Yield and gap analysis of wheat productivity through frontline demonstrations in Jhunjhunu district of Rajasthan

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ABSTRACT

Front line demonstrations on wheat variety Raj-4083 were conducted on farmers’ fields in district Jhunjhunu (Rajasthan) during rabi season of the year 2010-11, 2011-12 and 2012-13. About 10.95 per cent higher grain yield was recorded under demonstrations over the farmers’ practices. The extension gap, technology gap and technology index were observed to be 409 kg per ha, 359 kg per ha and 7.98%, respectively. An additional return of Rs. 7887 per ha was obtained with an additional investments of Rs.1552 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 5.08.

Key words: Demonstration, economics, gap analysis, grain yields, wheat.

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 and 33.54 q/ha, respectively (Anonymous, 2013). 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 [Nagarajan (2005) and Joshi et al. (2007)]. The average productivity of wheat in Rajasthan is less than 3.0 t/ha, which is substantially lower compared to ~ 4.0 t/ha in adjoining 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 Jhunjhunu district, wheat is a major rabi crop grown in over 0.76 lakh ha area with 2.06 lakh ton of production and 27.15 q/ha productivity (Anonymous, 2012). The productivity level of Wheat crop in the Jhunjhunu district is low because farmers are not following the recommended package of practices. Therefore, on the basis of ‘seeing is believing’ principle 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 to demonstrate the proven technology at
farmer’s field through KVKs. Keeping the importance of FLDs, the KVK, Jhunjhunu had laid out demonstrations of wheat crop on farmers field under irrigated situations during Rabi 2010-11, 2011-12, & 2012-13 with following specific objectives.

- To demonstrate the performance of recommended high yielding wheat variety with complete package of practices;
- To assess the performance of FLD fields with local check; and
- To analyse the economics of FLDs on wheat.

**MATERIALS AND METHODS**

Front line demonstrations on wheat were conducted at farmer’s field in district Jhunjhunu (Rajasthan) to assess its performance during the three consecutive rabi seasons 2010-11, 2011-12, & 2012-13. Soils of the demonstration sites were sandy loam, low in organic carbon (0.2-0.3%) low to medium in phosphorus (20-46 kg/ha.) and medium to high in potash (323-356 kg/ha.) with alkaline reaction (pH 8.2-8.5). The demonstrations were laid out on irrigated fields with cluster bean-wheat, cowpea-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 two days 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, Jhunjhunu. The grain yield of demonstration crop was recorded & analyzed. Different parameters as suggested by Yadav et al. (2004) and Dayanand et al. (2012) were used for calculating 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 - Farmers' practice yield
- Technology gap = Potential yield - Demonstration yield
- Technology index = (Potential yield - Demonstration yield) x 100/ Potential yield
- Additional return = Demonstration return - Farmers' practice return
- Effective gain = Additional return - Additional cost
- Incremental B:C ratio = Additional return / Additional cost

**RESULTS AND DISCUSSION**

During the period of study, a total no. of 96 FLDs were conducted at farmer’s field as per the allotment by ICAR, New Delhi. Out of 96 demonstrations, 39 (41 per cent) were in the yield range of more than 4000 kg/ha, 49 (51 per cent) in range of 3500-4000 kg/ha and remaining 08 (8 per cent) were found in the low yield category i.e. less than 3500 kg/ha which might be attributed to variations in biotic and abiotic stresses observed across different time horizone (Table 1).

**Grain yield**

The increase in grain yield under demonstration over the farmers local practices was in the range of 9.82 to 13.31 per cent . On the average basis 10.95 per cent yield advantage was recorded under FLD demonstrations as compared to farmers practices (FP)of wheat cultivation.

**Gap analysis**

An extension gap ranging from 368-476 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 409 kg per hectare (Table 2). The extension gap was lowest (368 kg/ha) in year 2011-12 and was highest (476 kg/ha) in year 2010-11. Such gap might be attributed to adoption of improved technology in demonstrations which resulted in higher grain yield than that in the farmers practices. Wide technology gap were observed during these years and this was lowest (240 kg/ha) during 2012-13 and was highest (449 kg/ha) during 2010-11. On average basis the technology gap of all the 96 demonstrations was found to be 359 kg per hectare. The difference in
technology 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 cash inputs for the FLD demonstrations as well as for farmers practice. It is observed that an additional investment of Rs. 1552 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. Maximum returns of Rs. 9319 per hectare during the year 2010-11 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 4.40 & 5.89 in
2012-13 and 2010-11, respectively (Table 3) which depends on grain yield and MSP or sale price. The results are in conformity with the findings of Yadav et al. (2004), Lathwal, O.P. (2010), Dayanand et al. (2012) and Meena, et al. (2012).

The front line demonstration on wheat revealed 11 per cent increase in yield over local check. This increase was with an extra expenditure of Rs.1552/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 409 kg/ha. The IBCR (5.08) 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. 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.

References


