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# Constraints and Socio-Economic Viability Among Direct Seeded Rice Growing Farmers in Karnal District of Haryana

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## ABSTRACT

Direct seeded rice is a feasible alternative to conventional puddled transplanted rice with good potential to save water, reduce labour requirement and mitigate greenhouse gas emissions. Though puddled transplanted rice is the most popular system but whether under the emerging scenario of acute shortages of water and labor, it would maintain sustainability in future is highly uncertain in Haryana. The study aimed to highlight the constraints along with socio economic impact on direct seeded rice growers. The sample of 100 farmers (DSR adopters) from rural areas of Karnal district of Haryana was selected through random sampling technique. Data were collected by directly interviewing the farmers through well-structured interview schedule. Cumulative socio-economic impact as perceived by respondents indicated that DSR is a total cost-effective method (Rank I) from planting /sowing to cultivation which includes water saving, labour saving followed by increased expenditure on social ceremonies and on quality and variety of food got rank II & III with WMS 2.23 and 2.21 respectively. Some of the constraints faced by respondents in Direct Seeded rice growing like weed infestation (Rank I) which was observed by overwhelming majority of the farmers (86%), followed by first to second month is crucial (Rank II) as growth of DSR in the beginning is very slow/not so good.

**Key words:** Direct seeded rice, Puddled transplanted rice, Socio economic impact, Water saving

Rice is one of the most important cereal crops in the world and staple food of the global population. Rice is indeed one of the oldest types of cereal recorded in the history of mankind. Being the major source of food after wheat, it meets 43 per cent of calorie requirement of more than two third of the Indian population. The cultivation of rice in intensive subsistence agriculture becomes synonymous with agriculture. India is the second largest producer of rice in the world being superseded only by China in the gross annual output. In South Asia, rice was cultivated on 60 million hectares (m ha), and production was slightly above 225 million tonnes (m t) of rice, accounting for 37.5 and 32 per cent of global area and production, respectively [1]. Direct seeded rice (DSR) is an alternative establishment method of aerobic rice to sustain productivity of rice as well as natural resources. Aerobic rice is a projected sustainable rice production technology, which can reduce water use in rice production and produce more rice with less water. Direct seeded rice (DSR) is the only viable option to reduce the unproductive water flows. Direct seeded rice as a resource conservation technology which has several advantages over transplanted puddled rice system (TPR). It helps in reducing water consumption as it does away with

raising of seedling in nursery, puddling and transplanting. Thus, it reduces the labour requirement to the extent of about 40 per cent and water saving up to 60 per cent from nursery raising, field preparation, seepage, percolation and evaporation losses [2]. It offers certain advantages viz., less labour, less water requirement, less drudgery, early crop maturity (07-10 days), low production cost, proper placement of seed and fertilizer, increase fertilizer use efficiency, improve soil health for crops and less greenhouse gas emission, in different cropping systems [3]. A transformation represented by an on-going shift from conventional to conservation agriculture i.e., from an earlier set of principles based on massive soil inversion with a plough towards a new set of principles based on minimal soil disturbance, management of crop residues and innovative cropping systems is the best option of farming under rice-wheat cropping system. Recent studies indicate a slowdown in the productivity of growth in the rice-wheat systems of India [4]. Evidence from long-term experiments shows that crop yields are stagnating and sometimes declining. Current crop cultivation practices in rice-wheat systems degrade the soil and water resources thereby threatening the sustainability of the system [5-6]. A transformation represented by an on-going shift from conventional to conservation agriculture i.e., from an earlier set of principles based on massive soil inversion with a plough towards a new set of principles based on minimal soil disturbance, management of crop residues and innovative cropping systems is the best option of farming

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under rice-wheat cropping system. Recent studies indicate a slowdown in the productivity of growth in the rice-wheat systems of India [7]. Direct seeded rice avoids repeated puddling, preventing soil degradation and plough-pan formation. It facilitates timely establishment of rice and succeeding crops as crop matures 10-15 days earlier. It saves water by 35-40% and reduces production cost by Rs. 3000 ha<sup>-1</sup> with an increase in yields by 10% [8]. In general, a total of 1382 mm to 1838 mm water is required for the rice-wheat system accounting more than 80% for the rice growing season [9]. It saves energy, labour, fuel and seed besides solving labor scarcity problem and reduces drudgery of labours. Several countries of Southeast Asia have been shifted from Transplanted Puddled Rice (TPR) to Direct Seeded Rice (DSR) cultivation [10]. The shift in TPR to DSR is due to issues of water scarcity and expensive labour [11]. DSR has several benefits to farmers and the environment over conventional practices of puddling and transplanting. Direct seeding helps reduce water consumption by about 30% (0.9 million liters acre<sup>-1</sup>) as it eliminates raising of seedlings in a nursery, puddling, transplanting under puddled soil and maintaining 4-5 inches of water at the base of the transplanted seedlings. Direct seeding (both wet and dry), on the other hand, avoids nursery raising, seedling uprooting, puddling and transplanting, and thus reduces the labor requirement [12]. So, keeping in view various benefits and advantages, a study was planned to know the socio-economic impact along with various constraints with following objectives:

- To know the socio-economic impact of direct seeded rice method
- To study the constraints of direct seeded rice method

## MATERIALS AND METHODS

The study was conducted in Karnal district of Haryana. From this District Nilokheri and Assandh blocks were selected randomly for the purpose of the study. From Nilokheri block Trarori, Anjanthali, Jamba, Bid Nidana and Shamgarh villages

and from Assandh block Gangatehri, Dupedi, Ruksana and Salwan villages were taken for the study. One hundred respondents were selected, who had adopted direct seeded rice method. On the whole, a total of 100 respondents were surveyed with the help of well-structured interview schedule as per the objectives of the study. Data were analyzed and tabulated to draw the inferences.

## RESULTS AND DISCUSSION

### *Socio-economic impact of DSR on farming families*

Cumulative socio-economic impact as perceived by respondents (Table 1) indicated that DSR is a total cost-effective method (Rank I) from planting /sowing to cultivation which includes water saving (approximately 20%), labour saving (30–35-man days/ha.) and other costs approximately a total saving of Rs. 3000-3200/ha. Increased expenditure on social ceremonies and on quality and variety of food got rank II & III with WMS 2.23 and 2.21 respectively. Further increase in about 10-15% of energy saving namely in nursery raising, tillage, sowing, fertilizers harvesting etc. (human and tractor) was reported by 45% and somewhat increased by 30% of the respondents (got rank IV), increase in expenditure on household construction work / facilities (Rank V), on quality education of children (Rank VI), social mobility increase rank (VII) followed by increase in quality of health services availed (Rank VIII) were reported by maximum number of respondents while on the other hand some of the respondents reported no change in terms of social mobility (34%), quality of health services (33%), expenditure on quality education (31%), on household assets (26%) etc. Direct-seeding of rice has the potential to provide several benefits to farmers and the environment over conventional practices of puddling and transplanting [13]. The various benefits are enumerated like it Saves labour (1-2 v/s 25-30 for PTR), sowing can be done in stipulated time frame because of easier and faster planting and Early crop maturity by 7-10 days which allows timely planting of subsequent crops etc.

Table 1 Socio-economic impact of DSR on farming families

Statements	Socio- economic impact					
	Increased	Somewhat increased	No change	W.S.	W.M.S.	Rank
Expenditure on quality and variety of food	46	29	25	221	2.21	III
Total cost effectiveness (from sowing/planting to cultivation)	47	32	21	226	2.26	I
Expenditure on social ceremonies	46	31	23	223	2.23	II
Expenditure on quality education of their children	42	27	31	211	2.11	VI
Increase in household construction/facilities	45	29	26	219	2.19	V
Socio economic status	39	27	34	205	2.05	VII
Quality of health services availed	39	27	33	204	2.04	VIII
Energy saving	45	30	25	220	2.20	IV

### *Constraints in direct seeded rice*

Although DSR was appreciated by most of the farmers but results revealed (Table 2) some of the constraints faced by respondents in direct seeded rice growing like weed infestation (Rank I) which was observed by overwhelming majority of the farmers (86%), followed by first to second month is crucial (Rank II) as growth of direct seeded rice in the beginning is very slow/not so good. Other constraints opinioned were like problem of rodents (Rank III), and lack of suitable varieties (Rank IV) with WMS 2.32 and 2.16 respectively in growing DSR. The major hurdle has been

paucity of knowledge / awareness and contributing to high yield for weed management in direct seeded rice (DSR) and weeds are a major constraint to the success of DSR in general and to Dry-DSR in particular [14-16]. The major hurdle has been paucity of knowledge / awareness and contributing to high yield for weed management in direct seeded rice (DSR). Weeds are a major constraint to the success of DSR in general and to Dry-DSR in particular [17]. Results revealed that, in the absence of effective weed control options, yield losses are greater in direct seeded rice than in transplanted rice [18]. Weeds are a major constraint to the success of direct seeded

rice in general and to Dry- direct seeded rice in particular [19]. Results revealed that, in the absence of effective weed control

options, yield losses are greater in direct seeded rice than in transplanted rice [20].

Table 2 Constraints in direct seeded rice (DSR) growing among farmers

Constraints	Level of constraints (n=100)					
	Agreed (3)	Neutral (2)	Not agreed (1)	W. S.	W.M.S.	Rank
Weed infestation	86	04	10	276	2.76	I
First to second month critical	53	31	16	237	2.37	II
Problem of rodents	51	30	19	232	2.32	III
Lack of suitable varieties	43	30	27	216	2.16	VI

## CONCLUSION

It is concluded that DSR methods had good socio-economic impact on farming families like it is a most cost-effective method (Rank I) which saves water, labour and time. Some other impacts are increased on social ceremonies,

energy saving, expenditure on household facilities, on quality of education etc. Some of the constraints reported by majority of the respondents were weed infestation (Rank I). Starting 1-2 months are crucial and problem of rodents (51.1%). So, it's suggested that there is a need to find out solution for weed management and to launch suitable varieties of DSR.

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