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Constraints Perceived by Farmers in Adoption of Direct Seeded Rice Cultivation in Haryana

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ABSTRACT

The study focused on constraints perceived by farmers' in adoption of Direct Seeded Rice Cultivation Technology in Haryana since it is being a most feasible and sustainable alternative rice-ecosystem in view of depleting water resources, reduced labour use and climate risks being major concerns in conventional method of cultivation. Among constraints non- availability of quality seeds, fertilizers, weedicides and pesticides in required quantity and at proper time, high weed infestation in DSR in comparison to transplanting, wide fluctuation in prices of basmati paddy due to lack of MSP, lack of storage facilities in villages, lack of proper knowledge of irrigation schedule, non-availability of extension personnel, non-availability of agricultural magazines and literature in time in villages, lack of stable procurement policy for basmati rice and lack of trained field staff to provide technical guidance during cultivation process were serious constraints faced by farmers in adoption of DSR technology in Haryana. Concerted efforts should be made by government and non-government agencies to address the problems faced by farmers in adoption of DSR especially quality inputs and strengthening the capacity building of both field functionaries and farmers regarding DSR technology for its establishment in farmers' field.

Keywords: Constraints, basmati rice, climate change, direct seeded rice

INTRODUCTION

Rice is the most prominent crop of India since it is the staple food of more than 70 per cent of population of the country. It also plays vital role in country's food security as well as providing livelihood to millions of rural households. India is the second largest producer of rice after China. Since independence its yield has increased four times due to increase in yield of improved varieties, area under rice approximately increased 40 per cent since 1950. In India demand for rice will increase because of population growth and change in dietary pattern. The increase in rice production has to come from higher yields by adoption of innovative and sustainable technologies making efficient use of natural resources because further expansion of area is not possible in fact it is declining.

Therefore, the sustainability of rice-eco-system and ability to increase production in pace with population growth with reduced water and labor use and climate changes are major concerns in conventional method of cultivation of rice. Only direct-seeded rice (DSR) is feasible alternative with good potential to save water, reduce labour requirement, mitigation of green house gases (GHGs) emission and adaptability to climate risks.

Haryana is second largest state to contribute in central procurement pool of rice after Punjab. The yield is almost at par in case of basmati group if crop

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is properly managed for which CCS Haryana Agricultural University, Hisar have recommended package of practices of DSR cultivation in the year 2012. Presently, Haryana leads in production of aromatic basmati rice and more than 60 per cent export of basmati rice is undertaken from the state.

Keeping in view the above facts and importance of this technology towards sustainable production of rice for the country as a whole and Haryana in particular, the study was undertaken with the following objectives.

1. To ascertain the constraints perceived by farmers in adoption of DSR cultivation technology.

METHODOLOGY

The study was conducted in Haryana state. Four districts Yamuna Nagar, Kurukshetra, Karnal and Kaithal were selected purposively because maximum cultivation of rice is under these four districts. From each district, one block with maximum area under DSR culture was selected purposively viz. Sadhaura from Yamuna Nagar, Shahbad from Kurukshetra, Assand from Karnal and Pundary from Kaithal. Further two villages, namely, Sarawan and Peerbholi villages from block Sadhaura, Malikpur and Basantpura villages from block Shahbad, Rugsana and Chochra villages from block Assandh and Faral and Habri villages from block Pundri were selected because maximum DSR culture was under these villages. From each village, 15 farmers were selected randomly, who were growing rice in DSR culture, making a total of 120 farmer respondents. The data were collected with the help of well structured interview schedule. The data were analyzed and tabulated after applying suitable statistical techniques like frequency, percentage, means and rank orders.

RESULTS AND DISCUSSION

Constraints related to inputs perceived by farmers

The findings of the study (Table 1) revealed that among input constraints viz., 'non-availability of quality seeds, fertilizers, pesticides in required quantity and at proper time' ranked first with highest weighted mean score (1.64) followed by 'high cost of seed' ranked second with the weighted mean score (1.60), 'non-availability of inputs at village level' ranked third with the weighted mean score (1.57).'Inadequate credit facilities for purchase of inputs' ranked as fourth and 'high prices of weedicides, chemical fertilizers, pesticides and fungicides' ranked fifth with weighted mean score of 1.43 and 1.41, respectively. So it can be concluded that non-availability of quality seeds, fertilizers, and pesticides in required quantity and at proper time, high cost of seed and non-availability of inputs at village level were serious constraints. The findings, therefore, concluded that timely availability of quality inputs in required quantity and at proper

Table 1. Constraints related to inputs perceived by farmers

(n=120)

Input constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
Non-availability of inputs at village level	23(19.17)	22(18.33)	75(62.50)	188	1.57	III
High cost of seed	25(20.83)	22(18.33)	73(60.83)	192	1.60	II
High prices of weedicides, chemical fertilizers, pesticides and fungicides	20(16.67)	9(7.50)	91(76.83)	169	1.41	V
Non-availability of quality seeds, fertilizers, weedicides and pesticides in required quantity and at proper time	18(15.00)	41(34.17)	61(50.83)	197	1.64	I
Inadequate credit facilities for purchase of inputs	18(15.00)	16(13.33)	86(71.67)	172	1.43	V

time was not assured which was very much essential for sustainability of agriculture particularly food crops to ensure health and nutritional security of human beings. Findings are in consonance with past study of Oudhia (1999) who reported that 30 per cent farmers faced problem due to high cost of input. While, Jasna *et al.* (2016) also reported that inputs in required quantity was major constraints.

Constraints related to production perceived by farmers

From results presented in Table 2 it is clear that among production constraints viz., 'high weed infestation in DSR in comparison to transplanting' ranked first constraint with highest weighted mean score (2.88), 'poor drainage facility' ranked second major constraint with the weighted mean score (2.39) and 'attack of insects pests' ranked third constraint with the weighted mean score (1.39) followed by 'low production due to unfavourable weather conditions' and 'attack of drought prone plant diseases' were ranked as fourth and fifth constraints with weighted mean (1.29) and (1.08), respectively.

The very serious constraints related to the production, faced by the farmers was, 'high weed infestation in DSR in comparison to transplanting' ranked first followed by 'poor drainage facility' as serious constraints, whereas least serious or not so serious constraints were, 'low production due to unfavorable weather conditions' and 'attack of drought prone plant diseases' . The study revealed that weed infestation was the major problem and responsible to increase input cost and weeds competed with main crop plants for uptake of water, nutrients, etc. in decreasing the yield. The findings are in agreement with the findings of Muhammad *et al.* (2006), Kumar *et al.* (2008), Pathak *et al.* (2011), Rehman *et al.* (2011) and Weerakoon *et al.* (2011).

Constraints related to marketing perceived by farmers

The results presented in Table 3 regarding constraints related to marketing show that 'wide fluctuation in prices' ranked first constraint with highest weighted mean score (2.83) and 'lack of storage facilities in village' ranked second major constraint with the weighted mean score (2.78), whereas 'lack of minimum support price' ranked third constraint with the weighted mean score (2.60). While 'low price of produce in spite of export-oriented food grain' was ranked as fourth constraint with the weighted mean score (2.83) followed by 'lack of cooperative organization for marketing of produce' ranked fifth constraint with the weighted mean score (2.08), 'lack of marketing facilities in village' ranked sixth constraint with the weighted mean score (1.97). 'High market charges for sieving, cleaning, loading and unloading of produce', 'lack of marketing knowledge & intelligence' and 'lack of grading system' ranked seventh, eighth and ninth with weighted mean score of 1.71, 1.33 and 1.21, respectively.

Table 2. Constraints related to production perceived by farmers

(n=120)

Production constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
Low production due to unfavorable weather conditions	5(4.17)	25(20.83)	90(75.00)	155	1.29	IV
Poor drainage facility	58(48.33)	51(42.50)	11(9.17)	287	2.39	II
High weed infestation in DSR in comparison to transplanting	106(88.33)	13(10.83)	1(0.83)	345	2.88	I
Attack of drought prone plant disease	2(1.67)	6(5)	112(93.33)	130	1.08	V
Attack of insects-pests	5(4.17)	37(30.83)	78(65.00)	167	1.39	III

Table 3. Constraints related to marketing perceived by farmers

(n=120)

Marketing constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
Low price of produce in spite of export oriented food grain	49(40.83)	56(46.67)	15(12.5)	274	2.83	IV
Lack of minimum support price	74(61.67)	44(36.67)	2(1.66)	312	2.60	III
Lack of cooperative organization for marketing of produce	30(25.00)	69(57.5)	21(17.5)	249	2.08	V
Wide fluctuation in prices	107(89.17)	12(10.00)	1(0.83)	346	2.83	I
Lack of marketing facilities in village	16(13.33)	84(70.00)	20(16.67)	236	1.97	VI
Lack of storage facilities in village	100(83.33)	14(11.67)	6(5.00)	334	2.78	II
Lack of marketing knowledge & intelligence	1(0.83)	38(31.67)	81(67.50)	160	1.33	VIII
Lack of grading system	3(2.5)	20(16.67)	97(80.83)	146	1.21	IX
High market charges for sieving, cleaning, loading and unloading of produce	18(15.00)	49(40.83)	53(44.17)	205	1.71	VII

Among constraints related to marketing, 'wide fluctuation in prices' was perceived most serious ranking first, 'lack of storage facilities in village' was considered as the second most serious constraint followed by 'lack of minimum support price' and 'low price of produce in spite of export-oriented food grain'. The findings seem to be logical since farmers are forced to distress sale of produce ultimately hampering adoption of new technology oriented to export quality food grain production in view of wide fluctuation in prices even the minimum support price for which is not fixed by the government.

Constraints related to technical guidance perceived by farmers

Table 4 reveals that among constraints related to technical guidance 'lack of proper knowledge about irrigation schedule' ranked first with highest weighted mean score (1.73), followed by 'non-availability of extension workers for technical guidance' which

Table 4. Constraints related to technical guidance perceived by farmers

(n=120)

Technical guidance constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
Lack of guidance for proper sowing time	6(5.00)	21(17.50)	93(77.50)	153	1.28	IV
Lack of guidance for controlling insect-pests & diseases and application of pesticides and fungicides	2(1.66)	23(19.17)	95(79.17)	147	1.23	VI
Lack of knowledge of current advances in direct-seeded rice cultivation technology	5(4.16)	38(31.67)	77(64.17)	168	1.40	III
Lack of guidance about recommended doses of new weedicides and their application techniques	2(1.66)	26(21.67)	92(76.67)	150	1.25	V
Lack of proper knowledge about irrigation schedule	2(1.66)	83(69.17)	35(29.17)	207	1.73	I
Non-availability of extension workers for technical guidance	23(19.17)	31(25.83)	66(55.00)	197	1.64	II

ranked second with weighted mean score (1.64), 'lack of knowledge of current advances in direct-seeded rice cultivation technology' as third major constraint with weighted mean score (1.40), whereas 'lack of guidance for proper sowing time' ranked fourth with weighted mean score (1.28), 'lack of guidance about recommended doses of new weedicides and their application techniques' ranked fifth with weighted mean score (1.25) and 'lack of guidance for controlling insect-pests & diseases and application of pesticides and fungicides' ranked sixth constraint with weighted mean score (1.23).

Lack of proper knowledge about irrigation schedule' as the major constraint faced by the farmers related to technical guidance, 'non-availability of extension workers for technical guidance' and 'lack of knowledge of current advances in direct-seeded rice cultivation technology' were ranked second and third. Although the farmers had high adoption in case of irrigation schedule may be due to assured irrigation facilities but they have expressed as most serious constraint for technical guidance. Perusal of the data indicates that most crucial aspect like irrigation schedule which is core activity for success of DSR technology needs more result demonstration and further dissemination by the extension agencies for increasing the benefits of this resource conserving and eco-friendly rice production technology and concern of farmers regarding lack of knowledge of DSR technology along with lack of guidance related to weed control and insect-pest control seems to be logical that field functionaries are concerned only to supply inputs rather than technical advancement. The study got strength from Oudhia (1999) who reported that only 12.5 per cent farmers were aware about technical guidance. Singh *et al*. (2013) reported that farmers do not have full knowledge of scientific cultivation practices.

Financial constraints perceived by farmers

The findings contained in Table 5 regarding perception about financial constraints reveal that 'lack of low interest-credit facility' ranked first with highest weighted mean score (1.62) followed by 'higher cost of farm machinery' and 'inadequate funds to buy seed drill, power sprayers, harvester and other farm implements' and 'no subsidy on seed drill machine' were ranked second, third and fourth constraints with weighted mean score (1.59), (1.36) and (1.21), respectively. Singh et al. (2016) also reported that lack of government subsidy was major constraint.

It can be concluded that 'lack of low interest-credit facility' is a major constraint faced by the farmers related to financial matters followed by 'higher cost of farm machinery', 'inadequate funds to buy seed drill, power sprayers, harvesters and other farm implements' and 'no subsidy on seed drill machines'. Findings of the study seem to be logical since financial situation of the farmers plays a vital role in adoption of mechanization oriented technology like DSR for which a specially designed seed drill is required.

Table 5. Financial constraints perceived by farmers

(n=120)

Financial constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
No subsidy on seed drill machine	2(1.67)	21(17.50)	97(80.83)	145	1.21	IV
Lack of low interest-credit facility	15(12.50)	44(36.67)	61(50.83)	194	1.62	I
Inadequate funds to buy seed drill, power sprayers, harvester and other farm implements	10(8.33)	23(19.17)	87(72.50)	163	1.36	III
Higher cost of farm machinery	15(12.50)	41(34.17)	64(53.33)	191	1.59	II

Constraints related to information as perceived by farmers

An examination of the results presented in Table 6 indicates that among constraints related to information, viz., 'agricultural magazines and literature are not timely available in village' was ranked first with highest weighted mean score (2.78), 'no knowledge about Radio/T.V. programs related to DSR cultivation technology' was ranked second with weighted mean score (2.76) and 'poor knowledge about using cyber communication source' was ranked third with weighted mean score (2.72).

While 'inadequate and incomplete information is given by input dealers' was ranked fourth constraint with weighted mean score (1.83), 'ADOs have poor knowledge about DSR cultivation technology' was ranked fifth with weighted mean score (1.32) and 'experts language is more scientific than local language' was ranked sixth constraint with lowest weighted mean score (1.15). 'Experts' language is more scientific than local language' was ranked sixth

It is surprising to note that most reliable mass media like agricultural magazines and literature is not made timely available to farmers along with poor knowledge of radio & TV programs pertaining to DSR technology which are essential for supplementing and complementing their knowledge of DSR as well as to reach largest number of farmers for its quickest acceptance by the farming community for sustainable food production. Although the constraints such as inadequate and incomplete information by input dealer and poor knowledge of ADO about DSR were perceived not so serious by farmers for which probable reason may be their dependence on them for inputs like seeds, fertilizers and chemicals so the technical knowledge of the grass root functionaries should be updated for greatest success of such technology. Similar findings have been reported by Oudhia (1999) that information was a major constraint and 42.5 per cent farmer faced that problem.

Miscellaneous constraints perceived by the farmers

An examination of the findings presented in Table 7 indicates that miscellaneous constraints perceived by the farmers viz., 'lack of proper procurement policy of Govt.' ranked first constraint with highest weighted mean score (2.46), followed by 'lack of trained field extension staff to provide technical support throughout cultivation process' which ranked second constraint with weighted mean (2.02), 'non-availability of quality seed from Govt. agencies' ranked third constraint with weighted mean score (1.96) and 'high cost of seeds, chemical fertilizers, weedicides and pesticides, etc. was ranked fourth with lowest weighted mean score (1.48).

Table 6. Constraints related to information as perceived by farmers

(n=120)

Information constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
ADOs have poor knowledge about DSR cultivation technology	11(9.17)	16(13.33)	93(77.50)	158	1.32	V
Experts language is more scientific than local language	6(5.00)	6(5.00)	108(90.00)	138	1.15	VI
No knowledge about Radio/T.V. programs related to DSR cultivation technology	97(80.83)	17(14.17)	6(5.00)	331	2.76	II
Agricultural magazines and literature are not timely available in village	96(80.00)	22(18.33)	2(1.67)	334	2.78	I
Poor knowledge about using cyber communication source	92(76.67)	22(18.33)	6(5.00)	326	2.72	III
Inadequate and incomplete information is given by input dealers	17(14.16)	65(54.17)	38(31.67)	219	1.83	IV

Table 7. Miscellaneous constraints perceived by the farmers

(n=120)

Miscellaneous constraints	Constraints			Total weighted score	Weighted mean score	Rank order
	Very serious (3)	Serious (2)	Not so serious (1)			
Non-availability of quality seed from Govt. agencies	42(35.00)	31(25.83)	47(39.17)	235	1.96	III
High cost of seeds, chemical fertilizers, weedicides and pesticides, etc.	26(21.67)	6(5.00)	88(73.33)	178	1.48	IV
Lack of proper procurement policy of Govt.	62(51.67)	51(42.50)	7(5.83)	295	2.46	I
Lack of trained field extension staff to provide technical support throughout cultivation process	43(35.83)	36(30)	41(34.17)	242	2.02	II

The findings pertaining to miscellaneous constraints perceived by the farmer show that 'lack of proper procurement policy of Govt.' was ranked first followed by 'lack of trained field extension staff to provide technical support throughout cultivation process', 'non-availability of quality seed from Govt. agencies' and 'high cost of seeds, chemical fertilizers, weedicides and pesticides, etc.' were ranked second, third and fourth, respectively. Findings of the study seem to be logical since remunerative price of produce and its demand along with higher technical skills of production are key components of adoption of new technology by farmers so government should take necessary steps like stable procurement policy for basmati rice and maximum number of trainings for updating technical knowledge and skill of field functionaries and farmers both for harnessing greater benefits of such eco-friendly and resource conservation technology in food production system.

CONCLUSION

The overall adoption of DSR technology was low to moderate for which study reported that non-availability of quality seeds, fertilizers, weedicides and pesticides in required quantity and at proper time, high weed infestation in DSR in comparison to transplanting, wide fluctuation in prices of basmati paddy due to lack of MSP, lack of storage facilities in villages, lack of proper knowledge of irrigation schedule, non-availability of extension personnel, non-availability of agricultural magazines and literature in time in villages, lack of stable procurement policy for basmati rice and lack of trained field staff to provide technical guidance during cultivation process were serious constraints faced by farmers in adoption of DSR technology in Haryana.

The government should seriously look into the problems faced by farmers in adoption of DSR technology. Moreover, the actions are needed to ensure the availability of quality inputs, reducing the cost of inputs or providing these at subsidized rates, fixing the minimum support price of export-oriented crop, updating the technical knowledge of both the field functionaries and farmers for its higher adoption and wider dissemination using the mass media like newspaper, radio & TV for the success stories of active adopters for greater acceptance by the farmers.

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