Adoption Behaviour and Constraints in Wheat Production Technologies for Higher Wheat Productivity in Hills of Uttarakhand

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ABSTRACT

The study was carried out to determine the farmers' adoption behaviour on wheat production technologies. The farmers were selected from Pithoragarh district of Uttarakhand and were demonstrated production technology during 2008-09 and 2009-2010. It was revealed that 32 per cent farmers fully adopted demonstrated wheat production technology whereas 24.9 per cent farmers adopted partially .The major constraints observed in wheat production was lack of irrigation facility as well as mechanization. In wheat, under irrigated condition yield of 29.8 q/ha was recorded which was 32.4 per cent higher than farmers' practice while in rain fed condition demonstrated plot resulted in 16.2 per cent higher yield over farmers' practice. The B:C ratio of demonstrated plots under irrigated condition was 1.35 and of farmers' practice was 0.90 while under rain fed condition B:C ratio of demonstrated plots was 0.66 and of farmers' practice was 0.45.

Key Words : Adoption , Wheat production technology, Constraints and B:C Ratio

INTRODUCTION

Wheat (*Triticum aestivum L.*) is the second most important food crop in India after rice, both in terms of area and production. India is the second largest wheat producer and produces 12 per cent of the world production. In India wheat is grown between 11°N to 55° N latitude and 72°E to 92°E longitude and at an altitude of more than 3000 m above mean sea level.

In Uttarakhand, diverse agro-climatic condition from sub-tropical to temperate exits. In hilly areas of Uttarakhand during the year 2011-12 wheat was cultivated on 1.96 lakh ha. with production of 2.64 lakh tonne and the average productivity was 13.4 q/ha. On the other hand, the productivity of wheat under plain area was 35.7 q/ha and state's average productivity was 23.8 q/ha (Anonymous, 2011). The productivity in the hilly areas is far below the average productivity of the state as well as of nation. The major reasons for this gap in productivity noticed are prevalence of rain fed condition in hills, improper nutrient management, non availability of improved varieties and lack of knowledge of improved agronomical practices. In hilly regions of the state, seed replacement rate is less than 3 per cent and fertilizer use is less than 7 kg/ha/yr. During rabi season most of the cultivated wheat is under rainfed condition (>90%), but wherever irrigation sources are available, even there farmers do not timely irrigate the crop due to lack of knowledge.

Hence, a study was undertaken with a view to assess the adoption behaviour as well as the various constraints being faced by the farmers of the hilly region regarding wheat cultivation so that KVK can make changes in their mode adopted for technology transfer.

MATERIALS AND METHODS

This study was undertaken to demonstrate the effect of good quality seed and timely agronomic practices in the enhancement in wheat yield. During the year 2009-10, 57 demonstrations were conducted under rain fed conditions in four villages namely; Kiri, Aincholi, Jakhani and Gaina, while 13 demonstrations were conducted under irrigated condition in three villages namely; Dungri, Jauljibi and Panlot. Selection of the farmers was done randomly. Under irrigated condition, only three irrigations were provided at 35 days, 90 days and around 135-140 days after

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sowing. Under farmers' practice seed of locally grown varieties was used. Yield under farmers' practice was recorded at five farmers' field each randomly under both rain fed and irrigated condition from the same villages. The data regarding adoption of technology and constraints experienced by the farmers were collected with the structured interview schedule from selected farmers where wheat demonstrations were laid out. Mean and per cent values were used to classify the data and its analysis. Similarly, the level of adoption of the farmers was classified into three categories viz. low, medium and high.

RESULTS AND DISCUSSION

Wheat grain yield under rain fed condition:

The average wheat yield obtained under demonstration was 12.2 q/ha which was 16.2 per cent higher over farmers' practice (Table 1). The net return was Rs 6,895/- ha. and B:C ratio was 0.67 while under farmers' practice net return was Rs 4,540/-ha. and B:C ratio was 0.45. Farmers usually grow tall wheat varieties due to its higher straw yield because there is an acute scarcity of fodder during winter and summer months and thus, extra straw of tall varieties helps in reducing fodder scarcity problem during 2009-10. It was worth to mention that no rainfall occurred during rabi season till the month of February, as a result tillering of wheat crop was reduced under rain fed condition and poor plant growth resulted in low wheat yield both under demonstration and farmers' practice.

Under irrigated condition:

The average wheat yield obtained under irrigated condition was 29.8 q/ha which was 32.4 per cent higher than yield achieved under farmers practice (Table 1).The net profit under demonstration was Rs 25,035/- ha. and the B:C ratio was 1.35 while under farmers' practice, net profit was Rs 16,090/-ha. and B:C ratio was 0.90. In hilly areas, under farmers' practice irrigation schedule was not followed properly. Pre sowing irrigation was provided and then irrigation was applied in the month of March and April. Further, no irrigation was applied at crown root initiation stage and other vegetative phases of crop, this reduced the wheat yield as tillering and other development phases of crop were affected adversely. Contrary to the farmers' practice in the demonstrated plot irrigations were applied at the recommended time thus recorded an increase of 32.4 per cent over the farmers' practice.

Adoption behaviour :

The farmers involved in the wheat demonstrations were asked questions in order to determine the extent of adoption of demonstrated package of practices. The data (Table 2) indicated that 70 per cent of the respondents had completely adopted the recommended high yielding varieties, 64 per cent proper sowing time and 61 per cent proper dose of farm yard manure. The respondents acknowledged the need of proper FYM application but its availability was the major constraint. About 68 per cent farmers did not adopt seed treatment and 91 per cent did not adopt line sowing due to lack of mechanization, 71 per cent did not follow fertilizer application due to non availability of fertilizer and 81 per cent did not perform any plant protection measure in wheat crop due to non occurrence of any disease and pest. These findings were in agreement with Patel *et al*, (2003) and Kumbhare *et al*,(2011).

Constraints perceived:

The constraints expressed by the wheat growers have been given in Table 3. Under technological constraints, non-availability of quality seeds (68.6%) of wheat, followed by high weed infestation (57.1%) and non-availability of chemical fertilizer (50.0%) were expressed as

Table 1. Yield of wheat under irrigated and rain fed conditions.

Condition	Number of farmers	Yield q/ha	Cost of Cultivation Rs/ha	Gross return Rs/ha	Net Return Rs/ha	B:C Ratio
Irrigated – Demonstration	57	29.8	18,590	43,625	25,035	1.35
Farmers Practice	15	22.5	17,960	34,050	16,090	0.90
Rainfed –Demonstration	13	12.2	10,430	17,325	6,895	0.67
Farmers Practice	15	10.5	9,960	14,500	4,540	0.46

Table 2 : Extent of adoption of wheat production technology.

Sr. No.	Parameter	Extent of Adoption (n=70)		
		Full Adoption	Partial Adoption	No Adoption
1	High Yielding Varieties	50 (71.4)	15 (21.4)	05 (07.1)
2	Seed Treatment	10 (14.3)	12 (17.1)	48 (68.6)
3	Sowing Time	45 (64.3)	15 (21.4)	10 (14.3)
4	Recommended Seed Rate	25 (35.7)	30 (42.9)	15 (21.4)
5	Line sowing	01 (01.4)	05 (07.1)	64 (91.4)
6	Time of Irrigation	05 (07.1)	08 (11.4)	57 (81.4)
7	Recommended fertilizer Dose	15 (21.4)	20 (28.6)	35 (71.4)
8	Recommended dose of FYM	43 (61.4)	22 (31.4)	05 (07.1)
9	Proper and effective weed control	18 (25.7)	22 (31.4)	30 (42.9)
10	Plant protection measures	05 (07.1)	08 (11.4)	57 (81.4)
11	Proper and timely harvesting	30 (42.9)	35 (50.0)	05 (07.1)

Table 3. Constraints perceived in wheat cultivation.

Constraints	Number	Per cent	Rank
Lack of Irrigation Facilities	59	84.29	I
Lack of Mechanization	52	74.28	II
Non Availability of Quality seeds	48	68.57	III
Inadequate Availability of FYM	44	62.85	IV
High Weed infestation	40	57.14	V
Inadequate Availability of Chemical Fertilizers	35	50.00	VI
Lack of Market Facilities	15	21.42	VII

Table 4. Suggestion given by the respondents to overcome the constraints in wheat production.

Suggestion	Number	Per cent	Rank
Availability of water lifting pumps	56	80.0	I
Availability of low weight power tiller	48	68.6	II
Timely Availability of HYV seed	40	57.1	III
Land Consolidation	37	52.9	IV
Adequate support from government agencies	30	42.9	V
Timely availability of fertilizers, weedicide	28	40.0	VI
Good Market facilities	17	24.3	VII

perceived constraints by the respondents. Likewise under resource constraints, 84.3 per cent farmers reported lack of irrigation facilities is major constraint in wheat production followed by mechanization (74.3%). In hilly areas farming is done on bench terraces and moreover entire ploughing is done by bullocks which is time consuming and availability of bullocks even on rent was considered as the constraints by the respondents. 62.9 per cent farmers acknowledged inadequate FYM availability as constraint in wheat production.

To overcome these constraints 80 per cent respondent expressed that availability of water lifting pumps are needed to boost the productivity (Table 4), while 68.6 per cent expressed that low weight power tiller are required for better and timely field preparation, 57.1 per cent said that timely availability of HYV seeds need to be ensured and 52.9 per cent reported that land consolidation should be done. In hilly region of Uttarakhand land consolidation till date has not been done and therefore, land holdings are scattered.

CONCLUSION

It was concluded that if limited irrigation, good quality seeds are provided and proper agronomic practices are followed then wheat yield increased by 32.4 per cent under irrigated

condition and 16.2 per cent under rain fed conditions. Full adoption of wheat production technologies was reported by 32.0 per cent and partially adopted by 17.5 per cent. The major constraint perceived by farmers was lack of irrigation facility followed by lack of mechanization. If these constraints are managed some how then farmers can harvest more yield with the same level of inputs which would definitely improve their socio-economic status.

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