

What is SRI?

SRI is a system of rice growing where the plant growth environment on a micro scale, particularly within the root zone, is deliberately modified. Multi-fold increase of rice yield through SRI is based on the supposition that micro-scale modification rekindles the existing genetic potential that has been suppressed by crop, soil, water and nutrient management practices used when growing irrigated rice.

Principles of SRI

1. Rice is not an aquatic plant. Although rice can survive when growing under flooded (hypoxic) conditions, it does not really thrive in such a soil environment. Under continuous submergence, most of the rice plant's roots remain in the top 6-10 cm of soil, and most degenerate by the start of the plant's reproductive phase.
2. Rice seedlings lose much of their growth potential if they are transplanted more than about 15 days after they have emerged in their nursery. Their potential for greater tillering and root growth can be preserved by early transplanting in conjunction with the other SRI practices.
3. During transplanting, avoid trauma to seedlings and especially to their roots. Stresses, such as drying out seedling roots, will delay the resumption of plant growth after transplanting and reduce subsequent tillering, root development and grain filling. If germination is high enough, direct seeding can be used with SRI practices instead of transplanting as direct seeding can avoid root trauma entirely.
4. Wider spacing of plants will lead to greater root growth and associated tillering, provided that other favorable conditions for growth, such as soil aeration, are provided.
5. Soil aeration and organic matter create beneficial conditions for plant root growth and for consequent plant vigor and health. This results from having a greater abundance and diversity of microbial life in the soil, helping plants resist pest and disease damage. Increased root exudation enhances soil biotic populations.

These principles are transferred into a set of practices which should be applied to local conditions and environments:

- Start by transplanting young seedlings, preferably 8-12 days old and not more than 15 days old, when the plant still has only two small leaves and the seed sac is still attached to the root. The seedling nursery should be maintained like a garden, watering intermittently and not kept submerged.
- Transplant seedlings quickly and carefully, allowing only 15-30 minutes between uprooting from the nursery and planting in the field. Seedlings should be put 1-2 cm deep into soil that is muddy but not flooded. They should be laid into the soil with care, with roots lying horizontally so that their root tips are not inverted upward.
- Plant the seedlings far apart, with one seedling per hill and relatively few plants per m². In poorer soils, two plants per hill may give more tillers per m² but certainly more plants in a hill than this will inhibit root growth due to competition between plants for nutrients and light.
- Plant in a square pattern to facilitate weeding. The most common SRI spacing is 25x25 cm, but with good soil conditions, hills up to 50x50 cm apart may give the best yield. With plants in a square pattern, weeding can be done in perpendicular directions.
- After panicle initiation, keep only a thin layer of water on the field (1-2 cm) until 10-15 days before harvest, when the field should be drained. During the period of tillering, either:

- a.** Apply small amounts of water daily -- just as much as needed to keep the soil moist but never saturated, with no standing water. During tillering, the field should be allowed to dry out for several short periods of 3-6 days to the point of surface cracking, or
- b.** Flood and dry the field for alternating periods, each 3-6 days, throughout the period of vegetative growth.
- With either method of water management, the objective is to avoid continuous hypoxic soil conditions that will cause the roots to turn brown and die back. Aerated soil, on the other hand, supports profuse root growth.
 - To control weeds, there should be early and frequent weeding. This is best done with a simple hand push-weeder, often called a 'rotating hoe,' starting about 10 days after transplanting. Then weed about every 10 days, at least once more, and if possible 2 or 3 times more, until canopy closure makes weeding difficult and no longer necessary. These later weedings aerate the soil, accomplishing more than just removing weeds.
 - Add nutrients to the soil, preferably in organic forms such as compost or mulch. This is optional since the above practices will increase yield in almost any soil, at least for several years. The best results with SRI come from soil that is rich in organic matter and microbial activity. SRI farmers often apply their compost to a preceding crop, such as potatoes or beans, rather than to the rice crop itself, to give it more time for decomposition and microbial multiplication. Chemical fertilizers used with SRI practices raise yield, but they do not contribute as much over time to soil quality, which is a key factor in best SRI performance.