

# System of Rice Intensification (SRI) – Practices for improving crop and water productivity in India

International Agriculture and Rural Development, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853, USA

Pratyush Ranjan Singh (prs83@cornell.edu)



## 1. INTRODUCTION

**The System of Rice Intensification (SRI)**, developed in Madagascar in the 1980s, has proved to be one of the most important recent agricultural innovations which had been spreading across farmers' fields. SRI is a promising rural innovation that has been developed outside of the formal research system. It modifies conventional practices of paddy cultivation by managing plant, water, soil and nutrient in more effective ways, which raise the productivity of available land, labor, water, and energy and enhance food security for vulnerable farming communities. As rice is a main staple food in India, adoption of SRI methods can reduce demand for irrigation water, while improving yield and protecting the environment.

### SRI is based on six basic management principles:

1. Transplant young seedlings when 8-15 days old
2. Plant seedlings singly and avoid trauma to the roots
3. Give optimally wider spacing
4. Avoid continuous flooding of paddy fields
5. Actively aerate the soil
6. Enhance soil organic matter



Fig 1. A farmer of Jharkhand in his field, holding up a single rainfed SRI rice plant (Source: PRADAN)

## 2. METHODOLOGY OF SRI PRACTICE

**2.1 Transplant the young seedlings when 8-15 days old:** In SRI method, seedlings which are 8-15 days old are transplanted directly in the field. This preserves their potential for tillering and rooting, compared to conventional methods of transplanting, which transplant seedlings after 20-30 days. The small nursery area and short growing period for seedlings allow farmers to schedule their nursery preparation only after they have confirmation of the monsoon's arrival for the season



Fig 2. SRI nursery (Source: PRADAN)



Fig 3. Transplanting of seedlings (Source: TNAU)



Fig 4. Young seedlings (Source: E. Styger)

**2.2 Plant seedlings singly and avoid trauma:** Seedlings are transplanted quickly, within 15–30 min of gentle removal from the nursery. They are carefully transplanted at a shallow depth of 1–2 cm. In the conventional method, seedlings are transplanted under flooded and hypoxic conditions and are subjected to transplant shocks. With SRI methods, the seedlings are transplanted into optimally moist soil. They do not experience transplant shock which impedes growth.

**2.3 Give optimally wider spacing:** Seedlings are spaced widely, at least 25 x 25 cm, and in some cases if soil fertility is very good, even 50 x 50 cm; and in a square pattern, rather than in rows. The plant population is radically reduced, by 80-90%, by transplanting single plant per hill.



Fig 5. Line transplanting (Source: PRADAN)



Fig 6. Transplanted SRI field (Source: PRADAN)

**2.4 Avoid continuous flooding:** Optimum water management for SRI is alternate drying and wetting which avoids continuous flooding of paddy fields and minimizes the water requirement for paddy cultivation.

**2.5 Actively aerate the soil:** The soil is repeatedly aerated and weeds are removed by using mechanical weeder such as rotating hoe or cono-weeder.



Fig 7. Alternate drying and wetting (Source: PRADAN)



Fig 8. Using weeder in SRI (Source: PRADAN)

**2.6 Enhance soil organic matter:** Application of organic matter or compost is highly encouraged to improve the soil's organic matter. The principle 'feed the soil, and soil will feed the plants' is the sound management strategy to develop the soil ecosystem.



Fig 9. Manure for application (Source: ITPAC)



Fig 10. SRI paddy yield (Source: Neevtrust)

## 3. SOME ADVANTAGES OF SRI PRACTICE

**Less water:** Yields can double or more with only half as much water

**Higher yield:** Higher crop production per acre and per day/hour of labor

**Environmental benefit:** SRI is environmentally-friendly as it reduces agro-chemicals and methane emissions, and also reduces extractions of water.