

SYSTEM OF RICE INTENSIFICATION COMPARING SRI WITH CONVENTIONAL METHOD, FARMER'S EXPERIENCES: WARANGAL, TELANGANA

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Abstract: System of rice intensification is an upcoming practice in Indian agriculture, introduced in Madagascar. System of Rice Intensification (SRI) emerged in the 1980's as a synthesis of locally advantageous rice production practices encountered in Madagascar by Fr Henri de Laulanie.

System of rice intensification is a combination of several good practices such as nursery management, water and weed management, transplanting, and irrigation facilities. It was different way of cultivating rice of conventional agriculture method through sum of sustainable best practices. Using of the new methods/techniques / practices to grow rice combinly called as system of rice intensification, by implementing this method there are two way benefits like farmers can get proper income by good yield and increasing the soil fertility, planting method etc. System of rice intensification(SRI) practices showing proper significant response in root number, number of effective tillers per acre, days to get mature, days to flowering, minimizing pest and disease incidence, shortening the crop cycle, and improving plant stand. Grain yield and harvest at end of crop.

Now we can discuss some practically experienced farmers in India. The System of rice Intensification (SRI) is a nationally accepted method in India. The farmers who are cultivating rice crops particularly those who are less then 2 acre of land, have experimented their lands throughout the number of years from 2006 to 2014 and they compared with conventional method simultaneously. Now they are growing the rice in 20 to 30 acre of land they are very much satisfied by using this method. It is their hard work and trust has spread this unknown method in to all rice growing states. Now a days more than 300 districts are following this method for better livelihood by better growing environment for the crops.

By using this method their net returns increased approximately 1.5 to 2 times. However, comparatively higher grain yields from conventional inorganic methods. The System of rice intensification (SRI) is truly a farmer's initiative movement. It would become a farmer friendly method by using organic SRI.

The article reflects the farming experience of **Mr. Gajula KumaraSwamy**, who has been practicing The System of rice intensification (SRI) for last eight (8) years.

Keywords: Conventional practices, Grain yield, Organic and inorganic management, System of Rice Intensification (SRI).

Introduction: The System of Rice Intensification (SRI), developed in Madagascar some 25 years ago, is gaining increasing belief and confidence momentum in the farmers probably 500,000 farmers in more than 50 countries are now using this method to raise their rice production, while also reducing their use of external inputs and production costs. Rather than focus on the innovation itself, this paper will introduce SRI



briefly.

Within SRI's conceptual and practical framework and series of practices farmers have devised many

new activities. These are the focus and the paper considers how farmers have made the original SRI methodology less labour-intensive (even labour-saving), and how they have extended methods devised for irrigated rice production both to un-irrigated areas for growing rice and to other crops beyond rice. By implementing this method there are two way benefits like farmers can get proper income by good yield and increasing the soil fertility, planting method etc. System of rice intensification(SRI) practices showing proper significant response in root number, number of effective tillers per acre, days to get mature, days to flowering, minimizing pest and disease incidence, shortening the crop cycle, and improving plant strength, Grain yield, and harvest at end of crop. By using this method their net returns increased approximately 1.5 to 2 times. However, comparatively higher grain yields from conventional inorganic methods.

The System of rice intensification (SRI) is truly a farmer's initiative movement. It would become a

farmer friendly method by using organic SRI.

Conventional method of rice production

1. **Age of seedlings:** Older seedlings are transplanted at 21-40 days old. Soil is shaken from roots; and seedlings are bundled and transported to fields. Bundles are often left in the open for days.

Seeding rate: 50-75 kg/ hectare

2. **Number of seedlings:** 4-6 seedlings (even 6-8) are clumped and pressed deep into flooded soils, resulting in closely competing seedlings with inverted roots and anaerobic soil conditions.

3. **Spacing of plants:** Close spacing with hills 8-12 cm apart, either in rows or more typically with random spacing.

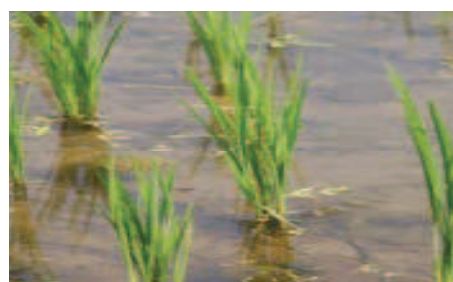
4. **Water management:** Continuous flooding of paddy fields with 4-12cm of water throughout the growing period.

5. **Soil fertilization:** Inorganic synthetic fertilizer is applied, largely replacing the application of organic matter, which enhances soil structure and functioning.

6. **Weed and pest control:** Flooding is supplemented by manual weeding or by herbicide applications; manual weeders cannot be used in randomly planted fields. IPM is sometimes practiced, but pesticides are usually applied pre-emptively or as needed



1



2



4



6

Sri Method of rice cultivation:

1. **Developing nutrient-rich and un-flooded nurseries:** The seedbeds have to be nutrient-rich and established as close to the main field as possible. This will enable quicker and easier transportation between the nurseries and the fields, minimizing both transport time and costs so that the seedlings are efficiently transplanted.

2. **Using young seedlings for early transplantation:** This has to take place when the seedlings are just 8 to 12 days old, soon after they have two leaves, and at least before the 15th day after sowing.

3. **Ensuring wider spacing between seedlings:** The seedlings should be planted at precise spacing, usually 25 X 25 cm², about 16 plants per

squaremeter. Rice plant roots and canopies grow better if spaced widely, rather than densely.

4. **Transplanting the seedlings singly:** The seedlings must be transplanted singly with their roots intact, while the seed sac is still attached. They must not be plunged too deep into the soil, but placed at 1-2 cm on the ground at the appropriate point on the planting grid.

5. **Frequent intercultivation with weeder:** A manual weeder is to be operated perpendicularly in both directions in between the hills within 10 to 12 days of transplantation, and at intervals of 10-12 days afterwards. This operation not only controls the weeds but churns the soil which causes a lot of changes in the soil which favours better growth of the crop.

Managing water carefully so that the plants' root zones.

6. Moistened, but are not continuously submerged: SRI requires the root zone to be kept moist, not submerged. Water applications can be intermittent, leaving plant roots with sufficiency, rather than surfeit of water. Rice grown under SRI has larger root system, profuse and strong tillers with big panicles and well-filled spikelet's with higher grain weight. The

rice plants develop about 35 – 80 tillers and the yields are reported to be higher. The secret behind this is that rice plants do best when young seedlings are transplanted carefully at wider spacing; their roots grow larger on soil that is kept well aerated with abundant and diverse soil microorganisms. This book presents the experiences of some farmers who have tried out SRI method to cultivate rice in different agro-climatic regions of India.



1



2



3



4

Maturity time



5

2 weeks before harvesting



Harvesting time



Farmer's experience: By interaction with farmers on SRI their out comes first farmer Mr.Gajula Kumara Swamy, Bussapur,

(Laknavaram),Govendaraopet (Mandal),Warangal (D.t),Telengana. He cleared all my doubts and he was very happy and free to share his experience,

and he have 18 years of farming experience and now we can go in to the details, Contact no.09966126093.

Paddy cultivation: Gajula Kumaraswamy has 1 acre of agricultural land in which paddy is cultivated in 3-4 acres. His source of water is nearby lake. He applies DAP 75 kg, Urea 75 kg and MoP 25 kg/acre. He gets 2.2 t/acre of yield in flooding method.

SRI adoption: He came to know about SRI through Department of Agriculture, News Paper & Etc. He adopted SRI in *kharif* - 2006 with the guidance



provided by the local Agricultural Officer. Initially he took SRI in 1 acre. He used varieties like

swarna, DPT, MTU-1010 and MTU-1081. He applied inputs like DAP (20 kg), (7q/acre), Cow manure, cow dung,

Benefits:

- Less seed requirement.
- Weeding facilitated good aeration to roots and gave more number of tillers.
- Increased production (1.2-1.8t/acre).
- Early maturity (10-15 days.)
- Reduced chemical fertilizers.

Useful management information gained through experience:

- Reduction of input cost.
- Increased production (YIELD)
- Up to 6-10 acres can be easily cultivated
- Quality of grain is good when compared to conventional method
- Use of organics increased the weight of grains
- More straw yield facilitated sufficient fodder to cattle.

Table 1. Comparative study

Particulars	Cost of cultivation (1 acre)	
	Conventional method (INR.)	SRI method (INR.)
Operations		
Ploughing	1800	1800
Seed	600	400
Transplanting	1200	1100
Weeding	1000	800
Plant protection chemicals	1200	1000
Harvesting & Thrashing	2000	1500
Total	7800	6600
Yield and Income		
Yields (t/acre)	2.64	3.80
Gross Income @ (1400(INR)per q)	36960	53200
Net Income	29160	46600

Suggestions:

1. Formation of Farmers' Groups in villages will facilitate expansion of area
2. Mechanical (power) weeders may be provided for easy operation to adopt SRI In larger area.

Table 2 year vice analysis.

particulars	2010	2011	2012	2013	2014
Area under SRI	20 Guntaas	1 acre (40 guntaas)	90 Guntas	2.Acres 25 guntas	4.acres
Seasons	Kharif	kharif, rabbi	kharif, rabbi	kharif,	Kharif
Variety	Swarna mahsuri	samba mahsuri, 1010, sannalu	samba mahsuri swarna, BPT-5204	samba mahsuri, BPT-5204, 2060, SANNALU	samba mahsuri, BPT-5204, 2060, SANNALU
inputs used	Cow dung, NPK , (12:36:16)	Cow dung, NPK, Vegetable waste,	Cow dung NPK Vegetable waste	Cow dung NPK Vegetable waste	Cow dung NPK Vegetable waste
Practices followed	All practices followed	All practices followed	All practices followed	All practices followed	All practices followed
Implements used: their availability and usage	Rope used for making manual weeding	Rope used for making manual weeding	Rope used for making manual weeding	Rope used for making manual weeding	Rope used for making manual weeding
Yield	By workers (Manually)	by cutting machine	by cutting machine	by cutting machine	by cutting machine

Table.3 Treatments of first SRI trials at village

Experimental treatments in different years at our Village and on farmers' fields as shown in Tables 1-2 as follow: Table 1- Treatments of first SRI trials at our village

Treatments	Conventional methods in our centre	SRI methods
Raising of seedlings	Box seedlings	Box seedlings
Seed rate	17 kg/acre	3kg/acre
Seedling age	3 to 3.5 leaf age	3 to 3.5 leaf age
Number of seedlings/hill	3 to 7 seedling/hill	1 seedling/hill
Transplanting method	By hand	By hand
Plant spacing	30x15 cm	25x25 cm
Irrigation method	Continuous submergence	Intermittent irrigation
Fertilization	Only NPK(19-19-21) kg/acre	Only NPK(19-19-21) kg/acre

Table 4.- Treatments of second SRI trials at our Centre

Treatments	SRI methods without organic manure	SRI methods with organic manure
Raising of seedlings	Box seedlings	Box seedlings
Seed rate	2.5 kg/acre	2.5kg/acre
Seedling age	3 to 3.5 leaf age	3 to 3.5 leaf age
Number of seedlings/hill	1 seedling/hill	1 seedling/hill
Transplanting method	By hand	By hand
Plant spacing	25x25 cm	25x25 cm
Irrigation method	Intermittent irrigation	Intermittent irrigation
Fertilization	Only NPK(19-19-21) kg/acre	NPK+ Chicken manure; Chicken manure

The other farmer is Mamindla Bikshapathi: Lal bahadur nagar, Govindarao pet (Mandal), Warangal

(D.t), Telangana. Occupation(s): Agriculture. He has 10 years of farming experience.

Paddy cultivation: Mamindla bikshapathi possesses nine acres of land, in all of this he grows paddy in two Acres. He uses the bore well to meet all his irrigation needs. The yield using the Flooding method comes to 2.4 t/ acre.

SRI adoption: He came to know about the SRI cultivation through neighbouring Farmers. Following the training, he took it up during the 2008 kharif crop. He has been practicing SRI on one acre for six seasons now with the Yield touching 3.1t/acre. He grows BPT-5204, MTU-1010 with The application of DAP 50 kg, Urea 100 kg and ZnSo₄ 10 kg and 2.5 t of FYM. He Follows all the SRI practices and uses both Conoweeder and Marker. With regard to Pests and diseases.

Benefits: He is happy with the benefits he has received through SRI and sums these up as:

1. Overall reduction of input cost coupled with increased production, highlighting the
2. Individual gains, he cites them as follows.

3. Quality of grain better than that of conventional method.
4. more yield using less seed.
5. Low water requirement.
6. Low labour cost for raising nursery and transplanting.
7. Weeding facilitated good aeration to roots and provided larger number of tillers. This resulted in increased production.
6. Early maturity within 10-15 days.
7. Greater straw yield provided sufficient fodder for cattle.

Constraints in adoption

1. Use of the Conoweeder is very hard; and
2. Use of the Marker is very difficult. Threads

Lessons learnt:

1. Using fertilizers at the appropriate time results in a good crop with higher yields, Without wastage of fertilizers.
2. The practice of weeding at regular intervals also results in good crop growth.

PARTICULARS	Cost of cultivation (1 acre)	
	Conventional Method (INR.)	SRI method (INR.)
OPERATIONS		
Ploughing	2500	2500
Seed	1000	800
Transplanting	1200	900
Weeding	1100	800
Plant protection chemicals	1500	1100
Harvesting & Thrashing	2000	1200
Total	9300	7300
Yield and Income		
Yields (t/acre)	2.48	3.22
Gross Income @ (INR.1450/- per q)	35960	46690
Net Income	26660	33930

Table 6. Organisations involved in Promoting SRI in Andhra Pradesh.

S.no	Category of Actors	Organisations
1	State Bodies	WALAMTARI, NABARD, NFSM, CMSA, Agros, I&CAD, DRR, ATMA
2	Research Institutes	AcharyaRanga Agricultural University (AP), CRRI, IRRI, DRR, ICRISAT, IWMI, Rice Research Station (Warangal), KVKs, RSS,
2	Non-State bodies: National	CSA, CWS, SDTT
3	Non-State bodies: International	WWF, Oxfam, SIDA, SDC
4	Local Organisations: NGOs in AP	Timbaku Collectives, WASSAN, CROPS, RDT, APDAI, , JalaSpandana, Laya, many other local NGOs at grassroot level
5	Individuals (officials and progressive farmers)	Ajay Kallam, Narayana Reddy, Mandava Krishna Rao,

Problems and Suggestions:

The following problems or constraints have been identified, and solutions are being sought or worked out for these.

1. Sometimes due to their poor land preparation and levelling, farmers could not use or were afraid to transplant small, single seedlings as recommended.
2. Difficulty of square transplanting by hand using ropes, markers, etc., especially on big plots
3. Problems of water management caused by traditional field layout not having separate irrigation and drainage channels for the respective fields.
4. Shortages of water and farmers' fear that water supply will not be reliable, also difficulties in some places with drainage of water, making soil conditions more saturated than desirable with

5. Weed control sometimes is difficult under aerobic soil conditions, but this is not a main problem. The new weeders will help with control.
6. Compost and organic manure preparation is difficult and is not popular with farmers. This constraint is being addressed.

Conclusions: By using SRINet returns increased approximately 1-3 times for SRI-organic management regardless of the added labour requirements for weed control. However, comparatively higher grain yield from conventional-inorganic methods underscore the need for further investigations in defining what constitutes an optimum set of practices for an SRI organic system specifically addressing grain yield and weed management. **SRI is truly a farmers' movement.**

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