TRAINING MODULE
The System of Rice Intensification (SRI)

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What is System of Rice Intensification?

The System of Rice Intensification (SRI) is a synergistic management methodology for planting and growing rice that involves:

• Providing healthier growing conditions for plants by minimizing competition among them through single planting and wider spacing of seedlings

• Providing conditions for healthier soil and soil biota by (a) supplying them with organic amendments, (b) aerating the soil as part of weeding, and (c) managing water carefully to avoid both flooding and water stress.
Healthy and vigorous seeds are used. The seeds are pre-germinated by soaking in water for 24 hours. For a better seedling performance, seeds can be primed with microbial inoculants. e.g., *Trichoderma, Bacillus* or *Pseudomonas*.

The seeds are grown in 30 x 50 cm seedling trays containing a mixture of 500 g soil, 500 g sand, and 500 g compost as the growth medium.
Water is given carefully, using a water sprayer to avoid trauma to the seedlings, and the soils were kept moist with no standing water allowed.

Young seedlings between 8-12 days old (2-3 leaf stage) are transplanted to preserve potential for tillering and rooting ability.
Principles and Methods: Land Preparation

A grid pattern (25 × 25 or 30 × 30 cm) is scored on the field surface.

Transplanting widely spaced young single seedlings; transplanting is done quickly after removal from the nursery, and seedlings are planted shallow (less than 1 cm deep).
Surface soil is aerated by using a two-row weeder or cono-weeder every 10-12 days before the canopy closes; such weeding gives oxygen to the root system and aerobic soil biota while eliminating weeds.
Alternating wetting and drying of rice paddies instead of continuous flooding as this favors aerobic over anaerobic microorganisms. A recent study has indicated that SRI plants’ growth performance and yield parameters are better when alternate wetting and drying is continued through the reproductive phase, making the methodology even more water-saving.
Using organic fertilizer, as much as available, to enhance soil fertility in preference to chemical fertilizers.
Principles and Methods: Integrated Pest Management

*Lantana camara* L. and *Helianthus annuus* L. planted on bunds surrounding rice fields plot to enhance the ecosystem with natural enemies, predators and parasitoids.

A Parasitoid lives on the flower that has been planted surrounded the rice field. Parasitoid is used to control the pest.
SRI benefits: agronomics

- SRI: Lodging from storm damage
- Non-SRI: Darker green color, more chlorophyll and more photosynthesis
## SRI benefits: physiological and morphological

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<tr>
<th>Plant Growth Stages</th>
<th>Physiological and Morphological Advantages</th>
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<td>Vegetative stage</td>
<td>More tillers produced; more panicle formation at end of stage. Deeper and better-distributed root system. Higher xylem exudation rates. More open plant architecture, with more erect and larger leaves. Greater leaf area index (LAI), leading to greater light interception. Higher leaf chlorophyll content and higher rate of photosynthesis. Lower transpiration of water and higher water-use efficiency.</td>
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<td>Ripening stage</td>
<td>Higher leaf chlorophyll content; delayed senescence; greater fluorescence.</td>
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<td>Harvest stage</td>
<td>Longer panicles; more grains per panicle; higher % of grain filling; often heavier grains.</td>
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SRI agroecosystems provide supportive environment for microbes to grow and to benefit the rice plant, while conventional method limits their growth and inhibits their effects.
The findings of Watanarojanaporn et al. (2013) revealed that all arbuscular mycorrhizal fungi (AMF) sequences observed from the conventional plots evaluated belonged only to one genus, *Glomus*, colonizing the roots of rice grown under this type of cultivation. The roots of rice growing in an SRI environment showed sequences belonging to both the *Glomus* and *Acaulospora* genera.
Synergetic relationships between SRI and microbes affected rice plant growth, physiological processes, yield, and patterns of gene expression. From this symbiosis model, it is seen that microbes under favorable conditions can have a substantial and beneficial influence in modulating rice plant growth.

Source: Doni et al. (2019) [https://doi.org/10.1007/s00253-019-09879-9](https://doi.org/10.1007/s00253-019-09879-9)
SRI is adopted by more than 60 millions farmers in 66 countries