

Revolutionizing in Rice Farming: “*Unearthing the secrets of System of Rice Intensification (SRI) success*”

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Introduction:

The System of Rice Intensification (SRI) which is mostly promoting from past many years because of its enhanced yield achieved by a set of agronomical management practices for the cultivation of rice (Ceesay *et al.*, 2006; Kabir and Uphoff, 2007; Senthilkumar *et al.*, 2008; Zhao *et al.*, 2009). This makes the rice to cultivate in the rainfed and dryland areas which is generally not possible with the conventional method of rice cultivation, mainly because of its less water requirement to the rice cultivation (Satyanarayana *et al.*, 2007) and less requirement of inputs (Sinha and Talati, 2007). By this method farmers those having a small-scale land are also get benefitted and, they can easily access this method in their fields. This System of Rice Intensification (SRI) method is more environmentally friendly than conventional method of rice cultivation. Because, this SRI method does not required water logged condition as well as more inorganic fertilizers (Uphoff, 1999; Uphoff and Randriamiharisoa, 2002). Water scarcity is the major problem in paddy field that is going to affect the crop more and more. Globally, this situation is been found in many areas. In this situation this System of Rice Intensification (SRI) method attracted the people, mainly the Asian countries (Sinha and Talati, 2007; Uphoff *et al.*, 2002; Yuan, 2002). The main objective of this System of Rice Intensification (SRI) method is to cultivate the rice by making changes in cultural management practices of irrigated rice. These changes include:

- ✚ Transplanting of very younger seedlings compared to normally transplanted seedlings.
- ✚ Planting one seedling per one hill.
- ✚ Seedling are planted in square pattern with higher plant to plant and row to row spacing.
- ✚ Keeping the soil moist but not in water logged saturated condition (Namara *et al.*, 2008; Sato and Uphoff, 2007).
- ✚ Environmentally friendly

- ✚ Increasing the rice yield by using few resources.

This System of Rice Intensification (SRI) farming methodology was developed by a Father Henri de Laulanie in 1980s by spending 3 decades in Madagascar and developed better production method. He impoverished the conventional paddy cultivation method which required low external inputs, less water requirement, and environment friendly. This method improves the lives of small farmers who highly dependent on paddy.

System of Rice Intensification (SRI)

The System of Rice Intensification (SRI) is a management methodology of crop production in rice which helps in the increase in growth, development, and performance of the paddy crop by considering the soil biota with minimum inputs, which was ignored in conventional method of rice farming. The cultural management methods followed in SRI will improve the plant growing conditions which leads to achieving of good productive plants with more effective tillers, leaves, panicles with grains, and excellent root system. This SRI method is adopted locally. But, the principle behind this SRI method is widely applicable.

The elements of System of Rice Intensification (SRI) are:

- 1. Planting individual seedlings with careful:** In this System of Rice Intensification (SRI) method we generally place one seedling per hill which help in increasing its growth potential for root and shoot development. These seedlings are transplanted very early before 15 DAS.



- 2. Reduce plant competition:** In this System of Rice Intensification (SRI) method there will be wider spacing of 25cm x 25cm between plant to plant and row to row and plants are arranged in square pattern. This helps the individual plants to develop more canopy size and root system. This also helps in the maximum utilization of inputs.

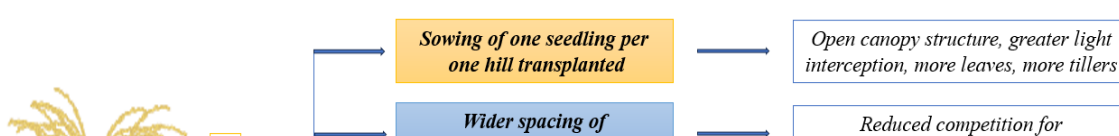


- 3. Keeping the soil in aerobic condition:** This aerobic condition of soil followed in System of Rice Intensification (SRI) method will help the plant in maintain water and oxygen inside the soil, which helps to avoid the plant roots to suffocate. This condition not only helps the plant and its roots, but also for the soil microbes like bacteria and earthworms which are present inside the soil and beneficial to rice plants.



- 4. Conserving of water resource:** In this SRI method alternate wetting and drying (AWD) or intermittent irrigation is followed and irrigation is provided during the critical stages. This will help in utilization of water resource properly and in less quantity compared to conventional method. This also helps in controlling the weed population by mechanical weeder which generally provides soil aeration. This System of Rice Intensification (SRI) method is more beneficial to the rainfed areas where there is less water availability and rice cultivation is not possible with less irrigation.
- 5. Improvement in soil fertility:** This System of Rice Intensification (SRI) method we use the combination of manures and fertilizers for nutrients supply. This will help in maintaining the soil fertility and physical structure of soil.

Elements of System of Rice Intensification (SRI)



Influence of SRI method on Morphological, Physiological changes and Yield in rice:

Morphological changes:	Physiological changes:	Grain yield and attributes:
Increase in plant height, tiller number, leaf number, leaf area index, canopy size, root depth, root length, etc.	Increase in crop growth rate, total chlorophyll content, canopy light interception, Photosynthesis rate, Enzyme activity of roots, Water, and nutrient uptake, etc.	Increase in yield, test weight, filled spikelet, effective panicle number, etc.

Difference between Convectional Farming and System of Rice Intensification

Characteristic	Convectional Farming (CA)	System of Rice Intensification (SRI)
Planting density	It has very high plant density with multiple seedlings are sown per hill.	It has very low plant density as it requires one seedling per hill.
Age of seedling	In this method, old seedlings are transplanted.	In this method, very young seedlings are sown .

Method of sowing	Relies on transplanting of rice seedlings from nurseries to field.	Direct sowing of seedlings is possible.
Fertilizer use	This method utilizes a very high doses of synthetic fertilizers.	This method utilizes organic manures along with low doses synthetic fertilizers.
Weed control	This involves utilizes herbicides for weed control.	In this method mechanical control of weeds is possible.
Resource efficiency	Resource efficiency is seen to be low in this CA.	Resource efficiency is seen to be high in this SRI.
Soil health	Soil is disturbed as it involves deep ploughing and puddling.	It involves shallow ploughing, no excess disturbance of soil.

Pros and Cons of Practicing System of Rice Intensification (SRI) method:

- ✚ **Pros:** Use of chemical fertilizers is reduced in this SRI method. Seed requirement is very low in case of SRI method. The crop is resistance to abiotic stresses. Quality of the grain is also increased by adopting this method. This method required very less amount of water which is a great advantage for the rainfed and dryland areas. The crop gets matured early compared to conventional farming. It reduced the competition among the crop for water, space, nutrients, and light.
- ✚ **Cons:** This method required high labour cost initially. This method is not suitable for areas where there is no irrigation source available. There is lack of awareness among farmers.

Conclusion:

System of Rice Intensification (SRI) is one of the best transforming approaches in rice cultivation which helps in obtaining a greater yield by both quality and quantity wise with a minimal inputs requirement. This method is environmentally friendly because, emission of methane in very low concentration. This method also utilizes organic manures as a nutrients source which is generally not seen in case of conventional rice farming. This is one of the best practises of the people of rainfed and dryland areas in which rice cultivation in very difficult. This method required a very less amounts water for irrigation which saves a lot of water from wastage.

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