

Introducing SRI in Chhattisgarh: The CARMDAKSH experience

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Considering the urgent need to find ways to grow more rice, with less water and fewer inputs, the SRI method is proving to be of considerable advantage in exponentially increasing paddy output

INTRODUCTION

CARMDAKSH works with small and marginal farmers in an area that is totally rain-fed. The area is mono-cropped and the farmers have no other livelihood options round the year in Chhattisgarh. They mainly depend on paddy cultivation for their sustenance.

Small and marginal farmers in this region have fragmented landholdings and low capital to invest in agricultural inputs, and are vulnerable to climatic changes. Considering the existing situation of the present scenario in rural areas, some alternatives had to be identified to address the situation of these unprivileged sections of society. SRI seems to be one of the alternatives to address the issues of the farmers.

CARMDAKSH's staff had very limited knowledge of SRI; most of it was learned from newspaper cuttings. The staff took up the challenge at their own risk, saying that if they failed, they would make up the loss from their own pocket. It was also difficult to persuade the labour to transplant 12-day-old seedlings. Finally, the seedlings were transplanted by the staff but there was a delay of 15 days at the time of transplanting. The results, however, were encouraging. The farmer got two bags of produce more than what he usually was able to get (10 bags).

CARMDAKSH was encouraged to take up SRI in a more systematic way; so it approached NABARD under the Rural Innovation Fund. NABARD sanctioned the support to carry out SRI in rain-fed areas, with tribal farmers in different conditions. In 2007, CARMDAKSH implemented SRI with 10 farmers and got encouraging results. The increase in production varied from 30–80 per cent.

there has been remarkable increase in the yield with the use of limited resources, after the adoption of SRI in this region. Farmers are not expected to use any chemical inputs that they will not be able to purchase. They are encouraged to use more organic manure, which is readily available to them. The focus is on the agronomical approaches that can be controlled by farmers such as seed treatment, early transplanting, use of weeders for transplanting, maintenance of a low level of water and use of organic manure.

Preliminary results indicate drastic increases in the yield whereas the use of inputs such as seeds and fertilizers had reduced. Therefore, SRI may be a valuable alternative for small farmers with limited land endowment and very little capital to invest in agricultural inputs. The most difficult aspect of rice plantation in the predominantly rain-fed rice systems was obviously water management with alternating flooding and drying of the rice fields.

CARMDAKSH demonstrated SRI in 2006 on a 75 decimal plot belonging to a tribal farmer in a rain-fed area. It was a big challenge for the team to persuade the farmer to participate in such an innovation, which was so far

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removed from the conventional method that he was used to.

The main obstacles to adopting SRI remain mental and attitudinal. Other common problems farmers face are that:

That SRI demands more personal attention and constant involvement by farmers.

Farmers have apprehensions about the new way of raising seedlings, handling young seedlings and square planting. They also find it difficult to level the main field properly. Weeders are unsuitable for some soils.

STRATEGIES

The new techniques for implementing SRI are often greeted with skepticism by the farmer, who has been cultivating rice in the traditional manner for decades. Farmers have first to be convinced through demonstrations and training about the new techniques; next, they have to be encouraged to try SRI in a small part of their fields and then build up the cultivation from there.

FIELD VISITS

Farmers were taken on field visits where SRI was demonstrated so that they could discuss the process with farmers, who were already

Table 1: Productivity using SRI

| | 2007 (Kharif) | 2008 (Kharif) | 2008 (Rabi) | 2009 (Kharif) | 2010 (Kharif) |
|-----------------|------------------|------------------|----------------|------------------|------------------|
| No. of farmers | 05 | 10 | 50 | 522 | 1,200* |
| Area (in acres) | 2 | 6 | 18 | 261 | 700* |
| (* Expected) | | | | | |

using SRI, and see the difference for themselves. It is easier to believe when you can actually see the results. The farmers find it especially difficult to believe that a single plant can give 40–50 tillers.

INTENSIVE TRAINING/ CAPACITY BUILDING PROGRAMME

Training forms a very important part in SRI expansion because the new method of cultivation needs lower inputs than the conventional method. In spite of repeated explanation that SRI needs only two to three kilogrammes of seed per acre, the farmers use six to eight kilogrammes of seed.

Second, farmers are unable to understand that 10-day-old seedlings can be transplanted. The farmers try to delay the transplanting because they find it difficult to believe that such a young seedling can survive the transplantation.

Third, during the period between transplanting and the first weeding (that is, 15–20 days), the field looks thin compared to conventional fields. At this stage, farmers tend to re-sow the plot with conventional methods because of immense social pressure from family, relatives and other farmers.

WHY SRI?

In the last decade, the Government of India (GoI) and various institutions have implemented many agricultural productivity improvement programmes. They have used different approaches and strategies to increase the yields of rice from the land-holdings of the small farmers. These

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programmes are expected to improve food security, increase rural income and reduce the vulnerability of rural households. The fertilizer split application and the integrated pest management (IPM) were promoted on a large scale. Many improved high-yielding varieties (HYVs) of seeds

were introduced as well. However, the economic viability of the high input approaches for the poor farmers is being questioned, especially because the system has hardly been able to increase yields.

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HOW DOES SRI DIFFER FROM CONVENTIONAL RICE FARMING?

SEEDLINGS FOR SRI

In the conventional method, farmers usually transplant four-week-old seedlings from the nurseries into the fields. In SRI, younger seedlings (10–12 days old) are transplanted. This approach encourages profuse tillering because younger seedlings can be established quickly without suffering from the shock of transplantation. Transplanting young seedlings also increase the number of tillers because they are in the main field for at least two weeks longer than in the conventional method of transplantation. In

Table 2: Comparison between SRI and Traditional Practice

| Conventional Practice | | | SRI Practice | | |
|--|----------------------|----------------------------------|--|------------------------|----------------------------------|
| Variety: 1010 | Area: 0.5 acre | | Variety: 1010 | Area: 0.5 acre | |
| Item | Cost (Rs) | Cost on one acre of land (Rs) | Item | Cost (Rs) | Cost on one acre of land (Rs) |
| Seed: 21 kg | 195.3 | 390.6 | Seed: 2 kg | 18.60 | 37.20 |
| Farmyard Manure (FYM) in nursery:30 kg | 150 | 300 | Farmyard Manure (FYM) in nursery:10 kg | 50 | 100 |
| Labour for seed bed preparation and seed treatment: 1 labour and 1 plough | 140 | 280 | Labour for seed bed preparation and seed treatment: 1 labour | 40 | 80 |
| Labour for ploughing and levelling: 2 labour and 2 ploughs | 560 | 1,120 | Labour for ploughing and levelling: 2 labour and 2 ploughs | 560 | 1,120 |
| Labour for transplanting: 26 labour | 1,040 | 2,080 | Labour for transplanting: 7 labour | 280 | 560 |
| Labour for interculture operations: 8 labour | 320 | 640 | Labour for interculture operations: 2 labour | 80 | 160 |
| Top dressing (7 kg urea) | 42 | 84 | Top dressing (7 kg urea) FYM | 42 300 | 384 |
| Labour for harvesting and threshing: 14 labour | 560 | 1,020 | Labour for harvesting and threshing:12 labour | 480 | 960 |
| Total Cost Incurred (Rs) | 3,007 | 5,914 | Total cost Incurred (Rs) | 1,550 | 3,401 |
| Total Income (Rs) | 4,800 | 9,600 | Total income (Rs) | 9,600 | 19,200 |
| Total paddy yield | 600 kg = Rs 4,800 | 1,200 kg = Rs 9,600 | Total paddy yield | 1,200 kg = Rs 9,600 | 2,400 kg = Rs 19,200 |

SRI, only one seedling is planted per hill as compared to two or three seedlings in the conventional method, and the hills are spaced more widely than usual, which drastically reduces the density of the

seedlings required for planting (from about 200/sq m to 16/sq m). Therefore, only 5 kg of seed are required to plant one hectare, instead of about 50 kg per ha required in conventional practice.

PLANTING

In SRI, planting is usually done in lines, often using a rope with markings at 25 cm intervals, to guide the line of planting. Square planting is important to facilitate the use of a weeder of a particular width. A minimum width is required in both directions and thus a square is optimal. After planting single young seedlings at 25 cm intervals, the plant density looks very low, but four weeks of robust tillering produces a healthy crop. There were concerns that labour requirements for transplanting in SRI would be higher than for conventional planting, despite the fact that the number of seedlings planted is drastically reduced. However, a recent analysis shows that the farmers employed an average of 60 workers for conventional planting and only 35 for SRI planting.

WATER MANAGEMENT

In the conventional method of planting, the recommendation is to irrigate to a depth of five cm one day after the previously standing water disappears from the surface. In SRI, there is no need to keep the field flooded—it is enough to keep the soil saturated. Up to the panicle initiation stage, it is recommended to irrigate the field to 2.5

cm, once the irrigation water has soaked away and hairline cracks have developed. After the panicle initiation, the field needs to be irrigated to 2.5 cm one day after the previously standing water soaks away so that the plants do not experience water stress. This involves alternate wetting and drying management.

INTER-CULTIVATING WITH A WEEDER

A key aspect of the SRI approach is to use a hand-operated weeder to disturb and churn the soil between the rows. This simultaneously removes weeds and aerates the soil. Farmers are concerned that the limited irrigation in SRI might lead to weed infestation. However, because weeder operations start after 10–12 days and are done every 10 days, weed growth is controlled. The cost of weed management in conventional cultivation (hand weeding twice at 15 and 30 days after transplanting) is about Rs 3,000/ha whereas the cost of inter-cultivation with a rotary weeder is about Rs 1,520/ha.

Thus, the profit in paddy cultivation with the conventional and the SRI techniques for 100 decimals is as follows: