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Frontline demonstrations an effective extension teaching tool for cost-effective maize fodder production in Barnala District of Punjab

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Abstract

The study was conducted to evaluate the performance of maize fodder production technologies under participatory frontline demonstrations (FLDs) at farmers' fields against farmers' practice during the kharif *seasons from 2015 to 2018 in the 17 villages of Barnala district of Punjab. The average fodder yield of maize cultivar J 1006 under FLDs was 7.16%, 14.83%, 15.79% and 16.40% higher compared to farmers' practice in the years 2015, 2016, 2017 and 2018 respectively. Average net returns and C:B ratio from FLDs plots were also 8.43 and 6.88%, 22.14 and 17.91%, 25.26 and 17.73%, 23.72 and 39.13% higher in 2015, 2016, 2017 and 2018 respectively as compared to local check plots. The technical efficiency maize fodder yield gaps varies from 22.00 to 58.70 q/ha in all the four study years. From our study is concluded that there is need to use a wide range of effective extension programmes to educate and train the farmers for changing their mind set, attitude, skills and knowledge of advances in maize fodder production technologies by the extension functionaries in the district.*

Key words: Maize fodder, Yield, Economics, Technical efficiency yield gap

Introduction

The livestock production mainly depends upon the availability of good quality green fodder. To meet out the green fodder need of the livestock population there is a need to increase the production and productivity of fodder in an economic efficient manner. Farmers have poor knowledge of fodder production technologies and its adoption.

Frontline demonstration (FLD) is an approach that shows the effects of a task by means of practical applications which usually compares results of recommended practice/ technology with existing one. By which relevant information/ improved agricultural technologies/ practices can be disseminated effectively to the farmers for its adoption which has been shown in farmers' field's (Richardson, 2003).

Demonstrations involve measures to increasing the knowledge and skills as well as adoption of recommended fodder production technologies and its utilization for their better livestock production (Pandey *et al*., 2013).

Keeping these views in mind participatory frontline demonstrations (FLDs) on maize fodder production technologies were conducted at farmers' fields during the *kharif* seasons of 2015, 2016, 2017 and 2018 to analyze the performance of recognize and recommended high fodder yielding variety (J 1006) of maize with recommended package of practices.

Methodology

A total of 87 participatory frontline demonstrations comprised of recommended package of practices for maize fodder production (Table 1) were conducted during the *Khaif* seasons from 2015 to 2018 under irrigated farming situation in the 17 villages of the two blocks i.e. *Barnala* and *Sehna* of Barnala district of Punjab. Farmers' practice plots were kept as control (local check plot) adjacent to frontline demonstration plots. The critical and nonmonetary inputs like cultivar J 1006, seed rate, method of sowing, etc. were taken care of through training of participatory farmers by the KVK. Frontline demonstration plots were frequently visited by KVK scientists to monitor and guide the farmers during crop growing period and other extension activities like SMS through m-kisan portal and fodder crop cultivation

Table 1: Particulars showing technological interventions under demonstrations and details of existing farmers' practices

Particulars	Demonstration plot (Technological interventions)	Control plot (Farmers' practices)	Technical efficiency gap
Farming situation	Irrigated	Irrigated	-
HYV	Improved cultivar J 1006	Local (Unknown)	Full Gap (100%)
Seed rate	74.10 kg/ha	80 -90 kg /ha	More than recommended
Sowing method	Line sowing R x R (30 cm)	Broadcasting or closer row spacing	Full Gap (100%)
Manuring and fertilizers application	Application of FYM 24.7 t/ha and 123.5: 59.28: 29.64 (N:P:K) kg/ha	No FYM application and higher dose of N, P and K	More than recommended
Weed management	Application of atrataf 50 WP (atrazine) 1.98 kg/ha	Excess use of herbicide without knowledge at wrong time.	More than recommended
Plant protection	Need based insecticide application with right quantity at right time.	Indiscriminate use of insecticides without knowledge	More than recommended
Harvesting	50 – 60 DAS	75 – 85 DAS	Delayed harvesting

related literature were distributed among the farmers for effective and timely information.

The yield gap indices were calculated from the data using following formulae:

Technical efficiency fodder yield gap (YGte) = Average FLD yields (Yd) – Average actual farmer yields (Yf) or $1 - \frac{Yf}{Yd}$

Ratio of actual farmer fodder yields to demonstration fodder yields in x year (%) = [Average farmer yields (Yf) in x year: Average FLD fodder yields of all study years (Average Yds)*100]

The maize fodder yield data from both frontline demonstrations and control plots was collected and analyzed using R software (version 3.6.1).

Results and Discussion

1. Fodder yield

The data presented as the average maize fodder yield of all the FLDs and farmers' practice plots (Table 2) during the study period from 2015 to 2018. The average yield of maize fodder was 7.16%, 14.83%, 15.79 and 16.40% higher compared to farmers' practices in 2015, 2016, 2017 and 2018 respectively. Average FLD and farmer practice plot yields and technical efficiency yield gap comparison are given in fig. 1. It is evident from the fodder yield levels obtained from FLDs that recommended agronomic practices for maize fodder crop could increase the fodder yield considerably at farmers' fields. This increase in fodder yield might be due to the adoption of recommended cultivation practices *viz*., cultivar, seed rate, sowing method, optimum use of inputs etc. for maize fodder crop under FLDs plots. Ali and Singh, (2020) reported 16.77% higher yield of cluster bean under FLDs in Churu district of Rajasthan, where recommended cluster bean cultivation practices were disseminated in effective manner. While, Singh *et al*. (2019) reported higher yield of sesame under the FLDs in Shahjahanpur.

2. Yield gaps

To evaluate the maize fodder yield gaps, comparisons were made for all the years i.e. 2015, 2016, 2017 and 2018. Variability in demonstration yields and actual farmer's yields reflects difference in maize fodder production techniques under FLDs and farmers' practice plots (Fig. 1) due to the technical inefficiency of the farmers.

The technical efficiency maize fodder yield gap was 5.83% ,15.02% ,15.82% and 16.40% in the years 2015, 2016, 2017 and 2018 respectively which could only be overcome by broaden the mental horizon of farmers.

The difference in technical efficiency fodder yield gaps in different years was due to the variation in maize fodder yields which may be owing to the improved farmers' skills and their resources use in optimal way.

Table 2: Impact of frontline demonstrations on maize fodder yield

Year	No. of FLDs	Cultivar	Yd (q/ha)	Yf (q/ha)	YGte (q/ha)	Yf : Av. Yds (%)
2015	29	J 1006	399.00	377.00	22.00	92.07
2016	19	J 1006	412.21	358.36	53.85	87.52
2017	24	J 1006	410.08	354.05	56.03	86.46
2018	15	J 1006	416.53	357.83	58.70	87.39

FLD = Frontline Demonstration, Yd = Average FLD yields, Yf = Average Farmer yields, YGte = Technical efficiency yield gap, Av. Yds = Average FLD yield of all years.

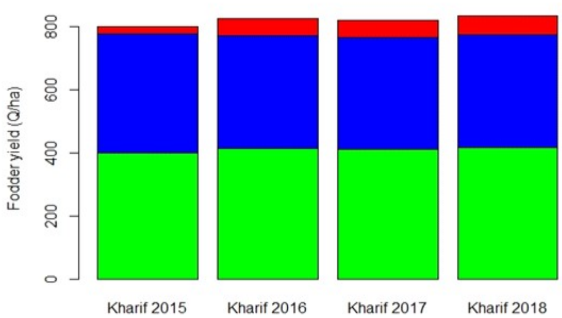

Figure 1: The green, blue and red portions of the bars indicate average demonstration yields (Yd) actual farmer's yields (Yf) and technical efficiency yield gap (YGte) respectively.

The ratio of actual farmers' yields to demonstration yields revealed that the farmers average yields were 7.93%, 12.48%, 13.48% and 12.61% less than average demonstrations fodder yield (Average Yds) in the years 2015, 2016, 2017 and 2018 respectively which showed that there is scope for further maize fodder yield enhancement by transfer of advanced maize fodder production technologies, hence, there is a need for educative and persuasive rather than coercive extension methodology to achieve maize fodder yield gaps.

3. Economic analysis

Variable cost of cultivation of maize fodder production includes value of improved cultivar seed, manure and fertilizers, pesticides, hired or own machine labour. The results (Table 3) indicate that per hectare average variable cost for maize fodder cultivation under FLDs was lesser than farmers' practices in all the years of study from 2015 to 2018. This might be due to the optimal use of inputs in demonstrations' plots. The similar results were reported by Sureshkumar, 2014 in wheat crop. Singh *et al.* (2015) suggested economical crop production is the only parameter which finally decides whether a farmer would adopt a crop or not.

Gross returns as a function of economic produce maize green fodder and its sale price which varied among years due varied sale price.

Per hectare average net returns and C:B ratio from maize fodder crop were 8.43 and 6.88%, 22.14 and 17.91%, 25.26 and 17.73%, 23.72 and 39.13%

Table 3: Impact of frontline demonstrations on economics of maize fodder production

Year	Av. Gross variable cost of cultivation (per ha)		Av. Gross Return (per ha)		Av. Net Returns over variable cost (per ha)		Average C:B Ratio	
	FLD	FP	FLD	FP	FLD	FP	FLD	FP
2015	15397.98	15556.06	59850.00	56550.00	44452.02	40993.94	3.88	3.63
2016	15134.00	15536.00	61818.00	53754.00	46683.00	38218.00	4.08	3.46
2017	15300.00	15550.00	51260.00	44256.25	35960.00	28706.25	3.35	2.85
2018	15306.40	15546.7	62480.72	53674.73	47174.32	38128.30	4.80	3.45

FLD = Frontline Demonstration, FP = Farmers' Practices higher in 2015, 2016, 2017 and 2018 respectively.

The higher economic returns from maize fodder crop under demonstrations may be due to the adoption of non-monetary inputs and scientific monitoring. Results corroborate the findings of Ali and Singh (2020) who reported the higher income from cluster bean crop in Churu district of Rajasthan.

Conclusion

Based on the results obtained from the participatory frontline demonstrations it can be concluded that there is need to educate and train the farmers about advanced maize fodder production technologies by the extension functionaries in the region so the farmers would reap higher maize fodder yields with lesser inputs for their better livestock production.

References

Ali, S. and Singh, B. (2020). Impact of frontline demonstration on productivity and profitability of rain fed cluster bean in Churu district of Rajasthan. *Forage Research*. 45 (4): 335-338.

Pandey, S.; Sharma, P.; Satyapriya and Sharma, R. K. (2013). Strategy for empowering farm women in livestock rearing. In: proceedings of International Conference on Extension Educational Strategies for Sustainable Agricultural Development -A Global Perspective. University of Agricultural Sciences, Bangalore, India, December 5-8, 2013: 145 - 146.

Richardson, J. G. (2003). On-farm demonstrations: Consideration factors for their success and viability as an extension teaching tool. *Soouth African Journal of Agricultural extension*. 32.

Singh, K. M.; Singh, L. B. and Gautam, U. S. (2019). Cluster frontline demonstration an effective tool for spreading the advance technology of sesame among the farmers. *The Journal of Rural and Agricultural Research*. 19 (1): 10-14.

Singh, S.; Elamathi, S.; Ghosh, G. (2015). Economics of weed and nitrogen management through dual cropping in direct seeded rice. *New Agriculturist*. 26(2): 381 - 383.

Sureshkumar, A. P.; Patel, K. S.; Asodiya, P. S.; Parmar, V. K. (2014). Input use, cost structure, return and resource use efficiency analysis of wheat crop in South Gujrat, India, International Journal of Agricultural Extension. 02(01): 05 - 12.