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Adoption of direct seeded rice (DSR) technology by the farmers in Kaithal, Haryana

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ABSTRACT

The study was focused on socio-economic profile and adoption level of direct seeded rice (DSR) technology by the farmers. It was found that majority of the farmers (36.53%) belonged to low level of adoption followed by 34.17 per cent to medium and 30.00 per cent to high level of adoption. In nutshell 70 per cent of the farmers had low to medium level of adoption means farmers had not adopted the full package of practices recommended by the CCS Haryana Agricultural University, Hisar, Haryana. KVK scientists and extension officials of agriculture department are motivating farmers by field demonstrations, exposure visits and subsidies on inputs and training on various aspects related to DSR so that they could adopt this resource conservation technology. It has been observed that the adoption of this technology has brought the desired results and helped the farmers.

Keywords: Direct seeded rice, adoption level; technology; farmers

INTRODUCTION

The introduction of modern technology in agriculture has resulted into a remarkable increase in agricultural production but it is not uniform in different regions among different sizes of farms and even within the crops having relatively low technological breakthrough. However agricultural development in India has initiated the shift from traditional to modern farming system. Due to predominance of agriculture in the national economy the overall rate of economic growth depends to a large extent on the growth of agricultural sector. Rice is the most important food crop of the developing world and the staple food of more than half of the world's population (http://ricepedia.org/rice-as-food). India requires increasing rice production by 3 million tonnes every year to ensure food security (Dass et al 2016). Rice-wheat is the major cropping sequence in India and India is the second largest producer of rice next to China (http://www.fao.org/india/fao-in-india/india-at-a-glance/en/). Rice receives a large amount of water during land preparation and the growing period causes poor crop water productivity and lower net benefits (Kumar et al 2012).

Over-exploitation of ground and surface water resources is a major threat to the sustainability of rice production in India. The main problem which becomes havoc to the Indian agriculture is heavy irrigation in the areas which receive ample quantity of water. The long term effects have been seen in terms of soil degradation. Soils with heavy irrigations are converted into barren lands due to soil salinity which in turn results into lower productivity per unit area. The population is increased many folds but the area under agriculture is reducing every year. So to manage this problem the different aspects of production of field crops have to be taken into consideration. Paddy is a crop which is grown in irrigated areas only and traditionally in India. To grow one kilogram of rice as many as 5,337 litres of water is required (Nibber 2016). It means to say that India is not exporting rice but water which in the coming years will become the commodity in the world. Exploring ways to produce more rice with less water is essential for food security and sustaining environmental health in Asia (Tuong and Bouman 2003). Direct seeded rice method of planting in paddy can result into saving of money of the farmers and the inputs used in the system can be efficiently utilized with the small changes in the cultivation practices (Kumar et al 2018). Direct seeding of rice was a

common practice in India before green revolution (Singh and Shahi 2015). Currently direct seeded rice in Asia occupies about 29 Mha which is approximately 21 per cent of the total rice area in the region (Pandey and Velasec 2002). The machines used in direct seeded rice can also influence the costs as compared to transplanted paddy. Land preparation duration is significantly reduced in direct seeded rice compared to transplanted rice. This leads to a significant reduction in irrigation and total water input (rainfall and irrigation) before crop establishment. However during the crop growth period in the main field, transplanted rice has a significantly shorter crop growth duration and total water input than direct seeded rice. Also the land under direct seeded rice captures more rainfall after crop establishment (Cabangon et al 2002).

The recent method of paddy cultivation ie direct seeded rice in Haryana is limited to the few paddy growing districts and only with the assistance of the KVK scientists and department of agriculture, Haryana. Extension officials are motivating farmers by field demonstrations, exposure visits and subsidies on inputs and trainings on various aspects related to DSR so that they could adopt this resource conservation technology. It has been observed that the adoption of this technology has brought the desired results and helped the farmers.

The present study was conducted for comprehensive analysis of conventional (transplanted) method and direct seeded rice (DSR) technology.

METHODOLOGY

Both secondary and primary data were collected for the study. Secondary data were collected from the state agriculture department and various websites of govt of Haryana and India. The primary data were collected through well-structured, pre-tested and comprehensive schedule exclusively prepared for the study from farmers by personal interview method. The schedule used for the primary data collection was designed based on the objectives of the study. The primary data collected were related to (i) crop yield, (ii) inputs used, (iii) price of inputs and output, (iv) number of irrigations and (v) socio-economic condition of the respondent farmers. A list of villages was prepared on the basis of area under DSR in the two randomly selected blocks. Three villages were selected from each selected block having maximum number of farmers adopting DSR technology (Table 1).

After selection of villages, 20 farmers from each village who had experience of both DSR and conventional methods of rice cultivation were selected randomly. In total 120 farmers were selected. The questions were framed fulfilling the objectives like use pattern of DSR in rice cultivation, economic impact of this conservation technology and to identify the constraints in adopting this technology.

RESULTS and DISCUSSION

Socio-economic status of sampled farmers

An understanding of the socio-economic condition of the sampled farmers provided an insight to the farm situation and the background information regarding the decision making pattern of farm households under study domain. Details of the socio-economic information are presented in Table 2.

Majority of the farmers in the study area had small landholdings (56.48%) with average family size of seven members. Medium farmer category (2-5 ha) included 19.32 per cent of the sampled farmers with average family size of six members. Other (large) farmers (more than 5 ha) category included 24.20 per cent of sampled farmers with average family size of eight members.

Educational status especially higher education is one of the major factors for the decision making. In case of small landholders 46.24 per cent had higher education. Only 11.49 per cent were illiterates. In case of medium farmers 33.66 per cent were educated above secondary and out of farmers having more than 5 ha, 39.20 per cent were educated above secondary.

Mass media exposure of farmers

The data given in Table 3 indicates the mass media used by the sample farmers. It was found that newspapers and KVKs (Krishi Vigyan Kendras) were mostly used for obtaining agricultural information while magazines and TVs were moderately used and internet sources were least used.

Contact status of farmers with extension functionaries

It is evident from Table 4 that among the extension contacts of farmers, the most popular contact source was KVK scientists who ranked first with the weighted mean score 1.93 followed by ADO which ranked second with weighted mean score 1.10. Progressive farmers and SDAOs/SMSs ranked third

Table 1. Villages/farmers of Kaithal district, Haryana selected for the study

Village	Farmers			
	Small	Medium	Large	Total
Kalayat block				
Kherilamba	3	7	10	20
Kailram	4	7	9	20
Dubbal	5	5	10	20
Pundri block				
Rasina	6	7	7	20
Hajwana	4	5	11	20
Bhana	4	6	10	20

Table 2. Socio-economic status of farmers

Component	Landholding (ha)		
	Small (2)	Medium (2-5)	Big (>5)
Number of farmers (%)	56.48	19.32	24.20
Average size of the family (number)	7	6	8
Education of head of household (% of total)			
Illiterate	11.49	8.61	12.78
Primary	16.22	18.02	16.62
Secondary	26.05	39.68	31.39
Higher	46.24	33.66	39.20

Table 3. Mass media exposure of farmers (n= 120)

Media	Utilization	Extent of utilization			Total	Weighted score	Rank mean score
		Daily (3)	Often (2)	Sometimes (1)			
Newspaper	124 (51.66)	86 (129)	26 (26)	12 (6)	161	1.34	I
KVKs	86 (35.83)	2 (3)	12 (12)	72 (36)	51	0.42	II
TV	48 (20)	0 (0)	26 (26)	22 (11)	37	0.30	IV
Magazine	42 (17.5)	4 (6)	32 (32)	6 (3)	41	0.34	III
Internet	30 (12.5)	0 (0)	10 (10)	20 (10)	20	0.16	V

Table 4. Extension contact status of farmers (n= 200)

Extension official	Frequency of contact				Total	Weighted score	Rank mean score
	Fortnightly (3)	Monthly (2)	Whenever needed (1)	None (0)			
ADO	14 (21)	24 (24)	32 (16)	130 (0)	61	1.10	II
KVK scientists	13 (39)	8 (16)	41 (41)	24 (0)	96	1.93	I
Progressive farmers	6 (18)	11 (22)	32 (32)	69 (0)	72	0.66	III
SDAO/SMS	0 (0)	6 (12)	17 (17)	96 (0)	29	0.27	IV

and fourth with weighted mean score of 0.66 and 0.27 respectively.

Overall adoption level of DSR cultivation technology

Data pertaining to overall adoption level of DSR cultivation technology are presented in Table 5. It was found that majority of the farmers (36.53%) belonged to low level of adoption followed by 34.17 per cent to medium adoption level and 30.00 per cent to high level of adoption. In nutshell 70 per cent of the farmers had low to medium level of adoption means farmers had not adopted the full package of practices recommended by the university.

Table 5. Overall adoption level of DSR cultivation technology (n= 200)

Adoption level	Farmers	
	Frequency	Percentage
Low	91	36.53
Medium	86	34.17
High	72	30.00

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