

Sustainable Intensification of Rice Farming

The System of Rice Intensification (SRI) + Conservation Agriculture (CA)

What is SRI?

SRI is an **agroecological approach to growing rice**, which allows farmers to **increase yields**, while at the same time **decrease inputs** such as water, chemical fertilizers, herbicides and pesticides. SRI can be applied to all varieties of rice.



EARLY AND HEALTHY
PLANT ESTABLISHMENT



ADD ORGANIC MATTER TO
BUILD HEALTHY, FERTILE
SOIL

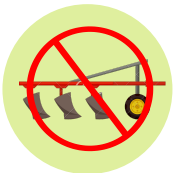


MINIMISE COMPETITION
AMONG PLANTS



AVOID FLOODING
AND ANY WATER
STRESS

MINIMUM SOIL
DISTURBANCE



PERMANENT SOIL
COVER



CROP
DIVERSIFICATION



What is CA?

CA is a crop and soil management system that **increases soil health** (chemical, physical and biological) by increasing soil organic matter, improves water infiltration that **reduces drought stress, reduces GHG emissions**, costs, wear and tear on equipment, and labor, and **increases yields** with less inputs over time. CA also **conserves natural resources, and biodiversity**.

How is SRI + CA possible?

The principles of SRI and CA can be merged to sustainably intensify rice farming. Minimum soil disturbance and early plant establishment are combined through direct seeding of rice (or by transplanting young seedlings into non-tilled/non-puddled fields). Soil cover as prescribed by CA is reinforced by the SRI mandate to add organic matter to build healthy soil. Avoiding flooded conditions and wider-spaced rice plants under SRI methods allows for intercropping and crop diversification. Crop rotation is an important component of integrated pest/disease/weed management.

MINIMAL MECHANICAL SOIL
DISTURBANCE



ADD ORGANIC MATTER TO BUILD
HEALTHY, FERTILE SOIL



MINIMISE PLANTS
COMPETITION



CROP DIVERSIFICATION
AND CROP ROTATION



DIRECT SEEDING



PERMANENT ORGANIC
SOIL COVER



AVOID FLOODING AND
ANY WATER STRESS

EARLY AND HEALTHY PLANT
ESTABLISHMENT



Why SRI+CA?

CA and SRI are both resource-conserving and sustainable farming methods meaning synergies arise from the combination of their practices. SRI enhances plants' phenotype from any given rice genotype while reducing water usage and building fertile soil. CA increases the sustainability of the whole agricultural system by improving soil structure and boosting biological activities

Enhanced Water Efficiency

SRI typically reduces water usage by 25-50% with an average of 3.3 million litres of water saved per hectare. CA increases soil water-holding-capacity and reduces evaporation, further lessening the need of water. CA increases soil physical properties and increases water infiltration and drainage that fills the soil profile with water that alleviates drought.



SRI increases grain yield by at least 20-50% with some studies reporting increases up to 100% or more. CA applied to rice farming increases yield by 12% while also improving soil quality. Combining the two methods allows positive synergies for increased yields.

Enhanced Soil Biodiversity and Resilience

Avoiding continuous flooding allows aerobic soil biota to thrive. Permanent organic mulch, crop diversity and undisturbed soil through no-till result in enhanced soil biodiversity that ensures a balanced nutrient cycle in the soil and improves the resilience of the whole farming system. The organisms in the soil food web are also directly responsible for the augmented carbon transformation and the subsequent sequestration into the soil.

Reduced GHG emissions

SRI water management results in a drastic reduction of methane (CH₄) emissions from paddies ranging from 50% up to 80%. Both SRI and CA reduce the need for synthetic inputs by enhancing ecosystem services (nutrient cycle, natural nitrogen fixation, natural pest management through enhanced biodiversity etc.). Optimizing the use of synthetic inputs and improving the efficiency of their use when needed highly reduces the emission of GHG like nitrous oxide (N₂O).

Why do we need Sustainable Intensification?

To increase agriculture yields without adverse impacts on the environment by taking the whole ecosystem into consideration.

A paradigm shift is needed to ensure food security and high-quality nutrition while fighting climate change. Given the relevance of rice production (9-19% of global CH₄ emissions, source of livelihood for 1 billion people and staple food for 3 billion) the sustainable intensification of rice farming is a priority for ensuring a livable future. SRI and CA are vital for improving soil health, reducing productions costs, increasing yields, improving farm household incomes, and increasing the efficiency of applied inputs.

The agro-ecological principles of SRI and CA enable the sustainable intensification of rice farming, integrating their practices allows for positive synergies.