

**A report on direct-seeding technology with SRI concepts in rice using drumseeder  
in Chittoor district of Andhra Pradesh, India**

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In the direct-seeding method of rice cultivation, the need for a nursery and tasks such as pulling, transporting and transplanting of seedlings are avoided as pre-germinated seeds are directly sown using a drumseeder in a well-puddled and well-leveled wet field. With a seed rate of 25–37.5 kg/ha, the seed is dropped in rows @ 20 cm row-to-row spacing. The drumseeder made of light fibre material little pulling force to operate, enabling one person to sow one hectare in 5-6 hours compared to 3-4 days of transplanting labour by 30- 40 people in the case of traditional cultivation method. The need for hand weeding is reduced by use of pre-emergence weedicides coupled with use of a modified conoweeder in between the rows. If for any reason the application of herbicides is not possible initially, post-emergence weedicides like Cyhalofop-butyl or Bis pyribac sodium may be applied at 15-30 days after sowing.

The rice seeds that are directly sown into the field need only moist field conditions, and flooded conditions are avoided until the panicle initiation stage. Up to the panicle initiation stage, intermittent irrigation is followed by irrigating the field every 2 to 3 days, depending on the physical properties of the soil. From the panicle initiation stage on, flooded conditions are followed, similar to those with transplanted rice, until irrigation is stopped at 10 days before harvest.

Direct seeding is helpful due to need for less labour and time, lower cost of cultivation due to skipping of nursery raising and transplanting, having a uniform recommended plant population, and also due to the crop's maturing earlier by 7-10 days.



It is observed that the cost of cultivation has been gradually and significantly increasing over the years due

**Smt K.Yuvarani of Mittoor village adopted  
direct seeding in rice since 2008**

to increased cost of inputs and higher wage rates of labour. There is scarcity of labour due to factors like implementation of MGNREGS and increased educational facilities in the rural areas which keep children from becoming agricultural labourers at an early age. These factors have created an imbalance between the supply of and demand for labour.

Further, agricultural operations like transplanting, weeding and harvesting are increasingly undertaken on a contract basis by labourers, who demand high wage rates from farmers. Also, agricultural operations are affected by this contract system due to inconsistencies between work done and the work force engaged. For instance, the transplanting of rice on one acre can require at least 15 labourers, but actually, 7-8 labourers are performing the operation and demanding the

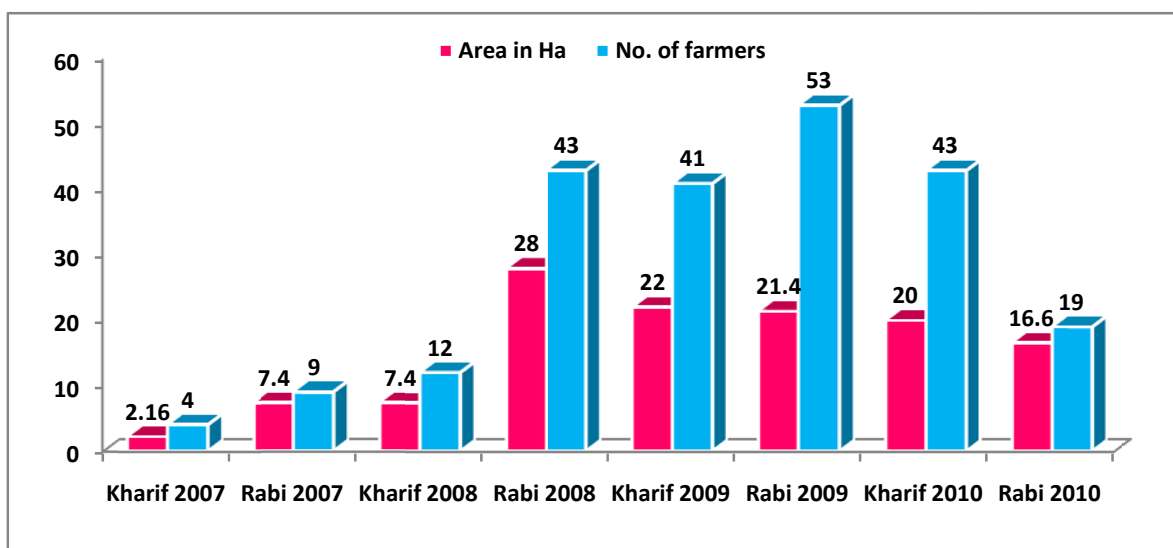
wage for 15 people. Aggressive pulling of seedlings from the nursery results in root damage or in cutting of roots, transplanting at more depth, etc. which affects overall productivity of the crop.

RASS-KVK, THE Rashiya Seva Samithi Acharya Ranga Krishi Vigyan Kendra, is an organization dedicated to improving the lives and future of the farming community with a center in Chittoor district of Andhra Pradesh state ([http://www.rassngo.org/agriculture\\_livelihood.html](http://www.rassngo.org/agriculture_livelihood.html)). It started working on SRI from 2003 by demonstrating the new methods in almost 150 acres. But the innovation was not taken up by many farmers, mainly because of labor costs and constraints.

Direct seeding in rice, applying SRI concepts and principles, was seen by RASS-KVK as a realistic solution to address farmers' problems and raise paddy productivity. Accordingly, cultivation methods were adapted and a direct-seeding implement was developed to utilize the opportunity which SRI innovation represented. The direct-seeding version described here is hence gaining popularity in the district.

KVK has been organizing front-line demonstrations (FLDs) in direct seeding in rice since 2007, and it has undertaken integrated extension efforts including training programmes, FLDs, field days, exposure visits, radio talks, dissemination through newspapers, exhibition stalls, digital videos on the technology, pamphlets and colour bulletins, etc. for disseminating the technology. In addition to this, the KVK has mobilized funds from other sources like the Agricultural Technology Management Agency (ATMA) and the National Bank for Agriculture and Rural Development (NABARD) for popularizing this technology in the district.

**Front-Line Demonstrations organized by KVK on direct seeding in rice in Chittoor district**



**Farm level impacts**

The impact of direct seeding at farm level was measured with indicators like cost of operations, yield parameters, and the economics of paddy production, as assessed in Table 1.

**Table 1. Cost of operation (in Rs.) for direct-seeding method using drumseeder compared with traditional method of transplanting (per ha), 2011**

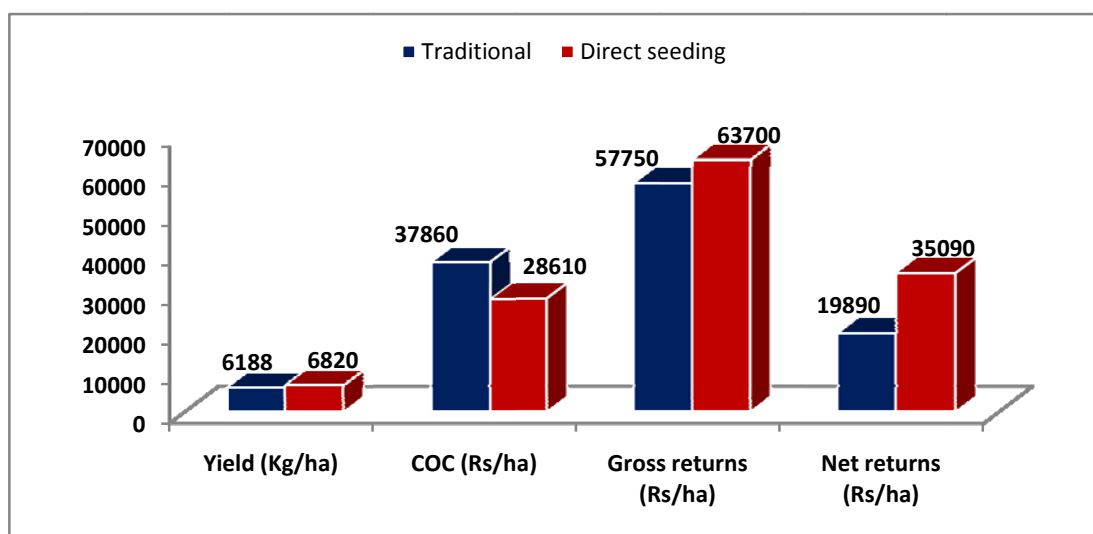
Operations	Direct seeding using drumseeder			Traditional method		
	Input cost	Labour cost	Total cost	Input cost	Labour cost	Total cost
Raising nursery	-	-	-	250	1,125	1,375
Seed rate	750	-	750	1,500	-	1,500
Pulling the nursery & carrying to main field	-	-	-	-	2,250	2,250
Transplanting	-	-	-	-	4,000	4,000
Sowing	-	300	300	-	-	-
Weeding	-	3,725	3,725	-	4,500	4,500
<b>Total (Rs.)</b>	750	4,025	<b>4,775</b>	1,750	11,875	<b>13,625</b>

Man labour: Rs.150/day

Women labour: Rs.90/day

Operationally, the direct seeding with drumseeder method differs from traditional transplanting method in its operations for nursery raising, seed rate, transplanting, weeding and irrigation. The rest of the operations like fertilization, plant protection, harvesting, threshing, and bagging remain the same in both cases. From Table 1, it can be seen that the cost of operations in direct seeding method is very low, 4,775/ha, compared to that for the transplanting method (Rs.13,625/ha).

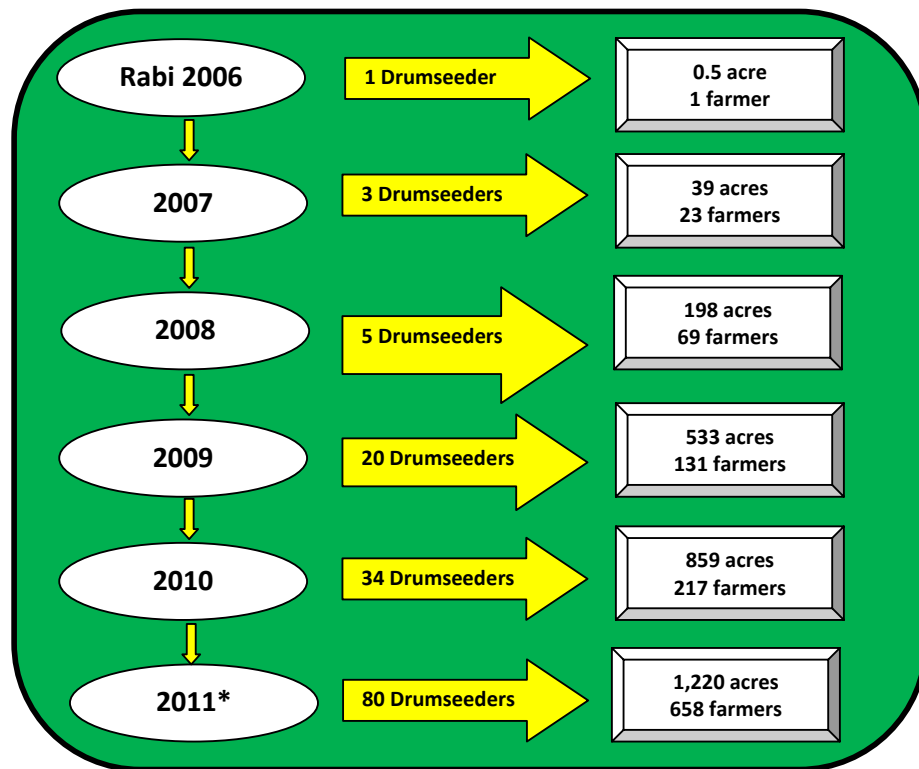
This means that the direct seeding method is profitable for farmers even if they get normal regular yields. Interestingly, recently farmers who manually harvest paddy for meeting fodder requirements are complaining that labourers are demanding more for harvesting drumseeder plots because the process of ‘sickling’ the heavy tiller base is more difficult. This indicates that the rice plants are growing more vigorously, but also there is more biomass available for fodder purposes.



**Figure 1. Yield and economics of rice grown under direct seeding method using drumseeder and traditional method of transplanting (per ha)**

For the reasons indicated in Figure 1 – higher yield (12%), lower cost of cultivation (by 25%), plus higher gross returns (10%), and much higher net returns (76%) – there is growing acceptance of this direct-seeded version of SRI cultivation in Chittoor district. We expect that it can become more popular in many other areas, especially where labor costs and constraints are significant.

**Figure 2. Status of direct-seeded rice cultivation in Chittoor district**



- Through Sept 2011

## Glimpses of direct-seeding technology



Filling up seeder drums with pre-germinated seed, putting an equal volume in all four drums, up to  $\frac{3}{4}$ <sup>th</sup> of the total capacity of each



The difference between direct seeding and traditional transplanting is clearly shown in this photo.



Modified conoweeder is run between rows from 20 DAS





**Modified conoweeder developed by KVK**



**Well-established crop**



**'Good bye' to traditional rice cultivation and welcome to direct-seeding method.**