

# Technical Guide to SRI

## for farmers and technicians



The System of Rice Intensification, or SRI, is a simple agro-ecological methodology for farmers to greatly increase their rice yields (20-50% and more), while using 90% less seed, 30-50% less water and fewer or no chemical inputs. SRI can be implemented with resources available on-farm, without the need to buy inputs, and can work with any variety of rice – including traditional or higher-yielding ones.

SRI principles have been successfully applied worldwide in irrigated, rainfed upland and rainfed lowland systems, and can be adapted to every agroecozone where rice is grown in West Africa.

### Background: SRI Principles

*SRI is based on four principles to enhance plant growth and productivity:*

1. **Healthy, early crop establishment** – select and soak seeds, establish raised-bed nursery, transplant young seedlings or sow directly in the field, nurture young plants to grow fast and tiller well
2. **Minimize plant competition** for better individual plant growth / health
3. **Build up fertile soils, rich in organic matter and beneficial soil biota**
4. **Manage water** to avoid both flooding and water stress

These principles stay the same in all environments, but it is the practices (see following sections) that can be adapted to local conditions.

### 1. Setting up an SRI Trial

*Here are some tips for planning an initial SRI trial:*

- Set up a side-by-side comparison, where SRI plot and farmer practice plot are directly next to each other
- Start with a small plot, 100m<sup>2</sup> is a good size for an initial trial
- Plots should be easily accessible, highly visible to villagers, and not prone to flooding
- Sow the SRI and farmer practice nurseries **on the same day**, using the same source of seed and rice variety; use a variety familiar to farmers

### 2. Field Preparation / Fertilization



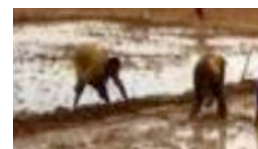
#### a. Plowing

- Follow normal farmer soil preparation methods
- Or, if using Conservation Agriculture principles: reduce soil disturbance as much as possible



#### b. Leveling

- Good leveling is essential: it creates uniform growth conditions for small seedlings
- Well-leveled plots use less irrigation water



#### c. Bunding

- Construct small bunds around each plot
- This allows for improved water management for both irrigated and rainfed plots



#### d. Organic matter and fertilizer applications

- Incorporate rice straw / residue after each harvest
- **During plowing:** lightly incorporate 5-15 t/ha of decomposed manure, compost, or other organic matter
- Add organic matter and/or use chemical fertilizer during plant establishment and at panicle initiation
- Use chemical fertilizers only as needed, as a supplement

### 3. Seed Selection and Preparation



#### e. Seed selection and calculation

- For *transplanting*, use 8kg of seed per hectare
- For *direct seeding*, use 16kg of seed per hectare



#### f. Seed soaking / germination

- Before sowing, soak seeds in a bucket of water for 24 hours
- Remove any non-viable seeds floating on the surface
- Soaking speeds up the germination process and separates viable from non viable seeds

*For transplanting continue with steps 4 and 5; for direct-seeding go to step 6*

*SRI can be practiced using transplanting or direct-seeding. Transplanting often results in better plant establishment and reduced weed pressure, but isn't always practical or the best method for some rainfed situations.*

## 4. Seed Sowing and Nursery Management



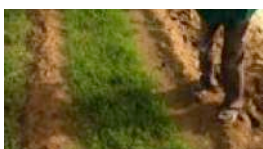
### g. Nursery establishment

- Install the nursery next to the field, and near water
- Use 1m wide beds – adjust the length to adjust the size
- SRI nurseries are 1% of the total field size – e.g., 1m<sup>2</sup> for a 100m<sup>2</sup> field, or 100m<sup>2</sup> for a 10,000m<sup>2</sup> (1ha) field
- Make a 15cm deep seed bed, mixing soil, finely sieved manure and sand in equal parts



### h. Seed sowing

- Sow evenly and at a low density; prevent seeds from touching each other; use 80g of seed per 1m<sup>2</sup> of nursery
- Cover seeds with a thin layer of fine soil, then cover nursery with palm fronds or banana leaves



### i. Nursery management

- Carefully water 1-2 times per day with a watering can
- Remove palm frond or banana leaves when seedlings emerge; protect against predators
- Transplant seedlings at the 2 leaf stage (8-12 days)

## 5. Transplanting



### j. Uprooting and transporting

- Water the nursery before uprooting the young seedlings
- Dig up soil and root mat together, keeping the soil with the roots, and transport on a tray to the field
- Transplant within 15-20 minutes after uprooting



### k1. Marking a planting grid with a rake (optional)

- Make a sturdy rake from metal or wood with 25cm spacing
- Start by marking one edge of the field with a straight rope
- Drag rake along edge rope, and continue marking the entire field in parallel rows, then in perpendicular rows



### k2. Marking a planting grid with a rope (optional)

- Mark a rope with string tied *into* the rope every 25cm
- Fix two marked ropes on opposite sides of field and use a marked third rope stretched in between for planting
- To create a perfect grid: choose one of the side ropes, and align a knot of the transplanting rope with the marks of this same rope, always along the same side of the field



### l. Transplanting

- Plant only 1 seedling per hill, at the 2-leaf stage (8-12d)
- Slide plants carefully into place, creating "L"-shaped roots; avoid pushing seedlings vertically into the mud, to prevent inverting the roots in a "J" shape

## 6. Direct Seeding (if transplanting is impractical)



### m. Spacing and sowing

- Mark out a 25cm x 25cm grid using a rake (k1) or rope (k2)
- Using good seeds (e) and soaking them (f) is essential in order to guarantee good germination!
- Sow 2 seeds per hill, not more! No need to thin them

## 7. Water Management

*Keep soils aerobic through the vegetative growth phase*



### n1. Water management – Irrigated Systems

- Keep soils moist for the first 2 weeks after transplanting
- **Vegetative phase:** Add 1-2 cm of water to field, then let dry – avoid deep water (5-10 cm); repeat each 7-10 days
- Reproductive stage: maintain shallow water level
- Stop irrigating 2 weeks before harvest to dry fields



### n2. Water management – Lowland Systems

- Bund fields (c) to help prevent flooding / retain water
- Choose sites above the flood plain to reduce inundation
- Advance the timing of planting season, so that flooding occurs later in the cropping season, during flowering



### n3. Water management – Upland Systems

- Bund fields (c) to help improve water management
- Use organic matter (d) and mulch to increase water retention in drought prone areas
- Use additional irrigation if available during dry periods

## 8. Weed, Pest and Disease Management



### o. Weed management

- Use a mechanical weeder starting 10 days after transplanting / 2-3 weeks after directly sowing, right after irrigation, and up to 4 times until plant rows close
- Additional benefits from weeder use include: soil aeration, improved nutrient uptake by plants, plot leveling



### p. Pest and disease management

- Follow local IPM recommendations when needed
- SRI crops mature 1-2 weeks earlier than normal, which can make a difference (positive or negative) in susceptibility to birds

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