

Because of the several advantages it offers, System of Rice Intensification is gaining popularity amongst farmers. Information on ways to implement SRI method of rice cultivation organically has been provided in this booklet.



SYSTEM OF RICE INTENSIFICATION

- An Introduction



Introduction

More than 90% of the world's rice production is from Asia. As far as Asian countries are concerned, China and India are the leading producers of Rice. There are several efforts and research being carried on in India to increase the food productivity. As far as India is concerned, rice is a major food crop. At the global level, India stands first in the acreage of rice cultivation (42.4 million hectares) and holds the second position in production (87.6 million tonnes).

The acreage under rice cultivation has reduced from 44.6 million hectares in 2000-2001 to 42.4 million hectares. Increase in population, reduction in groundwater level in the rice growing areas and the interest to cultivate other crops has led to the decline in rice production.

Rice cultivation in Tamil Nadu

In Tamil Nadu, the rice growing area has reduced from 2.8 million hectares to 2.1 million hectares since last 50 years. However, as far as the production is concerned, Tamil Nadu is in second position next to Punjab. Various efforts are being taken in Tamil Nadu to match the food productivity with the growing population.

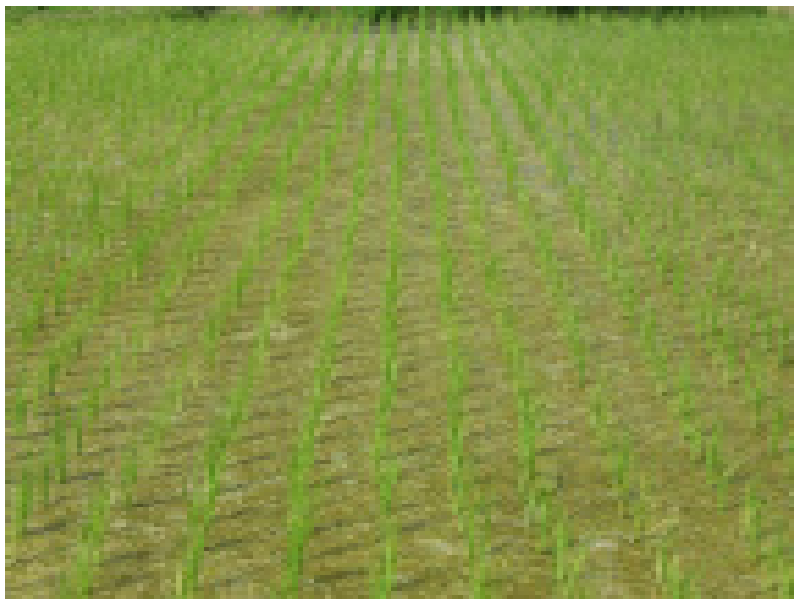
In India, researches are conducted at various levels to increase the rice productivity. Among the various methods of rice cultivation, the SRI (System of Rice Intensification) method is gaining more popularity in recent days. Farmers in several parts of Tamil Nadu have adopted this method on a trial basis. The results we get out of the research is also favourable to this method of cultivation.

SRI Method

SRI method is a method that has been introduced in agriculture to increase productivity. In this method of cultivation, techniques like transplanting of very young seedlings, transplanting seedlings with sufficient spacing, use of weeders to manage weeds etc are adopted to increase the yield. Moreover, use of inputs like seeds, irrigation water, manures is lessened. The yield obtained through this method of cultivation is 25% more when compared to the conventional method of cultivation.

This method was first introduced by a French priest S. J. Henri de Laulanie in 1983 in Madagascar. After he reached Madagascar from France in 1961, he spent nearly 34 years in improving the agricultural practices of the farmers of Madagascar.

SRI method is quite different from the conventional methods of rice cultivation. In the conventional method, the number of seedlings sown per hill is not counted. It is roughly planted (4/5 seedlings per hill). In SRI method, care is taken to sow only one



seedling per hill. Hence the seed requirement also reduces considerably. The seedlings are transplanted with a spacing of 25 - 30 cms between them, so that there is enough room for the sunlight to reach the under parts of the crop as well. Hence, the pest and disease attack is also less.



Since the spacing provided in between the crops is more, there is an advantage of using weeders for controlling the weeds. This way, the labour expense for weeding is also reduced. There is no need for holding the water in the field. Thus, the water requirement is also reduced by 40 - 50%. Since only one seedling is planted per hill,

there are chances for more tiller formation. Thus the yield also increases.

Advantages in SRI method

- ◆ Nursery size required is less.
- ◆ Seed requirement is low.
- ◆ Nursery care is not required for long.
- ◆ Expenses towards nursery preparation, maintenance and labour expense are less.
- ◆ Irrigation requirement is also less.
- ◆ The crop raised by SRI method withstands lodging.
- ◆ There is no problem of rats.
- ◆ The yield is more.
- ◆ The straw yield is also more.
- ◆ The yield is more even in saline soil.
- ◆ The grain weight is more.

Seed rate

Nearly 2-3 kg of seeds is enough for one acre. One cent of nursery is enough for cultivating one acre.

Seed selection

Care should be taken while selecting seeds for rice cultivation. There should not be any contamination in the seeds. The seeds should be pure and have good germination capacity. Seeds of high quality and certified seeds should be used for cultivation. The seeds should not have been attracted by pests and diseases. Salt solution can be used to remove the chaffy seeds from good seeds.

Salt solution test

Take some water in a vessel and drop an egg in it. Keep adding salt to it slowly until the egg reaches the surface of the water. When the seeds are dropped in this water, the good quality seeds will sink into the water. Remove the unviable seeds that float on the surface of the water. Wash the selected seeds in good water for 2-3 times to remove the salt deposits. If this is not done, the germination capacity of the seeds will be affected. By this method, the unviable seeds can be removed completely. This method should be followed when there is more of chaff.

Nursery preparation

One cent of nursery is required for one acre (40 sq. mt.). First, 8 beds of size of 1 m breadth, 5 m length and 5 m height should be prepared. The sand from the same place can be used for preparing the beds. Polythene sheets, coconut fronds or palmyra leaves should be laid on the nursery beds. Sand should be filled over this to a height of 4 cm. and covered with clay to a height of 2.5 cm. and levelled. Either wooden logs or banana sheaths





should be placed at the corners of the beds to keep them firm. Seeds should be sown at regular spacing before the clayey layer in the nursery bed gets dried. After sowing, the seed bed should be covered either with vermicompost or farmyard manure. This should then be covered either with straw or coconut fronds. Water can be sprinkled over this using a rose can or water can be stored in the layer around the bed.



Water should be sprinkled over this for three days after sowing. After this, the cover should be removed and water should be sprinkled daily in the morning and evening hours. Moisture content should be maintained properly in the bed to prevent cracking. Ten percent cow dung solution should be sprayed over the seedling on the 10th day of sowing to prevent disease attack in the nursery.

Handling of seedlings

Seedlings should be transplanted to the main field on the 12th day of sowing. It is good to take the seedlings along with the sand rather than removing them separately. This is done to prevent any damage caused to the roots and to prevent



transplantation shock in seedlings. The seedlings also adapt very well to the field condition and grow well. The seedlings should be removed along with the sand in the form of layers and taken to the main field in carton boxes. The seedlings should be separated at the time of transplanting.



TRANSPLANTATION

Preparation of the main field

Green manure or green leaf manure crop should be grown and ploughed into the soil before preparing the main field for transplantation. If this is not possible, farmyard manure should be applied at least 10 days before transplanting and ploughed well. The field should be ploughed at least six times and prepared well, to maintain uniform spacing among the seedlings. The bunds should be kept clean. Any holes or cracks found in the bunds should be sealed.

Leveling the field

Leveling the field is an important factor in SRI cultivation. The land should be leveled after the final ploughing is done. The land should be irrigated and the water level should be checked to confirm if the leveling has been done uniformly throughout the field. If the field is not leveled properly, the seedlings transplanted in the low lying areas will decay in the water. The soil should be wax like in a well prepared main field.

Method of transplantation

In SRI method, only one seedling should be planted per hill. There should be uniform spacing between the seedlings. Square



planting method can be adopted to maintain uniform spacing between the seedlings. In square planting method, squares should be formed in the wax -like layer of the soil using a marker or a rope.

The seedlings should be transplanted within 15-20 minutes of separating from the nursery beds. One seedling should be planted per hill. They should be planted deep. The seedlings should be planted at a depth of 1-2 cm. from the soil surface and care should be taken that the roots do not face upwards.





Spacing

There should be uniform spacing in between the seedlings. Weeders can be used only when the spacing is uniform in between the seedlings.

Spacing - rows x hills

Medium and long duration varieties - 30 x 30 cm

Short duration varieties - 25 x 25 cm

When a spacing of 25 cm is given between the seedlings, only 16 seedlings are planted per sq. mt. Because of this, the seedlings do not compete with each other for sunlight and nutrients. Hence the crop grows well and early tillers are formed.

Water management

Care should be taken to see that there is moisture content present in the soil always. This is an important criterion in SRI method of cultivation. Proper irrigation channels should be made in the

main field. In fields that do not have proper water draining facilities, channels should be formed at 5 m distance. There should not be any water stagnation in the field.

From transplantation to the panicle initiation stage, 2.5 cm of water level should be maintained in the field. When the crop has attained the panicle initiation stage, the water should be drained from the soil and the field should be left to dry so that small cracks are formed. Later the field should be irrigated to a level of 2.5 cm. This way of irrigating the field and draining the field in cycles, creates air circulation in the soil. At the same time, the moisture content is also maintained in the soil. This not only keeps the roots active but also boosts the activity of microorganisms in the soil.

Weed management

Immediate measures should be taken for weed management. Four weedings should be done using the weeder starting from the 10th day of transplanting - between 10th and 12th day; between 21st and 22nd day; 30th - 32nd day and 40th and 42nd day. Conoweeders can be used to eradicate the weeds. The soil should be moist when the weeders are used. The use of conoweeders is very simple. They should be used in a zig - zag manner in the field. The weeds that are left behind near the roots of the crops after using the weeders should be removed manually. If this is not done, tillering will be affected.

There are several advantages in using weeders for removing the weeds. The weeds are pressed into the soil when weeders are used. This way,





the nutrients that are lost to the weeds are brought back to the soil. When weederers are used, the old roots are cut off and new roots are formed. This helps in easy intake of nutrients from the soil. There would be proper air circulation in the soil. In this method, the soil is pushed close to the root surface and thus keeps the plant intact.

Nutrient management

In the field where the seedlings are to be transplanted, about 10-12 kgs of green manure seeds should be sown and the crop should be ploughed back into the soil when they attain 54-60 days of growth. When this is not possible, 5 tonnes of farmyard manure or 500-1000 kgs of vermicompost can be applied as basal manure. After 18 days of transplantation, 30 kgs of neem cake and 200 kgs of vermicompost can be applied per acre and after 45 days of transplantation, 20 kgs of neem cake and 100 kgs of vermicompost can be applied per acre as basal manure. *Amirthakaraisal* should be mixed with water during the time of irrigation.

***Amirthakaraisal* preparation**

Fresh cow dung	- 10 kg
Cow's urine	- 10 litres
Jaggery	- 250 gms
Water	- 100 litres

The above mentioned ingredients should be added to a cement tank and mixed well. The extract would be ready for use the next day. The extract should be mixed with water during irrigation. This improves the soil fertility and gives good yield.

Pest and disease management

In SRI method of cultivation, the spacing maintained between the crops is more when compared to the conventional method. Hence the pest and disease incidence and rat attack is also low. If there is any pest or disease incidence, it can also be controlled using organic techniques like sticky traps, light traps, rope method etc.

Harvest

The crops cultivated by SRI method comes to harvest 10 days earlier than the normal harvest period. In SRI method of cultivation, the yield will be 25% more. If this method is followed properly, more tillers will be formed and each tiller will produce panicles with more number of grains with better size. Some farmers have got yield of up to four tonnes per acre by practicing SRI method of cultivation.

In SRI method of cultivation though there are many advantages like high yield, less quantity of seeds etc., it has a few disadvantages too.

Disadvantages of SRI method of cultivation

- ♦ SRI method of cultivation is not suitable for rainy seasons.
- ♦ Leveling of field for this method of cultivation is a very difficult task.
- ♦ Square transplantation method is very difficult in large fields.

- ♦ Draining of excess water from the field is very difficult during rainy season.
- ♦ Since the size of the seedlings is very small, it is difficult to transplant them with the help of labourers.
- ♦ 'Conoweeder' should be designed to suit the conditions of the particular region. It is difficult to use a common conoweeder for all the regions.

SRI METHOD INCREASES THE YIELD



Mrs. Dhakshayani Velu is a very active women farmer from the Kaliyapettai village belonging to the Uthiramerur block of Kancheepuram District. She has taken up organic farming with support from our organization. She shows great interest and stands as an example to the other farmers in the village in adopting all the newer techniques in

organic farming. She practiced SRI method of cultivation in paddy. We shall now look at her experiences in SRI method of cultivation and the cost involved in cultivation.

Mrs. Dhakshayani Velu cultivated ADT-43 variety of paddy in 38 cents in the Sornavaari 2008 season by SRI method. She transplanted the seedlings on the 18th day of sowing with a spacing of 25 x 25 cm. The cost of cultivation is provided here.

COST OF CULTIVATION

Expenditure

Seed rate (1.5 kgs)	-	Rs. 50/-
Preparation of nursery	-	Rs. 30/-
Ploughing (4 times)	-	Rs. 800/-
Bund making	-	Rs. 100/-
Transplantation (7 women labourers)	-	Rs. 350/-
Weeding using conoweeder	-	Rs. 100/-
Weeding using labourers	-	Rs.400/-
Amirthakaraaisal (10000 litres)	-	Rs.500/-
Groundnut cake	-	Rs.300/-
Total expenditure	-	Rs.3,130/-

Profit

Grain yield (650 kg @ Rs. 10/kg)	-	Rs. 6,500/-
Straw yield (10 bundles)	-	Rs. 300/-
Total profit	-	Rs. 6,800/-
Net profit for 38 cents is Rs. 6,800 - Rs.3,130	=	Rs. 3,670/-

Mrs. Dhakshayani Velu has spent Rs. 3,130/- and made a profit of Rs. 6,800/- by cultivating ADT - 43 variety of

paddy in 38 cents of land through SRI method. Thus, she has made a net profit of Rs. 3,670/-.

Calculating the cost for one acre or 100 cents,

Total expenditure - Rs. 8,236/-

Total profit - Rs. 17,894/-

Net profit for one acre is

Rs. 17,894.00 - Rs. 8,236.00 = **Rs. 9,658.00/-**

Mrs. Dhakshayani Velu expressed that she got more profit through SRI method of cultivation when compared to the conventional method of cultivation. She further said that the seed requirement was less and the expenses incurred for nursery preparation, plucking of seedlings etc was reduced to a great extent in SRI method. She also reported that there was no pest and disease attack in the crop and the number of tillers was also more.