# SYSTEM OF RICE INTENSIFICATION (SRI) - A REVIEW

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## ABSTRACT

The system of Rice intensification acronym as (SRI) was developed in last two decades is an effort to find sustainable agricultural practices can be lead to higher productivity and optimum use of capital labour, and less requirement of water or less input cost. SRI, harmonizes the elements of soil, water, light and plant, the plants to achieve their fullest potential. broadcasting of rice in farm consumes 100Kg/ha while planting required 30-60Kg seeds per ha. In SRI only 4-10Kg of seeds is required per ha. Farmers accept and participate in a recommended practices the practice is profitable, compatible with existing farming practices, easy to use, relevance to their labour use, farm inputs marketing, credit community values or crop situation. SRI is found to be an integrated agro-ecologically sound approach to irrigated rice. It is protects ground water from chemical pollution and more dependent to poor farmers. a recommended spacing of 25x 25cm2 or more depending the soil fertility. About 25-50 % of water is saved in system of rice intensification. tillers in SRI plants, having 35-50, even 80-100 or more compared to common ones with 5-10. Number of tillers/plant or number of grains/panicle fertile tillers were also higher in the method. SRI, benefit farmers more in terms of more income with less input, given higher yield with lower investment and beneficial to poorer farmer and households . Crops mature sooner 10-20days, compared with conventional ones. And less economic risk and creates better environment for rice and lowers the risk of environmental and little or no chemical fertilizer is required. some draw backs such as areas are not kept continuously flooded and weeds presents problems. And labour demanding is considers labour intensive for many farmers. farmers are more comfortable with and skilled with SRI. Yield was also found to be higher in SRI with 8t/ha-1 as against 3/ha-1 under conventional paddy. And the system of rice intensification is the best option for rice production in order to meet up with the demand of the increasing population.

## INTRODUCTION

The system for rice intensification (S.R.I) was developed by French Priest Father Henri de Laulani in Madagascar in the 1980 in an effort to find sustainable agricultural practices which lead to higher productivity, optimum use of capital and labour, less input cost and less requirement of water. System of rice intensification (S.R.I) is an acronym that is defined system for rice intensification (SRI) is a way of harmonizing the elements of soil, water, light and plant to allow the plant to achieve its fullest potential, which is often hidden when inappropriate techniques are used (Zotoglo, 2011). SRI, as opposed to traditional rice production, involves alternate wetting and drying 28 SRI tend to be optimistic, they are incomplete in their coverage of the existing scientific literature, and there is a general lack of detailed field research following high scientific standards. So far mostly on-farm trials were conducted on SRI at different Asian countries; there is still need to improve the understanding and spread of this innovation and to undertake critical experiments on SRI. Little is known about how SRI practices, affect rice plants' morphology, their physiology, and the implications of any changes for crop performance in terms of grain yield and water saving. This study investigated whether SRI practices, could have significant effects on plant growth,development, and subsequently on grain yield andwater productivity. According to World Bank, if current trends continue, within 20 years, about 60% of all aquifers in India will be in a critical condition. It is serious implications for the sustainability of agriculture, long-term food security, livelihoods, and economic growth. It is estimated that over a quarter of the country's harvest will be at risk. thus an urgent need to change the

status quo. The 'Reportof the Expert Consultation on Bridging the Rice Yield Gap in the Asia-Pacific Region', published by the FAO in October 1999 says: "Countries like India and China are approaching the limits of water scarcity."

**Principles of system of rice intensification (SRI):** elements of SRI Uphoff, 2007.
physiological principle of SRI practices is to provide optimal growing conditions to individual rice plants so that tillering is maximized and phyllochrons are shortened, which is believed to accelerate growth rates
principles system of rice intensification (SRI)
1. seedlings get transplanted at a much younger age
2. only single seedling, instead of a handful of seedlings get planted in each hole
3. increased use of organic fertilizer to enhance soil fertility

**Beneficial effect of SRI:** SRI is showing that in many cases farmers income can be increased by using less rather than more external inputs. The fact that SRI can give higher yields with lower investment of capital make attractive and beneficial for poorer households. One of the benefit identified was that SRI farmers could make fewer cash outlay at the start of planting season, when their cash reserves were lower (Anthofer *et al.,* 2004). SRI reduces farmer application of synthetic fertilizer and crop protection biocides, with beneficial effect on soil and water quality and health.

**Intermittent irrigation during vegetative growth –**The reported that 25-50% water could be saved by intermitted irrigation without any adverse effect on rice yield (Ramamoorhy *et al*., 1993). Growth is not harmed when plants are exposed to limited water condition during their vegetative stage (Boonjung and Fukai, 1996). Plant adopts osmotic adjustment at the vegetative stage which contributes the mostly noticeable mechanism of dehydration tolerance in the rice drying in the vegetative stage may not only induce root growth into deeper soil layers but could also help the plant to develop xenomorphic. Intermittent drying also improves soil, stimulates tiller development and rice plant, especially upland cultivars having fewer aerenchyma compared to lowland-cultivars, is grown under continuously flooded condition with dense planting pattern, it retards the function of lower leaves and so the root activity and the resulting in 78% root degeneration at the time when flooded rice plants commence flowering (Kar *et al*., 1974) time when peak root activity is required by plants to achieve higher yield.

**Water saving with SRI:** benefit of SRI is through reductions in water requirements. Rice is the thirstiest crop in the world requiring thousand litres of water to produce 1 kg of rice when using conventional rice-growing methods with continuous flooding. SRI alternative water management methods can reduce this by 25-50%, while raising yields 50-100% or more. for using SRI methods wherever water is not an abundant and effectively free good. One social benefit, hard to quantify, is the advantage of reducing the amount of conflict over water (Uphoff, 2003). The realization that rice does not require or produce its best when in standing water comes as quite a surprise to many persons, who have accepted the conventional wisdom. Water productivity can be increased from two times to six times that the research held on China National Hybrid Rice Research and Development Centre, that the water applications could be reduced by as much as 65% on SRI plots compared with conventional irrigated ones and same time yield was 16 t/ha in trials with a Super-1 hybrid variety grown with SRI methods is 35.6% higher than the 11.8 t/ha achieved with the same hybrid in conventional, water intensive methods. water saving with SRI was calculated as 40% in Indonesia, 67% in Philippines and 25% in Sri Lanka while conducting different trials comparing with that of conventional system

**Plant growth under SRI:** Rice plants perform better if they are not flooded continuously and even better when the other SRI practices are followed. SRI demonstrations are already beginning to dissuade rice farmers from their long-held conviction that the more water, the better. This is beneficial for the environment by reducing water applications in rice crops. SRI can make it profitable for farmers not to flood their rice fields. that rice requires continuous flooding for best results (De Datta, 1981) is contradicted by SRI experience and scientific evaluations. That water stress reduces yields, well documented in the scientific literature, has been determined from evaluations of rice plants are grown entirely with continuous flooding, its roots are not well and growth is decresed

**SRI with direct seeding:** Farmers have labour shortages to make transplanting difficult to utilize, have been adapting SRI concepts and methods to direct-seeded crop the other SRI practices. its main objective is to reduce labour requirements. They are try to achieve this goal even if it means that their paddy yield may be reduced because they are most concerned with favourable economics, not just agronomics. evaluated by a rice scientist at Tamil Nadu Agricultural University in India (TNAU). Ariyaratne uses about five times more seed if he established his SRI crop with transplanted seedlings. He is broadcasts seed at a rate of about 25 kg per hectare instead of establishing a nursery with 5 kg of seed per hectare. When the young plants are 10-12 days old in the field Ariyaratne simply weeds he had transplanted it with spacing of 25x25 cm. weeding radically thins the stand of rice, eliminating about 80% of the young plants. It leaves them in a square geometrical pattern, with usually one plant at the intersections of weeding passes, and sometimes two or even three. Occasionally there is no plant within this intersected space, but then adjoining plants grow larger to fill in any open space.

**Yield components and yield performance under SRI**

Average number of panicles per hill was significantly greater than double in SRI hills (average: 16.9 hill-1; range: 12-30 hill-1) than in under SMP (average: 6.9 hill-1; range: 4-12 hill-1). the number of panicles per unit area was also significantly higher under SRI (439.5 panicles) than SMP (355.2 panicles) average panicle length in SRI (22.5 cm) was higher than panicles in SMP (18.7cm) The longer SRI panicles carried nearly 40% more number of grains compared to panicles obtained from SMP, and the percentage of ripe grains and 1000-grain weight were also significantly higher in SRI plants than SMP plants

**limitations or disadvantages of SRI:**

Drawback of SRI for most farmers is that when fields are not kept continuously flooded, weed control presents a problem and Use of herbicides is effective, but it is not have the positive effect of aerating the soil that is achieved Such implements not only remove weeds and create more favorable growing conditions for rice plant roots and for the majority of soil biota this are aerobic. This operation can be quite labour-demanding, but its timing is more flexible than for transplanting and farmers are inventing weeding tools that reduce the labour time required SRI has considered to labour-intensive for many farmers. who were using both SRI and conventional methods determined that while first-year users required 20-30% more labour/ ha, by the fourth year, SRI required 4% less labour and by the fifth year, 10% less. they are dependent on adequate financial underwriting from political commitment from decision makers, and on reliable, high-quality technical backs topping from field agents and researchers at the farmer level. The commitment and willingness of stakeholder including farmers, to continue to innovate with SRI practices within the agricultural system should result in its adaptation to the many environments. farmers have been quick to understand the importance of SRI.

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