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EVALUATION OF FRONT LINE DEMONSTRATIONS ON BARLEY PRODUCTION

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SUMMARY

The current study was carried out by Krishi Vigyan Kendra, Chandgothi (Churu), in Rajasthan with the particular goals of analyzing the yield difference, economics, the level of farmer satisfaction, and the challenges experienced by the farmers in cultivating barley. 50 participants were chosen from the beneficiary farmers who participated in the front line demonstration (FLD) at their fields from 2018–19 to 2019–20. For both the farmers' practise and the demonstration, the plot size was 0.4 hectare. The most recent recommended package of practises for barley was presented to the respondents before FLD. The FLD-demonstrated technology led to a 25.83 percent over-check increase in barley production. According to the experimental findings, there is a technology gap, an extension gap, and a technology index of 215.5 kg/ha, 906 kg/ha, and respectively. The economic performance of barley under FLD fetched an additional return of 12,269/ha. Further, on average, demonstration plots recorded a net return to the tune of 43976, with an Incremental B:C ratio of 18.35 over the years. However, under farmer's practice the net return fetched was Rs. 31707/ha. Moreover, respondent satisfaction index (RSI) revealed that 50.30 per cent respondent farmers' expressed high, 33.27 per cent respondent farmers' expressed medium and only 16.40 per cent respondent farmers' expressed low level of satisfaction.

Key words: Demonstration, Economics, Grain yields, Yield gap.

Hordium vulgare, L. is the scientific name for barley, which is a significant cereal crop in Rajasthan and India during the *Rabi* season. 2.74 lakh ha, 909695 tonnes, and 3324 kg/ha, respectively, are the area, production, and productivity of barley in Rajasthan (Anonymous 2017–18). In comparison to state (3324 kg/ha) and national (2679 kg/ha) output, the barley productivity in Churu district, Rajasthan, is 2302 kg/ha, which is quite low (Anonymous 2017–18). In addition to the inability to obtain high-quality seeds of improved varieties in a timely manner and poor crop management techniques brought on by ignorance of and failure to implement suggested production and plant protection technologies, low productivity may be caused by a number of biotic and abiotic stressors. There is a lot of room to grow in terms of barley productivity. There is a considerable scope for increasing the productivity of barley by using improved practices. There is a considerable scope for increasing the production of the crop. Large number of technologies for the barley crop improvement have been generated by the Research Institutes and Agricultural Universities, but only few of them have been accepted by the farmers (Singh *et al*. 2016). Therefore, Front Line Demonstration (FLD) on barley at farmer's field maybe helpful to establish the technology at farming community. The basic objective of this programme is to demonstrate improve proven technologies of recently released, short duration, high yielding varieties in compact block with INM, IWM and IPM at farmer's field (Table 1) through Krishi Vigyan Kendra to enhanced adoption of modern technologies to generate yield data with farmers feedback. Keeping this in view, KVK, Chandgothi, Churu conducted 50 demonstrations on barley crop at farmer's field during Rabi 2018-19 to 2019-20. The objectives of this study were as follows:

1. To find out the performance of recognized and recommended high yielding varieties of barley with full recommended package of practices.
2. To compare the yield of FLD organized by KVK with farmer's practices.
3. To collect and consider the feedback information from farmers for further improvement in research.
4. To motivate farmers by adoption of improved package on their fields.

MATERIALS AND METHODS

The conducted Front Line Demonstration on barley varieties *i.e.* R D 2715 at 50 selected farmer's field in a compact block in Churu District (Rajasthan)

during rabi 2018-19 to rabi 2019-20. The selection of villages was done on basis of non-adoption of improved and recommended varieties. After the selection of villages, most approachable side of farmer's field was selected, so that the performance of demonstrated technology can be seen by other farmers. The farming situation was irrigated and soil was sandy loam low in nitrogen, medium in phosphorus and medium to high in potash. The area for demonstration was 0.4 ha each and were conducted by using recommended package of practices. The KVK provided high quality seed of barley verities i.e. RD 2715 and RD 2786 @ 100 kg/ha and other critical input like DAP, micro-nutrients, bio fertilizers, herbicide and pesticides were purchased by the farmers and used (Table 2) with the guidance of KVK during the years.

The sowing of crop was done in month of November and harvested during second fort night of April. The scientist of KVK, Chandgothi, Churu regularly visited and monitored demonstrations on farmer's fields from sowing to harvesting. The grain yield of demonstration and local check was recorded and analyzed. Other parameters as suggested by Samui *et al.*, (2000) were used for calculating gap analysis, cost and returns. The details of different parameters are as follows:

1. Extension gap = Demonstration yield – Farmers practice yield
2. Technology gap = Potential yield – Demonstration yield
3. Technology index = Potential yield – Demonstration yield x 100/ Potential yield
4. Additional return = Demonstration return – Farmers practice return
5. Effective gain = Additional return – Additional cost
6. Incremental B:C ratio = Additional return / Additional cost

The respondents were interviewed personally with the help of a pre-tested and well-structured interview schedule. Client Satisfaction Index was calculated as developed by Kumaran and Vijayaragavan (2005). The individual obtained scores were calculated using the formulae as:

Client Satisfaction Index = (Score obtained by individual ÷ Maximum score possible)

RESULTS AND DISCUSSION

Grain Yield : The grain yield (Table 3) of barley under demonstration plot was ranged from 4252 kg/ha to 5148 kg/ha with an average of 4593 kg/ha, while, in farmer's local practices plot it ranged from 3402 kg/ha to 4172 kg/ha with an average of 3735 kg/ha (Table 3). The grain yield was increased from 20.34 to 27.13 per cent over farmer's practices during the years. On average basis, 25.83 per cent increase in yield was recorded under demonstrations plot as compared to farmer's local cultivation practices of barley. These results are in close conformity with the research findings reported by Ali and Singh, (2020); Shivran *et al.* (2020).

Data on wheat yield (Table 2) indicated that the FLDs given a good impact on the farming community of Churu district as they were motivated by the new agricultural technologist.

Gap analysis: An extension gap between demonstrated technology and farmer's practices of total 50 demonstrations was observed 250 kg/ha (Table

TABLE 1
Particulars showing the details of barley growing under front line demonstration and existing farmer's practices

S. No.	Technology	Improved technology	Farmers practice	GAP (%)
1.	Variety	Improved varieties RD 2715 and RD 2786	RD 2035, RD 2552	100
2.	Farming Situation	Irrigated	Irrigated	Nil
3.	Land preparation	Ploughing & harrowing	Ploughing & harrowing	Nil
4.	Sowing Method	Sowing Method Line Sowing (22.5×10 cm)	Line sowing (30×10 cm)	100
5.	Seed Rate	Seed Rate 120 kg/ha	Seed Rate 120 kg/ha	Nil
6.	Seed inoculation	PSB	No Seed Inoculation	100
7.	Fertilizer dose (kg/ha)	40 kg N, 20 kg P_2O_5 and 25	31 kg N and 23 kg P_2O_5 and -	N 9 kg < recommended and kg $ZnSO_4$ 25 kg $ZnSO_4$ P_2O_5 3 kg > recommended
8.	Micro-nutrients	Use of micro nutrients for balance fertilizer	No use of Micronutrients	100
9.	Weed Control	Herbicide application	Hand weeding No herbicide use	100
10.	Plant protection	Need based spray of Insecticide and fungicides	No spray	100

3). Such big gap might be attributed to adoption of improved technology in demonstration which resulted in higher grain yield than the traditional farmer's practices. Wide technology gap of +17 to -348 kg/ha in yield was observed during the demonstration years.

Average technology gap was found 215.5 kg/ ha. This less technology gap during all the years indicated more feasibility of recommended technologies during study periods. Similarly, the technology index for all the demonstrations during the study period were in accordance with technology gap.

Technology index: were ranged from -4.309 to -5.952% with means of both years was -5.131%. Lower technology index reflected the adequate proven technology for transferring to farmers and sufficient extension services for transfer of technology. Economics analysis: Improved variety seed, fertilizers, bio fertilizers, herbicides and pesticides were considered as cash inputs for the demonstrations as well as farmers practices. On an average additional investment of Rs 750 per hectare was made under demonstration resulted in additional return of Rs. 12269/ha. Economics returns as a function of grain yield and selling price varied during the both years. The higher effective gain of Rs. 11,376/ ha was obtained under demonstration. The higher additional returns and effective gain under demonstration could be due to improved technology, non-monetary factors, timely operations of crop cultivation and scientific monitoring. Big difference of incremental B : C ratio (IBCR) was found during both the years which was 24.32 to 12.38. On the average IBCR was found 18.35. Higher IBCR could be due to higher additional return with low additional cost in demonstration and also correlated with selling price. Client satisfaction can also help farmers' acquire new technologies and maximize their production (Table 5). The results confirm with the finding of Front Line Demonstration on barley and wheat crops by Verma *et al*. (2014), Tiwari *et al*., (2015), Singh *et al*. (2016), Kumari *et al*. (2017), Singh (2017), Hussain *et al*. (2018), Hussain *et al*. (2019), Ali and Singh, (2020); Shivran *et al*. (2020).

CONCLUSION

Based on both the year and front-line demonstration data, it is possible to draw the conclusion that following the recommended package of practises can boost barley output by % above farmer's practises. The growth was noted with only a small increase in spending of Rs. 9740/ha. Even a tiny and marginal farmer would not be able to afford this sum. The fundamental reason for the yield gap, which is more appropriately referred to as an extension gap, is ignorance and unawareness rather than the higher cost of adopting improved technology. Moreover, extension gap can be also be minimized by adopting such technology under FLD. The IBCR is much high to motivate the farmers for adoption of technology. Therefore, FLDs on barley

TABLE 2
Critical Inputs used to demonstrate the technologies in demonstration plot

S. No.	Input	Quantity	
		Demonstrated by the KVK	Used by the farmer
1.	Seed	120 kg/ha	-
2.	Urea	-	87 kg/ha
3.	SSP	-	125 kg/ha
4.	Micro nutrients	-	5 g/L water
5.	Biofertilizer	-	PSB @ 600 g/ha
6.	Herbicide	-	- 2,4-D @ 500 gm *a.i.*/haIsoproturon @ 750 gm *a.i.*/ha
7.	Pesticides	-	Termite : Chloropyriphos 20 EC @ 4 L/ha

TABLE 3
Grain yield and gap analysis of front line demonstrations on barley at farmers' field

Year	No. of Farmers	Area (ha)	Yield (q/ha)		% Increase over control	Technology Gap (q/ha)	Extension gap (kg/ha)	Technology Index (%)
			Demonstrated practices	Farmer's practices				
2018-19	25	10	43.81	34.83	25.78	181	898	-4.309
2019-20	25	10	44.50	35.35	25.88	250	915	-5.952
Means			44.16	35.09	25.83	215.5	906.5	-5.131

TABLE 4
Economic analysis of front line demonstrations on barley

Years	Cost of cultivation (Rs./ha)		Additional cost (Rs./ha)	Gross return (q/ha)		Additional Return in demonstrations (Rs./q)	Sale price of grain (Rs./q)	Net Return (q/ha)		Effective grain (Rs/ha)	Incremental B:C Ratio (IBCR)
	DP	FP		DP	FP			DP	FP		
2021	18500	18000	500	61772	49110	12162	1410	43272	31110	11662	24.32
2022	19400	18650	1000	64080	50940	12376	1440	44680	32304	11376	12.38
Means	18950	18325	750	62926	50025	12269	1425	43976	31707	11519	18.35

TABLE 5
Extent of farmer's satisfaction over performance of FLDs (n=105)

S. No.	Satisfaction level	Number	Percentage
1.	High	51	50.30
2.	Medium	37	33.27
3.	Low	17	16.40

was found effective in changing not only the mindset of farmers but attitude, skill and knowledge about improved practices of barley cultivation including adoption. Farmers and scientists' relationship also improved by this and built confidence between them. Technology Demonstration to farmers is a good primary source of knowledge or information on improved practices of barley cultivation and also source of good quality seed in locality and surrounding area for next season. FLDs helped in speedy and wider dissemination of the improved proven technology to the farming community.

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