



## Popularization of Wheat Raj 4037 through FLDs in Baran District of Rajasthan

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### Abstract

*Frontline demonstration (FLD) is one of the most important and powerful tools for transfer of technology. Keeping in view of an effective extension approach of FLDs for dissemination of technology FLDs on wheat were conducted by KVK, Anta-Baran, Rajasthan was assessed. The yield and economic performance of frontline demonstration, horizontal spread of technology, extent of adoption level and the extent of satisfaction level of respondent farmers over extension services and performance of demonstration was measured in this study. It was observed that there was 11.47 to 16.26 percent increase in grain yield over local check and the average benefit cost ratio was higher under demonstration as compared to control plots during the all years of the study. It was estimated that the horizontal spread of wheat Raj 4037 was from about 100 ha during 2008-09 to 1.32 lac ha during the year 2014-15. The findings of the study also revealed that they had increase in adoption level ranging from 07.62 percent of storage to 33.33 percent of improved and quality seed after conducting the FLD programmes. The majority of the respondent farmers expressed medium (48.57%) to the high (36.19 %) level of satisfaction for extension services and performance of technology under demonstrations. It can be concluded that frontline demonstration conducted under the close supervision of scientists is one of the important tool for extension to demonstrate newly released crop production and protection technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations.*

**Key Words:** *Frontline demonstration; wheat production technology; yield and economic performance; farmer's satisfaction; adoption.*

## I. INTRODUCTION

India is second largest producer of wheat in the world after China with about 12% share in total world wheat production. The total area under the crop is about 29.8 million hectares in the country and the production has increased significantly from 75.81 million MT in 2006-07 to an all time record high of 94.88 million MT in 2011-12. The productivity of wheat which was 2602 kg/hectare in 2004-05 has increased to 3140 kg/hectare in 2011-12. The major increase in the productivity of wheat has been observed in the states of Haryana, Punjab and Uttar Pradesh. Rajasthan, also known as Land of Kings is placed at 5th in the list of top 10 largest wheat producing states in India (2015). Wheat is grown in more than 24 lakh hectares of area in Rajasthan and accounts for more than 8% of total wheat production in India. *Triticum aestivum* and *Triticum durum* are the species of wheat, which are grown in Ganganagar, Udaipur, Jaipur, and Kota division of

Rajasthan. Rajasthan produces more than 72 lakh metric tonnes of wheat and owns the wheat productivity of more than 2,900 kg/hectare.

Frontline demonstration is one of the most important and powerful tools of extension because, in general farmers are driven by the perception that '*learning by doing*' and '*Seeing is believing*'. The field demonstrations conducted under the close supervision of scientists of the National Agriculture Research System is called front line demonstrations because the technologies are demonstrated for the first time by the scientists themselves before being fed in to the main extension system of the State Department of Agriculture. The main objective of front line demonstrations is to demonstrate newly released crop production and protection technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations. While demonstrating the technologies in the farmers' field, the scientist are required to study the factors contributing higher crop production, field constraints of production and thereby generate production data and feedback information. Realizing the importance of FLDs in transfer of latest technologies, Krishi Vigyan Kendra, Anta-Baran have regularly been conducting FLDs on wheat at farmers field in different villages of Baran district of Rajasthan with the objective of convincing farmers and extension functionaries together about the production potentialities of production technologies for further wide scale diffusion. Keeping in view of an effective extension approach of FLDs for dissemination of wheat technology, it was thought that impact of FLDs conducting by KVK, Anta-Baran was to be assessed.

## II. METHODOLOGY

The frontline demonstrations on wheat were conducted by several institutes or organizations in Rajasthan but due to paucity of time and proximity, study was confined to FLDs conducted by KVK in Baran district of Rajasthan. The data on output were collected from FLDs plots and finally the grain yield, cost of cultivation, net returns with the benefit cost ratio was work out. For the purpose of investigation, three villages from each block (seven) of Baran district where FLDs on wheat were conducted during preceding five years (Rabi 2010- 11 to 2014-15) were selected. A comprehensive list of FLD farmers was prepared. Out of this, five beneficiaries from each selected village were randomly selected. Thus, a total sample of 105 respondents was taken for the study. The Adoption level of the farmers about improved production practices of wheat before conducting and after conducting FLD was measured. Further, the satisfaction level of respondent farmers about extension services provided was also measured based on various dimensions like training of participating farmers, timeliness of services, supply of inputs, solving field problems and advisory services, fairness of scientists, performance of variety demonstrated and overall impact of FLDs. The data were collected through personal contacts with the help of well structured interview schedule. The gathered data were processed, tabulated, classified and analyzed in terms of mean percent score and ranks etc. in the light of objectives of the study. The Client Satisfaction Index was calculated as developed by Kumaran and Vijayaragavan (2005).

$$\text{Client Satisfaction Index} = \frac{\text{The individual obtained score}}{\text{Maximum score possible}}$$

### III. RESULT AND DISCUSSION

**Yield performance of wheat (Raj 4037):** During 2008-09 to 2014-15, result of wheat variety Raj 4037 demonstrations conducted at farmer's field revealed that there was 11.47 to 16.26 percent increase in grain yield over local check. The table 3 shows that average yield in demonstrations varied from 4717kg to 5220 kg/ha during all seven years and highest yield in demonstration was recorded during 2012-13 followed by 2011-12 (5162 kg/ha), 2013-14 (5080 kg/ha), 2009-10 (4916kg/ha), 2008-09 (4880kg/ha), 2010-11 (4738 kg/ha) and 2014-15(4717kg/ha) respectively. In local checks (Table1), also same trend was found i.e., maximum average grain yield (4680kg/ha) was recorded during 2012-13 and lowest grain yield (4143kg/ha) was observed during 2014-15. The overall average yield in demonstration plots (4959kg/ha) was higher as compared to local plots (4363kg/ha) and increase in grain yield was 13.66 percent over local checks during the study period (2008-09 to 2014-15). It might be due the soil type & its moisture availability, rainfall & weather condition as well as the change in the locations of demonstration plots every year. In general, in all the years grain yield of FLDs plots was higher as compared to local check which was due to good variety, seed treatment, recommended fertilizer doses, plant protection measures were followed by the demonstrators and scientists in the demonstrations plots. The similar results were also observed by Thakral and Bhatnagar (2002), Dhaka *et.al.*(2010) and Sharma and choudhary (2014). Hence, it can be concluded from the table 1 that increased yield was due to adoption of improved variety and conducting demonstration of proven technologies yield potentials of crop can be increased to greater extent.

**Table 1: Yield performance of frontline demonstrations on wheat variety Raj 4037.**

Season and Year	No.of Demo	Area (ha)	Average Yield (Kg/ha)		Increase in Yield (%) over local
			Demo	Local Check	
Rabi 2008-09	50	25	4880	4220	15.64
Rabi 2009-10	90	27	4916	4310	14.06
Rabi 2010-11	60	24	4738	4143	14.36
Rabi 2011-12	60	30	5162	4440	16.26
Rabi 2012-13	70	35	5220	4680	11.54
Rabi 2013-14	120	36	5080	4530	12.14
Rabi 2014-15	180	72	4717	4218	11.47
<b>Overall average</b>			<b>4959</b>	<b>4363</b>	<b>13.66</b>

**Table 2: Economic performance of frontline demonstrations on wheat variety Raj 4037.**

Season and Year	Cost of cultivation (₹/ha)		Gross Return (₹/ha)		Net return (₹/ha)		Additional net returns over local (₹/ha)	Benefit Cost Ratio	
	Demo	Local Check	Demo.	Local Check	Demo.	Local Check		Demo	Local Check
Rabi 2008-09	17000	18000	45100	37600	28100	19600	8500	2.65	2.09
Rabi 2009-10	17400	18300	49000	43000	31600	24700	6900	2.82	2.35
Rabi 2010-11	18000	19500	52000	46000	34000	26500	7500	2.89	2.36
Rabi 2011-12	18500	20000	62000	53000	43500	33000	10500	3.35	2.65
Rabi 2012-13	25000	27000	68000	61000	43000	34000	9000	2.72	2.26

Rabi 2013-14	31000	33500	71000	63000	40000	29500	10500	2.29	1.88
Rabi 2014-15	32000	34500	75000	66000	43000	31500	11500	2.34	1.91
<b>Overall average</b>	<b>22700</b>	<b>24400</b>	<b>60300</b>	<b>52800</b>	<b>37600</b>	<b>28400</b>	<b>9200</b>	<b>2.66</b>	<b>2.16</b>

**Economic performance of wheat (Raj 4037):** The year wise economics of wheat production under demonstration were estimated and the result has been presented in table 2. The economic analysis of the data over all the years revealed that wheat (Raj 4037) recorded higher gross returns (₹ 60300), net returns (₹ 37600) and B: C ratio (2.66) as compared to local check. Further, the table 2 also shows that the cost of cultivation was more in local checks as compared to demonstration plots. It was due to the fact that farmers were practicing to use more seed rate and over doses of fertilizers. The cost of cultivation increased successively of the years of study in demonstration and local plots due to hike in prices of inputs. The figures in table 2 clearly explain the significance of wheat (Raj 4037) demonstration at farmer's field during seven years of study in which greater net returns were obtained under demonstration plots than local checks. The highest net return was received in the year of 2011-12 (₹ 43500) and lowest during 2010-11 (₹ 28100). The Benefit cost ratio was higher under wheat demonstration as compared to control plots during the all years of study (Table 2). The higher net returns and B: C ratio in wheat demonstration might be due to the higher grain yield and better pricing of the produce in the market. The overall average additional net returns was ₹ 9200 over local plots. These results are in line with the findings of Gurumukhi and Mishra (2003), Hiremath and Nagaraju (2009), Dhaka *et.al.*(2010) and Sharma and Choudhary (2014).

**Increase in area under improved varieties (Raj 4037):** The estimated data regarding increase in area under improved variety Raj 4037 in the Baran of Rajasthan is presented in table 3. It was observed that the area under improved variety raj 4037 was estimated only 100ha during the year 2008-09 which was horizontally increased and estimated 2000ha (2009-10), 15000ha (2010-11), 60000ha (2011-12), 95000ha (2012-13), 115000ha (2013-14) and 132000ha (2014-15) respectively in the Baran district of Rajasthan. It clearly shows that the horizontal spread of wheat Raj 4037 was from about 100 ha during 2008-09 to 1.50 lac ha during the year 2014-15 and after introduction of Raj 4037, it was covered more than 80 percent area of the total wheat area in the Baran district during the year 2014-15. It might be due to the fact that the variety Raj 4037 was superior in terms of productivity, no lodging problem, no scattering at the time of harvesting and good quality of chapatti as compared to Lok 1 and Raj 3765.

**Table 3. Increase in area under improved variety of wheat raj 4037 in Baran district of Raj.**

Season and Year	Total area under wheat (ha)*	Estimated Area under Improved variety Raj 4037 ( ha)*
Rabi 2008-9	95800	100
Rabi 2009-10	105570	2000
Rabi 2010-11	147930	15000
Rabi 2011-12	142589	60000
Rabi 2012-13	167037	95000
Rabi 2013-14	162852	115000
Rabi 2014-15	180172	132000

\*Source: Department of Agriculture, Baran (Raj.)

**Extent of Adoption level of farmers:** The data regarding adoption of the improved wheat production technologies were also recorded under two heads like; adoption before conducting and after conducting frontline demonstration. The data in table 4 revealed that they were followed improved practices of wheat production like; sowing time & method (79.05 percent), irrigation scheduling (74.28 percent), land preparation (68.57 percent), improved & quality seed (66.67 percent), harvesting (64.76 percent), Seed treatment (62.86 percent), weeding (60.95 percent), storage (45.71 percent), fertilizer application (30.48 percent), and seed rate & spacing (14.29 percent) before conducting programmes while other farmers were started adopting the improved practices like; improved & quality seed (33.33 percent), fertilizer application (25.71 percent), land preparation (23.81 percent), weeding (22.86 percent), seed rate & spacing (23.81 percent), seed treatment (20.00 percent), irrigation scheduling (14.27 percent), sowing time & method (11.43 percent), harvesting (8.57 percent) and storage (7.62 percent). The low level of adoption was found like; seed rate and spacing and fertilizer application due to the farmers were practices of high seed rate with closing spacing and over doses of fertilizers in wheat cultivation. The findings of the study also revealed that they had increase in adoption ranging from 07.62 percent of storage to 33.33 percent of improved & quality seed after conducting the training and FLD programmes. This might be due the fact that increasing in knowledge, skills and confidence level of farmers through training programmes on different production technologies of wheat crop like; high yielding variety, seed rate & spacing, seed treatment, soil testing, soil treatment, weeding, plant protection measures, irrigation scheduling, fertilizer application and harvesting has helped farmers to improve the yield of wheat crop. The similar results were also reported by Meena and Gupta (2013)

**Table 4: Extent of adoption level of the respondents regarding wheat production technologies (n=105).**

Gram Production Technologies	Before FLDs		After FLDs		Increase in adoption level	
	No.	Percent	No.	No.	Percent	No.
Land preparation	72	68.57	97	92.38	25	23.81
Seed treatment	66	62.86	87	82.86	21	20.00
Improved & quality seed	70	66.67	105	100	35	33.33
Seed rate & spacing	15	14.29	40	38.10	25	23.81
Sowing time & method	83	79.05	95	90.47	12	11.43
Irrigation scheduling	78	74.28	93	88.57	15	14.27
Weeding	64	60.95	88	83.80	24	22.86
Fertilizer application	32	30.48	59	56.19	27	25.71
Harvesting	68	64.76	77	73.33	09	08.57
Storage	48	45.71	56	53.33	08	07.62

**Farmer's satisfaction:** The extent of satisfaction level of respondent farmers over extension services and performance of demonstrated variety was measured by Client Satisfaction Index (CSI) and results presented in table 5. It is observed that the majority of the respondent farmers expressed medium (48.57 %) to the high (36.19 %) level of satisfaction for extension services and performance of technology under demonstrations. Whereas, very few (15.24 percent) of respondents expressed lower level of satisfaction. The results are in conformity with the results of Narayanaswamy and Eshwarappa (1998), Kumaran and Vijayaragavan (2005). The medium to higher level of satisfaction with respect to services rendered, linkage with farmers, and technologies demonstrated etc. indicate stronger conviction, physical and mental involvement in the frontline demonstration which in turn would lead to higher adoption. This shows the relevance of frontline demonstration.

**Table 6: Extent of farmers satisfaction of extension services rendered (n=105).**

Satisfaction level	Number of Respondents	Percent
Low	16	15.24
Medium	51	48.57
High	38	36.19

#### IV. CONCLUSION

It can be concluded that the FLD is playing one of the important role in motivating the farmers for adoption of production technology resulting in increasing their yield and profit. . It was observed that the horizontal spread of wheat Raj 4037 was from about 100 ha during 2008-09 to 1.32 lac ha and it was covered more than 80 percent area of the total wheat area in the Baran district during the year 2014-15. The farmers were expressed medium to the high level of satisfaction for extension services and performance of technology under frontline demonstrations. They had increase in adoption level after conducting the FLDs. It can be concluded that frontline demonstration conducted under the close supervision of scientists is one of the important tool for extension to demonstrate newly released crop production and protection technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations.

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