Analysis of Yield Gap Analysis by Front Line Demonstrations in Wheat in Banaskantha district of Gujarat

ABSTRACT

The front line demonstration is an effective and appropriate tool to demonstrate the recommended technologies among farmers. We conducted eighty demonstrations on wheat with recommended package of practices during 2018 to 2021 in Banaskantha district. The results of the study revealed that the yield of wheat with latest improved practises under irrigated conditions were ranges from 44.52 to 45.02 q/ha whereas in Farmer Practices it were ranges between 38.85 to 40.99 q/ha. The per cent increase in yield with improved practices over farmer practices were recorded in the range of 9.03 to 15.39 per cent. Extension gap of were ranging from 3.80 to 5.98 q/ha. The benefit cost ratio was 2.19 to 2.87 under demonstration, while it was 1.44 to 2.34 under local check. Yield potential of wheat could be enhanced to a great extent with increasing the farmer's income by conducting front line demonstration of latest recommended technologies.

INTRODUCTION

Wheat has been known as "Staff of life or king of cereals" and It is one of the most important staple food crop. Wheat is rich in carbohydrates and protein so it has its own outstanding importance as a human food. To generate production data and feedback information to various developmental agencies, which are engaged in dissemination of technological advances through researchers to the farmer's fields, front Line Demonstrations were started. Eighty front line demonstrations were conducted from 2018 to 2021 in Banaskantha district of Gujarat to demonstrate the scientific production technologies of wheat which are suitable for that particular eco-system. This study was started to analyze the impact of the FLDs in vertical and lateral spread of the technologies and the resultant improvement in yield and income of the wheat growers, with the objective of assess the impact of frontline demonstrations on yield and income obtained by the wheat growers. Farmers were using old varieties of wheat crop without proper use of recommended scientific package of practices So we conducted FLDs of scientific cultivation of wheat.

MATERIAL AND METHOD

The study was carried out at different villages of the banaskantha district (*i.e.* Dhunsol, Kotda, Khoda. Kuda and Ratanpura) of Gujarat state during the year 2018 to 2021. Total Eighty demonstrations were conducted in different villages to work out the difference in input cost and monetary returns between frontline demonstrations and farmers' practices in wheat. All the inputs were applied as per the scientific package of practices recommended by Wheat Research Station, SDAU, Vijapur, Gujarat given in the table. The component demonstration of front line technology in wheat was comprised of improved variety GW-451, Line sowing, seed treatment of biofertilizer, integrated pest management for termite, proper seed rate, balance dose of fertilizer and weed management (Table 1). The data on cost of

cultivation and gross return were collected for four years (from 2018 to 2021) from FLD farmers to work out the economics of frontline demonstrations of scientific cultivation of wheat and local check data were also collected from that farmers who were using their own practices of wheat cultivation. Samui *et al*. (2000) gave the following formula of extension gap which was used in this study to calculate extension gap.

Extension gap = Demonstration yield – Yield from farmers practice (Local check)

$$\text{Percent increase yield} = \frac{\text{Demonstration yield farmers yield}}{\text{Farmers yield}} \times 100$$

Table.1 Information of technology intervention and farmers practice of wheat

Particulars	Technology intervention	Existing practice	Gap
Variety	GW-451	Old variety	Full gap
Sowing time	15 – 25 November	Early (October) or Late (December)	Full gap
Seed rate	125 kg/ha	100-150 kg/ha	Partial gap
Sowing method	22.5 cm Line sowing method	Broadcasting	Full gap
Seed treatment	Azotobacter and Bifenthrine	No seed treatment	Full gap
Fertilizer dose	(120:60:00: kg NPK/ha)	Not decided	Full gap
Weed management	Application of Pendimethalin @1.0 kg a.i./ha as Pre-emergence	One hand weeding	Partial gap
Plant protection	Need based plant protection Measure and seed treatment for termite control	Unjudicious use	Uneven use of pesticide

Source : Scientific cultivation of cereal crop book (2015)

RESULTS

Technology gap between improved practices and farmers practice of wheat

The gap between the existing practices and improved technologies used in cultivation of wheat in Banaskantha district were presented in table 1. In case of high yielding variety, sowing time and method, seed treatment and fertilizer dose, Full gap was observed. While in case seed rate and weed management, partial gap was observed and that is the main reason for not achieving potential yield of wheat. Awareness of recommended technologies of wheat was very low among farmers. Due to this most of farmers used old-age varieties with improper method of sowing and fertilizer. Farmers used uneven pesticide and high dose of pesticides so their cost increases for control the pest and diseases.

Impact of front line demonstrations

The inputs used by farmers and selling prices of commodities prevailed during each year of demonstrations were taken for calculating benefit cost ratio. Front line demonstrations of improved practices (IP) recorded higher productivity and B: C ratio over local check (Farmer practices) in each year. This might be due to knowledge and adoption of full package

of practices i.e. sowing of latest high yielding variety with proper spacing, adoption of improved nutrient management, adoption of improved weed management and pest management techniques. Similar results have been reported earlier by Desai *et al.*, (2020), Romade *et al.*, (2018) and Kumar *et al.*, (2015). The year wise fluctuation in yields was observed mainly on the account of variations in soil fertility status, climate and moisture availability.

Result revealed that wheat yield in latest improved practises were ranges from 44.52 to 45.02 q/ha whereas in Farmer Practices it ranges between 38.85 to 40.99 q/ha. The per cent increase in yield with improved practices over Farmer practices were recorded in the range of 09.03 to 15.39 per cent. The cost benefit ratio was 2.19 to 2.87 under demonstration, while it was 1.44 to 2.34 under local check. Yield potential of wheat could be enhanced to a great extent with increasing the farmer's income by conducting front line demonstration of latest recommended technologies.

Table : 2 Production and economic of Wheat under FLDs and farmer practices

Year	No. of demonstration	Yield (q/ha)		Percent increase in yield over local	Extension gap (q/ha)	B : C ratio	
		Improved practice	Farmer practice			Improved practice	Farmer practice
2018	15	44.83	38.85	15.39	5.98	2.53	1.92
2019	15	45.02	39.89	12.86	5.13	2.49	1.44
2020	25	44.52	40.54	09.81	3.98	2.19	1.75
2021	25	44.79	40.99	09.03	3.80	2.87	2.34

Extension gap

Extension gap of 5.98 q/ha, 5.13 q/ha and 3.98 q/ha was recorded in the year 2018 to 2020 respectively as compare to the year 2021 (3.80 q/ha). Results revealed that to revert the trend of wide extension gap there is a need to educate the farmers through front line demonstration for adoption of latest improved production technologies. We can aware the farmers for adoption of latest production technologies with high yielding varieties which will subsequently change this alarming trend of galloping extension gap by horizontal spread of improved practices through front line demonstration. Results was close conformity with results given by Desai *et al.*, (2020) and Romade *et al.*, (2018.

Conclusion

From the analysis of four years FLD data, It can be concluded that front line demonstrations have significant role to enhance the yield potential of wheat could be enhanced to a great extent with increasing the farmer's income and reducing the extension and technology gap by conducting front line demonstration of latest recommended technologies.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

REFERENCES

Desai, C. K.; Singh, P. B.; Patel, V. K. and Rabari, P. H. (2020). Yield gap analysis through front line demonstration in cumin. *Journal of Pharmacognosy and Phytochemistry*, **9**(4): 3444-3445

Kumar, A. H.; Rudramuni, T.; Naik, H. G. and Chandrappa, D. (2015). Yield gap analysis through front line demonstration in castor crop in Chitradurga districts of Karnataka. *International Journal of Tropical Agriculture*, **33** (3): 2367-2371.

Romade, B. D.; Deolankar K. P. and Gosavi, A. B. (2018). Yield and gap analysis of wheat productivity through frontline demonstrations organized by agricultural research station, NIPHAD. Guj. J. Ext. Edu. Special Issue on National Seminar: April 2018

Samui, S. K.; Mitra S.; Roy, D. K.; Mandal, A. K. and Saha, D. (2000). Evaluation of front line demonstration on groundnut. *Journal of the Indian Society Costal Agricultural Research*, **18** (2): 180-183.

Scientific cultivation of cereal crop (Gujarati language), Book published by Wheat Research Station, SDAU, Vijapur (2015-16).