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Yield gap analysis through front line demonstration in wheat crop

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Abstract

Front Line Demonstration is one of the most powerful tool for transfer of technology. The present study was undertaken to find out the yield gap through FLDs on wheat crop. Krishi Vigyan Kendra, Basuli, Mahrajganj conducted 75 demonstrations with a total area of 30.0 ha. On wheat during 2015-16, 2016-17 and 2017-18 in different five adopted villages. Prevailing farmer's practices were treated as control for comparison to recommended practices. The average three years data observed that an average yield of demonstrated plot was obtained 54.73 q / ha. Over control (44.38 q / ha.) with an additional yield of 10.35 q/ha having an increase of 23.29 percent. The average Extension gap was 10.35 q / ha. Technology gap was 15.26 q / ha. While technology index was found 21.81 percent

Keywords: Front line demonstration, transfer of technology, recommended practices, yield gap, wheat

1. Introduction

Wheat (*Triticum aestivum*) is the second most important cereal crop in India after rice contributing substantially to the national food security by providing more than 50% of the calories to the people who mainly depend on it. In historical perspective India has made spectacular advancement in productivity and sustainability of wheat and wheat based cropping system. The scenario of the past ten years has clearly indicated that the wheat production in the country has soared ahead despite area remaining the same. The wheat programme has released 399 wheat varieties, comprising 355 bread wheat, 54 durum, 5 dicoccum and 5 triticale for cultivation under different zones. (Anonymous, 2012) ^[1].

Wheat is an important food crop of Mahrajganj district of U.P. Mahrajganj district has been considered as productive potential region of wheat crop due to assured irrigation facilities and favourable soil and climate conditions. In the district wheat is grown in an area of 1.49 lac ha. with a production of 5.25 lac tons having productivity of 35.28 q/ha while in UP total area is 98.85 lac ha. with a production of 349.71 lac tons having productivity of 35.38 q/ha (Deptt. of Agric. Mahrajganj, 2016-17). However there is still a wide gap between the production, potential and the actual production obtained by the farmers. This may be due to partial adoption of recommended package of practices by the wheat growers. Technology gap is a major problem in increasing wheat production in Mahrajganj district of U.P State. So far, no systematic effort was made to study the technological gap existing in various components of wheat cultivation.

2. Material and Methods

The study was carried out by Krishi Vigyan Kendra, Basuli during rabi season mahrajganj from 2015-16, 2016-17 and 2017-18 (consecutive years) in the farmers's field of adopted 5 villages. Mahrajganj district. During this year of study, in area of 30 ha was covered with plot size 0.4 ha under Front-line demonstrations using Wheat var.HD-2967 with active participation of 75 farmers. Before conducting FLDs, a list of farmers was prepared for group meeting and specific skill training was given to the selected framers regarding package of practices of wheat. The difference between Demonstration package of practices and Existing farmers practices are given in Table 1.

In general the soils under study were loam soil in texture with a PH range in between 6.8 to 7.5. The available nitrogen, phosphorous and potassium varied between 100-250, 26-60, 150-300 Kg/ha, respectively. However the soils were deficient in micro nutrients particularly zinc.

In demonstration plots use of quality seeds of improved variety, timely sowing, weeding, need based use of pesticides as well as balanced fertilization, and irrigation were emphasized. The traditional practices were maintained in case of local check. The data were collected from both FLD plots as well as control plot and finally the extension gap, technological gap, technological index (Samui *et al.* 2000) ^[14] along with the benefit-cost ratio were calculated as given below.

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Technology gap = Potential yield- Demonstration yield
 Extension gap = Demonstration yield – Farmers practice yield

(Potential yield- Demonstration yield)
 Technology index = $\frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$

Table1: Comparison between demonstration package of practices and existing practices in wheat crop

Sl. No.	Particulars	Demonstration practices	Farmer Practice
1.	Farming situation	Irrigated	Irrigated
2.	Variety	HD- 2967	PBW-343
3.	Time of sowing	November	November
4.	Method of sowing	Line sowing through seeddrill / ZT	Broadcast
5.	Seed treatment	carbendagym @ 2 g/kg of seed	Without seed treatment
6.	Seed rate	100 kg/ha	125 Kg/ha
7.	Fertilizer dose	NPK (150:60:60)	NPK (150:60:25)
8.	Plant Protection	Application of bio fungicide Beuveria bassiana	Injudicious use of pesticide and fungicides
9.	Weed management	Spraying of sulforoufuron + metsulfuron at 30-35 days after sowing	Use of Isoproturon 75% @ 1.0 kg / ha.at 30-35 days after sowing

Table 2: Yield, Technology gap, Extension gap and Technology index in Wheat under Front Line Demonstration

Sr. No.	Year	Seed Yield (q/ha)			% increase over control	Technology gap (q/ha)	Extension gap (q/ha)	Tech. index %
		Potential	Demo.	Control				
1.	2015-16	70	50.40	41.20	22.33	19.60	9.20	28.00
2.	2016-17	70	56.65	45.45	24.64	13.35	11.20	19.07
3.	2017-18	70	57.15	46.50	22.90	12.85	10.65	18.35
	Mean		54.73	44.38	23.29	15.26	10.35	21.81

Table 3: Economics analysis of FLDs

Sr. No.	Year	Yield q/ha		Gross return Rs/ha	Cost of Cultivation (Rs./ha)	Net return (Rs/ha)	B:C
		Grain	Straw				
1.	2015-16	57.20	57.20	97240	37550	59690	2.59
2.	2016-17	58.25	58.25	99025	37550	61475	2.64
3.	2017-18	56.81	56.81	96577	37550	59027	2.57
	Mean	57.42	57.42	97614	37550	60064	2.60

Table4: Economic analysis of Framer practice

Sr. No.	Year	Yield q/ha		Gross return Rs/ha	Cost of Cultivation (Rs./ha)	Net return (Rs/ha)	B:C
		Grain	Straw				
1.	2015-16	41.20	41.20	65920	36040	29880	1.83
2.	2016-17	45.45	45.45	77265	36040	41225	2.14
3.	2017-18	46.50	46.50	78950	36040	42910	2.19
	Mean	44.38	44.38	74045	36040	38005	2.05

3. Results and Discussion

The data revealed that the yield of wheat fluctuated successively over the three years in demonstration plot (Table-2). The maximum yield 57.15 q/ha. was reported during the year 2017-18 and minimum yield was reported in the year 2015-16 (50.40 q/ha) and the mean yield of 3 years was reported 54.73 q/ha. Over control (44.38 q/ha). During 3 years of study, the increased yield of demonstration over local was ranging between 22.33 to 24.64%. The results are similar with the findings of Tomer *et al.* (2003) [9], Tiwari and Saxena (2001) [7] and Tiwari *et al.* (2003) [8], Singh *et al.* (2007) [6], Sharma and Chaudhari (2014) [5], Katara *et al.* (2011) [2] and Pandey *et al.* (2018) [3]. The data indicated that the positive effect of Front line demonstration over the existing practices towards increasing the yield of wheat in Mahrajganj of U.P. Benefit-cost ratio was recorded to be more under demonstration than the control during all the years.

The Extension gap ranged between 9.20 to 11.20. During the period of study emphasis on the need to educate the farmers through various techniques for adoption of improved agricultural practices can reverse the trend of wide extension gap.

The technological gap i.e. the difference between potential yield and demonstration yield were ranged between 12.85 to

19.60 during the years 2015-16 to 2017-18. The average technology gap in all the three years was 15.26 q/ha. Technology gap imply researchable issues for realization of potential yield while the extension gap imply what can be achieved by the transfer of existing technologies.

The technology index revealed the feasibility of the demonstration technology. As such variation in technology index 18.35 to 28.00 during the study period in certain area may be attributed to dissimilarity in the soil fertility condition, attack of pest and disease, non availability as well as poor quality of irrigation water and weather conditions.

4. Conclusion

On the basis of the result obtained in the present study it can be concluded that adoption of improved practices of wheat cultivation can reduce the technology gap to a considerable extent thus leading to increase productivity of wheat in the district. Extension gap ranging between 9.20 -11.20 q/ ha emphasise the need to educate the farmers through various means like village level training, on campus training, Front line demonstration, field days etc. Technology index which shows the feasibility of the technology demonstrated has depicted good performance of the intervention.

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