

Appraisal of Direct Seeding of Rice in Kharif 2020

Executive Summary

Introduction

The return of migrant workers to their native states from Punjab during the COVID-19 lockdown created a severe shortage of labour during the Kharif season of 2020. Paddy transplantation operations were likely to be affected adversely with the possibility of a decline in the area under paddy. Therefore, the Government of Punjab encouraged Direct Seeding of Rice (DSR) by distributing about 4000 DSR machines at subsidised rates along with large-scale efforts on extension activities to promote this technology.

Reportedly, about 5 lakh ha area under paddy was sown through DSR. This remarkable shift in production technology, if continues over time, can also create a new pathway for groundwater sustainability in Punjab.

The Rapid Appraisal for Direct Seeding of Rice in Punjab was carried out during the year 2020 to examine the extent of adoption, factors influencing such adoption. The appraisal also attempted to document cultivation practices followed by DSR farmers during the initial phase of crop establishment, farmers' perceptions about the technology, and the challenges for scaling up DSR in Punjab.

Sampling and Data

The study covers 11 districts, namely Hoshiarpur, Roopnagar, Fatehgarh Sahib, Ludhiana, Sangrur, Ferozepur, Jalandhar, Amritsar, Faridkot, Sri Mukatsar Sahib and Bathinda. The study covered 2 blocks with the highest reported area under DSR and then 5 villages where DSR was majorly adopted in each district. Hence, the study covered 11 districts, 22 blocks and 110 villages in Punjab. The data for the study was collected from 1650 farmers (1100- who adopted DSR and 550- who had not adopted DSR).

Major Findings

- I. Relatively more educated farmers adopted the direct seeding of rice. The farmers who were graduates or above showed a stronger preference for technology.
- II. The adopters were relatively more connected with organisations such as Kisan Clubs, Farmer Producer Organisations (FPOs) and farmers' cooperatives. Their participation in Kisan Melas of PAU and access to institutional sources such as PAU, its KVKs and the Department of Agriculture and Farmers Welfare was for technical information and capacity building.
- III. Majority of the adopters of DSR were medium to large farmers with an average holding size of 22 acres. Also, the adoption of this technology was relatively less on sandy loam textured soils.
- IV. The adoption of DSR was higher amongst the farmers with relatively lower access to irrigation. The power of electric pumps on the farms where DSR was adopted was significantly lower (0.7 HP per acre) than that with the non-adopters (1.3 HP per acre).
- V. The proportion of area under paddy appeared similar on DSR and non- DSR farms and did not emerge as the significant factor for adoption.
- VI. The adopters initially practised almost half of the area under DSR, but nearly half of this area was ploughed back. The highest concentration of DSR reported in South-western districts of State viz. Sri Muktsar sahib (72.5%) Bathinda (61.4%), Sangrur (57.3%) and Faridkot (56.0%). In Hoshiarpur, Amritsar, Ferozepur, Ropar and Fatehgarh Sahib, the coverage was 40-50 percent, and in Ludhiana and Jalandhar districts, between 30-40 percent.
- VII. While 15 percent of farmers ploughed the DSR completely, 27 percent ploughed it partially. Three districts, namely Jalandhar, Ropar and Ludhiana,

reported 70-80 percent of the DSR area being ploughed back, while in the districts of Faridkot, Fatehgarh Sahib, Sangrur, Sri Muktsar Sahib, Bathinda, and Ferozepur ploughed back area was 35-60 percent.

- VIII. The adopters of DSR reported insufficient availability of transplanting labour (90.6%), resultant higher wages for paddy transplanting (88.5%) and less access to irrigation water (29.2%) as primary reasons for adoption.
- IX. The non-adopters reported more confidence in well-established paddy transplantation technology and lack of experience with DSR being new technology. Another important reason for non-adoption was the non-availability of a good DSR seed drill.
- X. Poor initial germination (89.3%), high weed infestation (59.1%), poor crop look/establishment of the crop (48.8%), micro-nutrient deficiency (24.6%), and the problem of rodents (22.4%) were the primary reasons for ploughing back of DSR and switching again to transplanted paddy.
- XI. Majority of farmers don't rate DSR to be a challenging option. They also view it as a cost-saving technology (more than 2/3rd farmers), with the average saving expected to be Rs. 3101 per acre. Most farmers are of the view that it leads to a significantly higher amount of water-saving. The farmers' perceptions about the effect on yield are varied; some were reporting no effect while others were expecting the yield to decline. The views on fertiliser use efficiency of DSR are also varied and call for ramping up efforts on awareness on this aspect.
- XII. The adopters of DSR did not completely adopt the recommended cultivation practices, and themselves brought considerable variations in them.
- XIII. Majority of the farmers (83%) had sown the crop after applying the pre-sowing irrigation (rauni). However,

only 46 percent of DSR adopters treated the seed before sowing. About 59 percent of DSR adopters used 8 to 10 kg paddy seed (per acre), as per the recommendation of PAU, though almost 40 percent used a lower seed rate than recommended. Nearly 95 percent of farmers had used DSR drill, and the rest used non-recommended machines/methods in DSR like broadcasting, happy seeder, wheat seed drill and zero drill.

- XIV. Only about 20 percent of non-basmati growers and 32 percent of basmati growers followed the recommended sowing time (1st and 2nd fortnight of June, respectively). On the other hand, almost 77 percent of paddy and 65 percent of basmati growers had sown the crop before the recommended time. More alarming is the case of about 12 percent non-basmati growers and 32 percent basmati growers who had sown the crop very early, viz. non-basmati in the first fortnight of May and basmati in the second fortnight of May.
- XV. About 56 percent of growers irrigated DSR crop after every 6-9 days. About 28 percent of farmers irrigated more frequently with an interval of 5 days or even less.
- XVI. The farmers adopting DSR faced problems of rodents, termite and excessive weed infestation at the initial stages of crop establishment. Due to weed infestation, most farmers applied weedicides along with one or more manual weedings and incurred costs of Rs. 700-800 per acre on each of them. More than half of DSR farmers resorted to gap-filling due to poor crop germination with an additional labour cost of Rs. 832 per acre.
- XVII. Almost 85 percent of DSR adopters had shown their willingness to continue the DSR, provided no significant yield losses occur. Easy availability of seed drills, quality seeds and weedicides is essential for large scale adoption of this environment friendly

technology. The majority of the farmers expect at least a 50 percent subsidy on these inputs to popularise DSR technology.

- XVIII. The farmers expect electricity supply to pumps to start in the 1st week of May to promote DSR. They expressed the need for awareness campaigns on DSR technique through trainings/camps.

Suggestions for Scaling up of DSR in Punjab

Based on the findings of Rapid Appraisal, the following suggestions are made to scale up the adoption of DSR in Punjab.

- I. There is a need to focus on more educated young farmers in promoting DSR in Punjab. A campaign with these Change Agents will help in fast pacing the adoption process.
- II. PAU, KVKs and the Department of Agriculture and Farmers' Welfare should be allocated more resources for increased connectivity and training with the farmers on DSR.
- III. The campaigns on the adoption of DSR should focus on marginal and small farmers and incentivise them to adopt DSR.
- IV. Special campaigns should be initiated in the districts where the coverage of DSR was relatively lower in 2020. Almost half of the districts, namely Amritsar, Moga, Gurdaspur, Ludhiana, Fatehgarh Sahib, Ropar, SAS Nagar, Ferozepur, Sangrur, Patiala and SBS Nagar, reported less than 25 percent coverage of DSR (source: DOAFW).
- V. There are widespread cases of partial or complete ploughing back of DSR during 2020. Developing literature on success stories in printed matter, audios and videos and distributing it through traditional and ICT tools will be beneficial.

- VI. There is a need to generate more awareness of standard DSR practices amongst farmers and the benefits of such practices.
- VII. There is a need to generate awareness of the optimal time for DSR. Encouraging farmers to adhere to recommended time and not following early sowing will save precious groundwater resources. Farmers must also be made aware of the optimal interval of irrigation to save water.
- VIII. Efforts on addressing the issues of weeds, rodents and other issues of DSR should be increased.