To avoid ill-conceived debates and assist farmers efficiently, we should ask:

## What are the key elements of SRI that can assist in the design, improvement and management of sustainable, productive and climate-smart rice systems?

Drawing on the principles and the science of agroecology, we can find ways to take advantage of ecological processes that create beneficial interactions and synergies and improve biological efficiency of the targeted agro-ecosystem (Altieri, 1987; Reintjes et al, 1992; Gliessman, 2015). This includes:

- Enhance nutrient and biomass recycling, and minimize losses
- Increase above and below-ground biodiversity in time and space
- Improve soil conditions through organic matter and enhance soil biotic activity
- Reduce external and non-renewable inputs
- Improve cropping patterns to realize productive potential and address environmental constraints
- Take full advantage of local knowledge and practices



The conceptual framework is based on the hierarchy of:

## Methodology – Principles – Practices

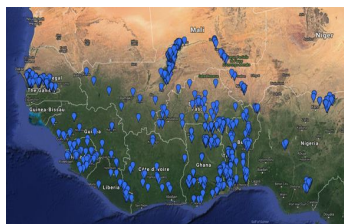
The SRI methodology is based on four interactive principles. These principles remain the same no matter where SRI is applied and provide the foundation for the practices that are adapted to local conditions.

SRI was originally developed for irrigated rice. But when farmers understood the interactions and synergies created when applying the SRI principles together, they continued to adapt local cropping practices in accordance with the SRI principles.

The SRI practices were developed for different

- Rice systems (rainfed lowland, rainfed upland, mangrove systems, recession systems etc)
- Agro-ecozones and climate zones
- Other crops, especially monocotyledons with good tillering potential

Advancing transplanting dates in lowland rainfed areas using SRI methods in Zambia, results in healthier plants, improved resilience to flooding/drought and higher yields (Styger, 2014)



## Application of the Conceptual Framework

The first large-scale use of this conceptual framework is done under the *Improving and Scaling Up the System of Rice Intensification in West Africa* project, covering more than 1000 SRI sites in 13 countries. Data is collected on cropping practices, yields, and rice cropping systems, along with GPS coordinates for each site. The data is then analyzed and categorized according to SRI principles and agro-ecological zones. The framework allows the analyst to focus at the geographical scale desired, from the individual field to an entire agro-ecological or climate zone, thus best practices and innovations for specified rice systems can be identified from the micro, field-level to the macro, continental-scale level. (<http://sriwestafrica.org>)

## Future directions

The SRI conceptual framework provides an ideal entry-point to assess and improve rice production systems. It can be used in association with other agro-ecological methods such as agroforestry and conservation agriculture, and can be integrated across farming systems or landscape systems. It is expected that further practical application in the field will lead to greater refinement of the conceptual framework.

## Citations:

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