

# Impact of LEISA based system of rice intensification (SRI) practices on rice grain yield and soil properties in rice – rice - rice cropping system in Puducherry region

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## ABSTRACT

A field experiment was conducted on farmers' fields in the Southeastern region of Puducherry, India during *kharif* and *rabi* seasons of 2002 to 2005 to study the effect of LEISA based system of rice intensification practices on rice grain yield and soil properties. The field experiment was laid out in Randomized Block Design with twelve treatments replicated thrice. The treatments include incorporation of farmyard manure @ 12.5 t ha<sup>-1</sup> and *Sesbania rostrata* @ 6.25 t ha<sup>-1</sup>, applied alone and in combination with organic mixtures prepared from cow products into plots of a rice–rice–rice system. The results revealed that soils amended with organic manures consistently registered significantly improved organic C, mineral, total N and grain yield compared to the unamended soil.

**Key words :** LEISA, System of rice intensification (SRI), Soil characters, Rice grain yield.

## INTRODUCTION

It is well known that intensive cultivation has led to a rapid decline in organic matter and nutrient levels besides affecting soil physical properties. Conversely, crop residue management practices influence agricultural sustainability by improving physical, chemical and biological properties of soils. However, a better understanding of nutrient cycling and the factors governing their decomposition in soil is imperative for implementing sustainable management practices (Babou *et al.*, 2001).

Therefore, the present study was conducted with the primary objective of determining the effect of successive additions of organic manures and system of rice intensification (SRI) on grain yield and soil properties like pH, organic C and total N content in rice–rice–rice cropping system.

## MATERIALS AND METHODS

### *Panchakavya (organic mixture-I):*

In Sanskrit, Panchakavya means a combination of five products obtained from cow – dung, urine, milk, curd and ghee, fermented for 21 days. When suitably mixed and used as foliar nutrient spray or soil application along with irrigation water or seed or seedling treatment etc., it has positive influence on all living organisms (Somasundaram *et al.*, 2003). It has pesticidal / biocidal and manurial properties, besides serving as a growth

regulator. The properties of Panchakavya are given in the Table 1. Foliar spray of Panchakavya @ 3% during four stages of rice *viz.*, active tillering, panicle initiation, flowering and heading have been given. There are no comprehensive publications on the impact of Panchakavya

**Table 1 : Physico-chemical and biological properties of Panchakavya**

pH	5.12	Actinomycetes	21 x 10 <sup>1</sup>
EC (dsm <sup>-1</sup> )	8.20	Sodium	1600 ppm
Available N	492 ppm	Calcium	1000 ppm
Available P	915 ppm	Magnesium	840 ppm
Available K	1635 ppm	Chlorides	248.50 ppm
Organic carbon	0.60%	Boron	0.442 ppm
IAA	13.50 ppm	Manganese	0.500 ppm
GA	5.60 ppm	Iron	3.150 ppm
Total sugar	575 ppm	Zinc	12.00 ppm
Bacteria	92 x 10 <sup>6</sup>	Copper	0.050 ppm
Fungi	48 x 10 <sup>4</sup>	Total dissolved solids	3.40 ppt

on grain yield and soil quality.

### *Amuthakaraisal (organic mixture-II):*

It is a mixture of cow – dung, urine, Jaggery and water. It is kept overnight and used the next day for soil application along with irrigation water. It has beneficial effects similar to Panchakavya, besides improving soil quality. The properties of Amuthakaraisal are given in the Table 2. Applications of Amuthakaraisal @ 1% through

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