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Research Article

YIELD AND GAP ANALYSIS OF WHEAT PRODUCTIVITY THROUGH FRONTLINE DEMONSTRATION IN ASHOKNAGAR DISTRICT OF MADHYA PRADESH

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Abstract- Front line demonstrations on wheat variety GW 273 and GW 322 were conducted on farmer's fields in Ashoknagar district of Madhya Pradesh, India, during Rabi season of the year 2008-2009, 2009-2010, 2010-2112 and 2011-2012 about 34.70 percent higher grain yield was recorded under demonstrations over the farmers practices. The extension gap, technology gap and technology index were observed to be 1779 kg per ha 1225 kg per ha and 20.42 % respectively. An additional return of Rs. 2544 per ha was obtained with additional investment of Rs. 1952 per ha coupled with scientific monitoring of demonstrations and use of other non-monetary factors. Fluctuating MSP and or sale price of wheat during different years also influenced the economic returns per unit area. On average basis the incremental benefit: cost ratio was found as 7.56.

Key words- Demonstration, economic, gap analysis, grain yields, wheat.

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Introduction

Wheat is the second most important food crop of the country. In India wheat is grown over 25.48 lakh ha area with production and productivity of 85.47 lakh ton 33.54 q/ha, respectively. Improvement in productivity of wheat crop has played a key role in making the country self sufficient in food production. However, in the past decade there has been marginal increase in the productivity of wheat [1,2]. The average productivity of wheat in Madhya Pradesh state of India is less than 3.0 t/ha, which is substantially lower compared to 4.0 t/ha in states like Haryana and Punjab. Efforts are being made at various levels to sustain food security through wheat production but as on date the result is not satisfactory and worthy.

In Ashoknagar district of Madhya Pradesh, India, wheat is a major rabi crop grown in over 1.34 lakh ha area with 2.06 lakh ton of production and 27.15 q/ha productivity. The productivity level of wheat crop in the Ashoknagar district low because farmers are not following the recommended package of practices. Therefore, on the basis of 'seeing is believing' principal it is very essential to demonstrate the latest technologies at farmers field so that the farmers see the results and adopt the technology in totality. A wide gap exists in wheat production with the use of available techniques and its actual application by the farmers which is reflected through poor yield of wheat crop on farmer's fields. There is a tremendous opportunity for increasing the productivity of wheat crop by adopting the improved technologies. There are many technologies generated at agricultural universities and research stations but the productivity of wheat is still very low due to poor transfer of technology. To demonstrate the scientific cultivation of wheat front line demonstrations should be laid out at farmer's field. The basic objective of FLDs is demonstrate the proven technology at farmer's field through KVKs. Keeping the importance of FLDs, the KVK, Ashoknagar had laid out demonstrations of wheat crop on farmers field under irrigated situations during Rabi 2008-2009, 2009-2010, 2010-2011 and 2011-2012 with following specific objectives.

Materials and Methods

Front line demonstrations on wheat were conducted at farmer's field in district Ashoknagar, (M.P.) to assess its performance during the four consecutive rabi seasons 2008-2009, 2009-2010, 2010-11 and 2011-12. Soils of the demonstration sites were clay loam, semi deep in organic carbon (o.35-0.41%) low to medium in phosphorus (11.26 kg/ha.) and medium to high in potash (221-335 kg/ha.) with black soil (pH 7-7.8). The demonstrations were laid out on irrigated fields with soybean, wheat, black gram-wheat and green gram-wheat rotations which are most prevalent in the area. Each demonstration was of one acre area and recommended package was provided to the farmers through one day on campus training at KVK. The sowing was done during mid November to last week of November and harvesting of crop was done during first fortnight of April. The demonstrations on farmer's fields were regularly monitored from sowing till harvesting by scientists of Krishi Vigyan Kendra, Ashoknagar. The grain yield of demonstration crop was recorded & analyzed. Different parameters as suggested by [3,4] were used for calculation gap analysis, costs and returns. The analytical tool used for assessing the performance of the FLD on wheat is as follows:

- Extension gap=Demonstration yield-Farmer's practice yield
- Technology gap=Potential yield-Demonstration yield
- Technology index= (Potential yield-Demonstration yield) x 100/Potential yield
- Additional return= Demonstration return- Farmer's practice return
- Effective grain=Additional return-Additional cost
- Incremental B:C ratio=Additional return/Additional cost

Results and Discussion

The increase in grain yield under demonstration over the farmer's local practices was in the range of 39.25 to 45.95 percent. On the average basis 34.70 percent

yield advantage was recorded under FLD demonstrations as compared to farmers practices (FP) of wheat cultivation.

The extension gap ranging from 1051 to 1618 kg per hectare was found between FLD demonstration and farmers practices during the different time line and on average basis the extension gap was observed to be 1379 kg per hectare [Table-1]. The extension gap was lowest (1051 kg/ha) in year 09-10 and was the highest (1618 kg/ha) in year 2011-12. Such gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than that in the farmer's practices. Wide technology gap were observed during these years and this was lowest (861/ kg/ha) during 2011-12 and was highest (1820 kg/ha) during 2008-03. On average basis the technology gap of all the 46 demonstrations was found to be 1225 kg per hectare. The difference in Yield and gap analysis of wheat productivity through frontline demonstrations

Table-1 *Grain yield and gap analysis of front line demonstrations of wheat on farmers' yield*

Years	No. of detonations	Variety	Potential Yield (q/ha)	Demonstration yield (q/ha)	Farmer's Practice Yield (q/ha)	Increase Over Farmers Practice (%)	Extension Gap (q/ha)	Technology Gap (q/ha)	Technology Index (%)
2008-09	10	GW-273	60	41.00	30.91	30.40	10.89	18.20	30.33
2009-10	12	GW-322	60	46.43	35.92	29.25	10.51	13.57	22.61
2010-11	12	GW-322	60	51.35	33.75	33.21	17.60	8.65	14.41
2011-12	12	GW-322	60	51.39	35.21	45.95	16.18	8.16	14.35
Overall average		-	-	47.54	33.94	34.70	13.79	12.25	20.42

Table-2 *Economic analysis of front line demonstration of wheat on farmers' field*

Years	Cost of cash input (Rs./ha)		Additional Cost in Demo. (Rs/ha)	Sale price (MSP) of grain (Rs/q.)	Total Net Returns (Rs./ha)		Additional returns in demonstration (Rs./ha)	Effective Gain (Rs./ha)	Incremental B.C. ration (IBCR)
	Demo.	FP			Demo.	FP			
2008-09	13840	11930	1910	1300	31689	22071	9618	7708	5.03
2009-10	16200	13100	3300	1300	39516	30004	9512	6412	3.06
2010-11	13600	12200	1400	1450	36285	24870	11415	10015	8.15
2011-12	15700	14300	1400	1500	51107	31473	19634	182341	4.02
Overall average	14835	12882	2002	-	39649	27104	12544	10592	7.56

Technologies gap during different years could be due to differential feasibility of recommended technologies during different years. Similarly, the technology index for all the demonstrations during different years were in accordance with technology gap. Higher technology index reflected the inadequacy of technology and or insufficient extension services for transfer of technology.

Economic analysis

Different variables like seed, fertilizers, herbicides and pesticides were considered as each inputs for the FLD demonstrations as well as for farmers practice. It is observed that an additional investment of Rs. 1952 per ha was made under FLD demonstrations. Economic returns was observed to be a function of grain yield and Minimum Support Price (MSP) or sale price which varied along different years. Additional item maximum returns of Rs. 19634 per hectare during the years 2011-12 was obtained due to higher grain yield. The higher additional returns under demonstrations could be due to improved technology, non-monetary factors, timely operations of crop cultivation and scientific monitoring. The lowest and highest incremental benefit: cost ratio (IBCR) were 3.06 & 14.06 in 2009-10 and 2011-12, respectively [Table-2] which depends on grain yield and MSP or sale price. The results are in conformity with the findings of earlier work [3-6].

The front-line demonstration on wheat revealed 34.70 per cent increase in yield over local check. This increase was with an extra even expenditure of Rs. 1952/ha which is very less and even small and marginal farmers could also afford. Thus it is not the cost that deters the farmers from adoption of latest technology but ignorance is the primary reason. It is quite appropriate to call such yield gap as extension gap. The extension gap was found to be 1379 kg/ha. The IBCR (7.56) is sufficiently high to motivate the farmers to adopt the technology. Therefore, FLD program was effective in changing attitude, skill and knowledge of farmers towards improved/recommended practices of wheat cultivation. This also led to improvement in the relationship between farmers and scientists and built confidence between them.

Conclusion

The FLD demonstration farmers acted as primary source of information about the improved practices of wheat cultivation. They also acted as source of good quality pure seeds in their locality and surrounding area for the next crop. The concept of Front Line Demonstration may be applied to all farmer categories including progressive farmers for speedy and wider dissemination of the recommended practices to other members of the farming community. This will help in the removal of the cross-sectional barriers among farming community.

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Abbreviations:
FP: Farmers practices
MSP: Minimum Support Price

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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