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Impact of front line demonstration over traditional farmers practice on Basmati Rice production at Kurukshetra district

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Abstract

Front line demonstration (FLD) of basmati rice was carried out by Krishi Vigyan Kendra, Kurukshetra to evaluate the yield gap of basmati rice (PB-1121) between demonstrated field and farmers practices (FP) in different villages. It was recorded that yield and net return was found better in Demonstrate field than Farmer practices during 2017-18 and 2018-19. The average yield of both the year in demonstrate field was 48.75 q/ha which was higher than farmer practices i.e., 45.35 q/ha. The average of technology gap, extension gap and technology index was 1.25, 3.40 and 2.50 respectively was recorded and the average cost benefit ratio was more favorable in demonstrated field than farmer's practices during both the year under studied. The yield gap of basmati rice may be due to the proper application of guidelines as mentioned in package of practices like use of improved variety, farm machines, seed treatment, timely sowing, irrigation, control of pests and weeds etc in demonstrated field.

Keywords: Basmati rice yield, Economics, Front Line Demonstration, Farmer Practices,

Introduction

Rice (*Oryza sativa*) belongs to the family Poaceae cultivated in Indo-Gandetic plans with high quality characters and good aroma. India is one of the top exporters of basmati rice, it export about 30-40 percent of basmati rice and 60-70 percent non-basmati rice to different countries of the world like Iran, Saudi Arabia, Iraq etc. Rice is grown in well irrigated system in 18 districts of Haryana with high to low productivity. High rice productivity districts of Haryana are Kurukshetra, Panchkulla, Fathabad, Ambala, Sirsa, Yamunanagar and Karnal. In Haryana Paddy acreages are estimated 1,350 thousand ha out of which Basmati acreages are estimated 843.4 thousand ha in 2019.

Major rice growing state which include West Bengal, Uttar Pradesh, Punjab, Andhra Pradesh, Tamil Nadu, Bihar, Orissa and Chhattisgarh contribute 72 percent of total rice area and 75 percent of rice production. India is still amongst the countries with the lowest rice yields, 70 per cent of the all rice growing districts report yields lower than the national average. Yield gap analysis further reveals that 30 to 40 per cent of the potential yield is yet to be tapped with available high yielding varieties (HYV) with improved practices. This gap is likely due to use of local varieties, high plant population, endemic pests and diseases, low input use, defective cropping systems and a low adoption rate by farmers of high yielding technologies. Keeping in view the above facts, front line demonstration has conduct at farmer's field to provide all the necessary information to the farmers to grow paddy crop in their field.

Materials and Methods

Krishi Vigyan Kendra, Kurukshetra conducted 52 front line demonstrations in farmer's field during 2017-18 to 2018-19 in different villages. Seeds of basmati rice cultivar PB-1121 were sown in demonstration field as per guideline given in package of practices published by CCS Haryana Agricultural University, Hisar. Soils of all the villages were clay loam in texture with low to medium in organic carbon content and other nutrients like Nitrogen, Phosphorous, and Potassium etc which is essential for plant growth. Seeds were sown after seed treatment with Bavistin @ 10 g in 10 liters of water for 10kg seeds and transplant only healthy seedlings to the demonstrate field. The application of Urea, Single Super Phosphate, micronutrients, weedicide, insecticides etc were applied in rice field as per information mentioned in Package of Practices. The output data like expenditure, profit, yield etc were collected from farmers grow rice under demonstrated field as well as form traditional farming practices field to find out the gap between both the technologies. Finally, the Technology gap, Extension gap, Technology index along with B:C ratio were analyzed by the formulas as given by (Katare et al. 2011, Samui et al. 2000)

Technology gap = Potential yield – Demonstration yield

Extension gap = Demonstration yield – Farmer's practice yield

$$\text{Technology Index} = \frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$$

$$\%\ \text{Increase over farmers practices} = \frac{\text{Demonstrated practices} - \text{Farmer practices}}{\text{Farmer practices}} \times 100$$

Results and Discussion

52 Front line demonstration of basmati rice (PB-1121) were conducted at farmers field in 20.8 ha areas during 2017-18 and 2018-19 (Table: 1). In demonstration field, farmers follows all the cultural and management practices as mentioned in Package of Practices from nursery preparation to final harvest of basmati rice like use of high yielding variety, seeds treatment, timely sowing in nursery bed (1st week of June), timely transplanting of rice seedlings (1st week of July) and planted at 2-3 cm deep with the help of transplanting machine, timely application of weedicide and pesticides. Samant (2015) concluded that replacement of HYV variety with newly released hybrid will increase the yield of rice and net income. All the essential fertilizers like Urea, Single Super Phosphate, Zinc sulphate were applied after soil testing of farmers field. The yield of basmati rice was 49.2 and 48.3 q/ha in front line demonstration field and 45.5 and 45.2 q/ha in farmers field during 2017-18 and 2018-19 respectively. Average yield of both the year was 48.75 and 45.35 q/ha in demonstrated field and farmers practices respectively. It was found that the yield of rice under demonstration field was 8.13 and 6.80 percent increased over farmers practices during both the years under studied, the result of yield during both the years showed that use of latest technology and timely application of irrigation water in the field help in enhancing of rice yield than traditional farmers practices. Mishra (2019) also reported that in demonstration field yield was more than farmer practices may be due to the use of recommended variety, seed treatment, recommended chemicals used in plant protection and other practices were timely applied in demonstrated field. Technology gap varied from 0.80 to 1.70, extension gap varied from 3.70 to 3.10 and technology index was varied from 1.60 to 3.40 during 2017-18 and 2018-19 respectively. The feasibility of technology increased if lowers the value of technology index. This gap may be due to the farmers use to grow rice in their field by traditional practices, use of over fertilizers resulted more disease and insects attack of their crop, apply over doses of pesticides, weedicides resulted they expend more money to control them. Mandavkar et al. (2012) reported that gap between potential and demonstration yield of rice varieties due to the gap between extension and technology gap. To overcome this gap, educate the farmers in adoption of improved technology through various technology transfer centers.

Table: 1. Comparison of Yield, % increase over farmers practices, technology gap, extension gap and technology index in basmati rice between Front Line Demonstration and Farmer's Practices

Year	No. of farmers	Area (ha)	Yield (q/ha)			% increased over farmers practices	Technology Gap	Extension Gap	Technology Index
			PY	DY	FP				
2017-18	26	10.4	50	49.2	45.5	8.13	0.80	3.70	1.60
2018-19	26	10.4	50	48.3	45.2	6.80	1.70	3.10	3.40
Average			50	**48.75**	**45.35**	**7.47**	**1.25**	**3.40**	**2.50**

PY- Average Potential yield, DY- Demonstrated Yield and FP- Farmer's Practices

The economics of both the practices i.e., demonstration in farmer field and farmer practices are presented in Table: 2, it showed the average gross cost, gross return and net return was Rs 104074, 157440 and 53366 respectively in demonstration whereas in farmer practices it was recorded Rs 105550,145600 and 40100 respectively. Raj et al. 2014 suggested that the production of rice yield by replacement of local variety with latest variety of rice resulted increases in net income of the farmer. In traditional farmers practices, farmer expend more money may be due to they grow rice seeds without seed treatment resulted they expend more money in controlling pests moreover, they use overdoses of pesticides in rice field and use traditional technology for growing rice crop from sowing to harvest. Whereas, in demonstration field, farmer sowing the seeds after treatment and applied prescribed doses of pesticides in controlling pests and applied fertilizer after soil testing resulted they less money and also use latest technology for growing rice crop form seeds sown in nursery to final harvest stage. Benefit cost (B:C) ratio was 1:51 during 2017-18 and 2:74 during 2018-19 in demonstrated field whereas 1:37 and 2:21 was recorded in traditional farmer practices during 2017-18 and 2018-19 respectively. The average B:C ratio was recorded 2:13 and 1:79 in demonstrated field and farmer practices respectively. Benefit cost ratio was better in demonstration field than traditional farmer practices. The gap between demonstrated field and farmer practices may be due to the farmers has not followed the full package of practices and latest technology in growing crop from sowing to final harvest period in summer moong reported by Singh *et al.* (2021) similar observation was also reported in wheat by Mamta *et al.* (2020) and Singh (2021).

Table: 2. Gross cost, Gross return, Net return and B: C ratio as affected by improved and traditional farming practices in Basmati Rice

Year	Economics of demonstration				Economics of Traditional Farmer's practices			
	Gross Cost (Rs)	Gross Return (Rs)	Net Return (Rs)	B:C	Gross Cost (Rs)	Gross Return (Rs)	Net Return (Rs)	B:C
2017-18	104074	157440	53366	1:51	105550	145600	40100	1:37
2018-19	60450	166152	105702	2.74	70200	155488	85288	2.21
Average	**82262**	**161796**	**79534**	**2:13**	**87875**	**150544**	**62694**	**1:79**

Conclusion

Front line demonstration was conducted at farmers field by Krishi Vigyan Kendra, Kurukshetra to compare gap of yield and economics with traditional farmer's practices and concluded that the basmati rice grow in field under demonstration by using the latest scientific technology and follows the guideline as mentioned in Package of Practices from sowing to final harvest like using the seed treatment with fungicide, improved high yielding variety, use adequate quantity of FYM, application of fertilizers in the field like Urea, Single Super Phosphate, Zinc Sulphate etc after soil and water analysis,

timely sowing, timely application of pesticides and irrigation, uses of latest technology from sowing to final harvest of basmati rice crop etc can be obtained higher seed yield and net returned. These gaps can be overcome by organizing the trainings at farmer's field and villages level to aware the farmers about the latest technologies and various management practices for growing basmati rice crop.

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