



Analysis of Yield Gap by Front Line Demonstrations in Wheat in Banaskantha District of Gujarat, India

C. K. Desai ^{a*}, V. K. Patel ^b, P. B. Singh ^b and P. H. Rabari ^c

^a Dry Farming Research Station, SDAU, Radhanpur, Gujarat, India.

^b Krishi Vigyan Kendra, SDAU, Tharad, Gujarat, India.

^c C. P. College of Agriculture, SDAU, Sardarkrushinagar, Gujarat, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The front line demonstration is very effective 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 revealed that the yield of wheat with latest improved practises under irrigated conditions were ranges from 4452 to 4502 kg/ha. While, it ranges between 3885 to 4099 kg/ha in farmer practice. 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 380 to 598 kg/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.

*Corresponding author: E-mail: ck.roziya@gmail.com;

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1. INTRODUCTION

“Wheat is also known as king of cereals and It is one of the most important staple food crop. It is rich in carbohydrates and protein. For 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” [1-3]. 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 [4-6]. This study was started to know the FLDs impact during vertical and lateral spread of the technologies through demonstration and its effect on 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 growing farmers.

2. MATERIALS AND METHODS

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 recommendation of Wheat Research Station, Sardarkrushinagar Dantiwada Agricultural University, Vijapur, Gujarat. 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 as per the Table 1. Cost of cultivation and gross return data 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. [7] gave the following formula of extension gap which was used in this study to calculate extension gap.

$$\text{Extension gap} = \text{Demonstration yield} - \text{Yield from farmers practice (Local check)}$$

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

3. RESULTS AND DISCUSSION

3.1 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

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

Particulars	Technology intervention	Existing practice	Gap
Variety	GW-451	Old variety	Full
Sowing time	15 – 25 November	Early (October) or Late (December)	Full
Seed rate	125 kg/ha	100-150 kg/ha	Partial
Sowing method	22.5 cm Line sowing method	Broadcasting	Full
Seed treatment	Azotobacter and Bifenthrine	No seed treatment	Full
Fertilizer dose	(120:60:00: kg NPK/ha)	Not decided	Full
Weed management	Application of Pendimethalin @1.0 kg a.i./ha as Pre-emergence	One hand weeding	Partial
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 [8]

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

Year	No. of demonstration	Grain yield (kg/ha)		Percent increase in yield over local	Extension gap (kg/ha)	B : C ratio	
		Improved practice	Farmer practice			Improved practice	Farmer practice
2018	15	4483	3885	15.39	598	2.53	1.92
2019	15	4502	3989	12.86	513	2.49	1.44
2020	25	4452	4054	09.81	398	2.19	1.75
2021	25	4479	4099	09.03	380	2.87	2.34

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 mostly farmers used old varieties, improper method of sowing and fertilizer. In addition to that they used improper pesticide with very high dose so cost of cultivation increased.

3.2 Impact of Front Line Demonstrations

For the calculation of cost of cultivation and benefit cost ratio, prevailing market price of each year were used. Improved practices recorded higher grain yield as well as benefit cost ratio over Farmer practices during each year. This might be due to knowledge and adoption of latest scientific cultivation practices. Results are closely conformity with results reported earlier by Desai et al., [1] Romade et al., [9] and Kumar et al., [10].

Result revealed that wheat yield in latest improved practises were ranges from 4452 to 4502 kg/ha whereas in Farmer Practices it ranges between 3885 to 4099 kg/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 in improved practices and it was 1.44 to 2.34 in local check. Higher grain yield of wheat could be enhanced to a great extent with increasing the farmer's income by conducting front line demonstration of latest recommended technologies.

3.3 Extension Gap

Extension gap of 598 kg/ha, 513 kg/ha and 398 kg/ha was recorded in the year 2018 to 2020 respectively as compare to the year 2021 (3.80 q/ha). Results revealed that there is a need to educate the farmers through front line demonstration for adoption of latest improved production technologies to reduce the wide extension gap. We can aware the farmers for adoption of improved scientific cultivation practices which will subsequently change this alarming trend of galloping extension gap by horizontal spread of latest scientific cultivation practices through FLDs. Results are close conformity with results given by Desai et al., [1,9].

4. CONCLUSION

From the analysis of four years FLD data, It can be concluded that front line demonstrations have

significant role to enhance the productivity of wheat 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.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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