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Impact of front line demonstrations on yield and economics of okra [*Abelmoschus esculentus* (L.) Moench] in tribal area of Dungarpur district of Rajasthan

Madan Lal Choudhary, Suchitra Dadheech and BL Roat

Abstract
A study was carried-out to popularization of okra production technologies during summer seasons 2016, 2017, 2018 and 2019 at farmer's fields in tribal area of Dungarpur district of Rajasthan. Front Line Demonstration on okra vegetable was conducted on an area of 70 ha. Total 350 demonstrations were conducted on 350 farmers' fields with improved technologies composed of Jamuna variety and recommended production practices. Krishi Vigyan Kendra has an innovative science–based institution, plays an important role in bringing the research scientists face to face with farmers. The main aim of Krishi Vigyan Kendra is to reduce the time lag between generation of technology at the research institution and its transfer to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis. Front line demonstrations were conducted on okra by the active participation of the farmers with the objective of improved technologies of okra production potential. Use of hybrid variety, balanced use of fertilizer on the basis soil testing report and integrated pest and disease management etc. are the main technologies to be tested in this demonstration. Okra is a major vegetable crop of Rajasthan, but the productivity of okra is very low in this district due to lack of knowledge and partial adoption of recommended package of practice by okra cultivators. Results showed that average yield obtained were 145.9, 147.5, 148.6 and 150.2 q/ha under demonstrated practice, whereas, in farmers practice 102.2, 103.1, 102.6 and 103.4 q/ha yield was recorded during summer season 2016, 2017, 2018 and 2019, respectively. On an average technology gap of four years front line demonstration programme was 3.95qha. The per cent increase in yield with high yielding over local variety was 42.76 to 45.26 per cent. The extension gap recorded was 43.7, 44.4, 46.0 and 46.8 q/ha during 2016, 2017, 2018 and 2019, respectively. An average technology index was observed 2.60 per cent during the four years of front line demonstration programme, which showed the efficacy of good performance of technical interventions. Besides this, the demonstrated practice gave higher gross return, net return with higher benefit cost ratio when compared to farmer's practice.

Keywords: Okra, B:C ratio, extension gap, FLD, technology gap, technology index, yield

Introduction

Okra [*Abelmoschus esculentus* (L.) Moench] is an annual vegetable crop belongs to family *Malvaceae*. The centre of origin is tropical and sub-tropical region of the world. It is known as 'Gumbo' in USA, 'Ladys Finger' in England, whereas 'Bhindi' in India. Okra occupies a place of prominence amongst summer vegetables in India. Total area under okra cultivation in India was estimated to be 509000 ha with an annual production of 6094000 Metric Tonnes (Anonymous, 2018) [1]. The area under okra cultivation in Rajasthan was 4.15 thousand ha with production of 21.39 thousand MT (Anonymous, 2018) [1]. Its adaptability to a wide range of growing condition makes it popular among vegetable growers. It is widely grown for its immature tender fruits which are used as vegetable. It is used in curries, cooked into soups, canned green or dried for off season uses. The root and stem of okra plants are used for cleaning the cane juice in the manufacture of Jaggery and Sugar. Its fruits also have good nutritional and medicinal values as the fruit contain 6.4g carbohydrates, 2.2g protein 0.2g fat, 66mg calcium, 500mg phosphorus, 15mg iron and 13mg vitamin-C per 100g edible portion. Similarly, okra fruit is excellent source of iodine which is necessary for the resistance against throat disease like goiter. It is good for the people suffering from heart weakness. Ripen seeds are roasted ground and used as substitute for coffee in turkey. Matured fruits and stem contain crude fibre which is used in paper industry. Okra thrives in all kinds of soils, but it grows best in a friable well manured soil.

KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different 'micro farming' situations in a district. Front line demonstration is a long term educational activity conducted in a systematic manner in farmer's fields to worth of a new practice/technology. Farmers in India are still producing crops based on the knowledge transmitted to them by their fore fathers leading to a grossly unscientific agronomic, nutrient management and pest management practices (Papnai *et al*., 2017) [7]. As a result of these, they often fail to achieve the desired potential yield of various crops and new varieties. To improve yield levels and make awareness to the okra growers, front line demonstrations were conducted. In the present study, performance of okra variety Jamuna against local check was evaluated in front line demonstrations conducted at farmer's field during summer seasons 2016 to 2019.

Materials and Methods

The frontline demonstrations were conducted by Krishi Vigyan Kendra, Faloj in Dungarpur district during summer season 2016, 2017, 2018 and 2019, a total 350 front line demonstrations on okra variety Jamuna was conducted at farmer's field in the tribal area of Dungarpur district. The yield and economic performance of frontline demonstrations, the data on output were collected from demonstrated practices as well as farmer practices and finally the vegetable pod yield, cost of cultivation, net returns with the benefit cost ratio was worked out. For the purpose of investigation, FLDs were conducted at Dungarpur district during summer season 2016, 2017, 2018 and 2019. For selection of beneficiary farmers, a list of farmers where FLDs on okra vegetable were conducted (Table 1) during summer season 2016, 2017, 2018 and 2019 was prepared and taking equal representation. 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 in the light of objectives of the study. More than 10 percent difference between beneficiary and non-beneficiary farmers' was considered as significant difference. The extension gap, technology gap, technology index, marginal benefit cost ratio and relative economic efficiency were calculated using the formula as suggested by Papnai *et al*. 2017 [7].

Extension gap = Demonstrated practice yield- farmer's practice yield

Technology gap = Potential yield- Demonstration yield

Additional return = Demonstration return- farmer's practice return

$$\text{Technology index} = \frac{\text{Potential yield - Demonstration yield}}{\text{Potential yield}} \text{ X 100}$$

Table 1: Details of Farming situation during four years of FLDs

Crop & Variety	Season & Year	No. of Demo.	Area (ha)	Farming Situation	Soil type	Sowing date	Date of Picking
Okra & Jamuna	Summer-2016	50	10	Irrigated	Medium brown loamy Soil	2nd Week of Feb. 2016	2nd Week of April to 4th week of June, 2016
Okra & Jamuna	Summer-2017	100	20	Irrigated	Medium brown loamy Soil	3rd Week of Feb. 2017	2nd Week of April to 4th week of June, 2017
Okra & Jamuna	Summer-2018	100	20	Irrigated	Medium brown loamy Soil	3rd Week of Feb. 2018	3rd Week of April to 1st week of July, 2018
Okra & Jamuna	Summer-2019	100	20	Irrigated	Medium brown loamy Soil	2nd Week of Feb. 2019	2nd Week of April to 1st week of July, 2019

Results and Discussion

The data with respect to yield and economic returns are presented in Table 2 - 3, whereas the data pertaining to yield gap, technology index are presented in Table 4.

Yield (q/ha)

During the period of study, it was observed that in cluster front line demonstrations of improved technologies increased productivity over respective farmer's practice (Table 2). Result revealed that an average vegetable pod yield was recorded 148.05q/ha under demonstrated practices as compared to farmers' practice 102.83q/ha. The highest vegetable pod yield of demonstrated practices was 150.2q/ha during summer season 2019 and in farmers' practice 103.4q/ha in the same year and lowest yield of demonstrated practices was recorded in the summer season 2016. Average vegetable pod yield of okra variety Jamuna increased per hectare by 44.92 per cent. The results clearly indicate that higher average vegetable pod yield in demonstration practices over the years compared to farmers practices was due to using knowledge and adoption of full package of practices *i.e.* improved varieties such as Jamuna, seed treatment with *Rhizobium* spp. and *Phosphate Solubalizing Bacteria*, use of recommended dose of fertilizers, method and time of sowing with proper spacing, weed management, water management, need based plant protection. The above findings are in similarity with the findings of Papnai *et al*., (2017) [7], Aklade *et al*., (2018) [3], Shelke *et al*., (2019) [9], Adhikari and Piya (2020) [2], Kachari and Barooah (2020) [6], Ray *et al*., (2020) [8], Sivakumar *et al*., (2020) [10], Irulandi *et al*., (2020) [5] and Bhati *et al*., (2021) [4] in vegetable crops. However variations in the yield of okra in different years might be due to the variations in environmental factors like soil fertility, moisture availability, rainfall, etc, and the change in the location of demonstrations every year.

Table 2: Yield and yield difference of okra under front line demonstrations

Year	No. of Demo.	Area (ha)	Yield (q/ha)		Additional yield over local check (kg/ha)	Per cent increase yield over Local Check
			DP	FP		
2016	50	10	145.9	102.2	4370	42.76%
2017	100	20	147.5	103.1	4440	43.06%
2018	100	20	148.6	102.6	4600	44.83%
2019	100	20	150.2	103.4	4680	45.26%
Mean	350	70	148.05	102.83	4523	43.98%

DP = Demonstrated practice and FP = Farmers practice

Economic return

The input and output prices of commodities prevailed during the study of demonstrations were taken for calculating cost of cultivation, gross return, net return, additional net return and benefit: cost ratio the data is presented in Table 3. The economic analysis of the data over three years revealed that okra under front line demonstrations recorded higher gross returns. Cost involves in adoption of improved technology in okra varies in different season but it was more profitable. The cultivation of okra under demonstrated practice gave higher net return of Rs.110400 per ha, Rs.139450 per ha, Rs.169250 per ha and Rs.185250 per ha, respectively, as compared to farmers practices Rs.67250 per ha, Rs.86670 per ha, Rs.105390 per ha and Rs.116080 per ha in the summer season 2016, 2017, 2018 and 2019, respectively (Table 3) with an average net return of Rs.151088 per ha which was higher as compared to farmer's practices (Rs.93848 per ha). An average cost of cultivation, gross return, additional net return and B: C ratio of demonstration practice was Rs.37973 per ha, Rs.189060 per ha, Rs.57240 per ha and 4.95, respectively as compared to farmers practice of cultivation cost (Rs.37318 per ha), gross return (Rs.131165 per ha) and B:C ratio (3.50). The benefit cost ratio of okra cultivation under improved practices has higher than farmers' practices in all the years and this may be due to higher yield obtained under improved technologies compared to farmers' practice. This finding is similar with the findings of Aklade *et al*., (2018) [3], Sivakumar *et al*., (2020) [10], Ray *et al*., (2020) [8] and Bhati *et al*., (2021) [4] in okra and Singh *et al*., (2008) [8], Balai *et al*., (2013), Nanda and Saha (2014), Khaiwal (2014) and Papnai *et al*., (2017) [7] in vegetables.

Table 3: Economics of Cluster front line demonstrations

Year	Cost of Cultivation (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		Additional net return (Rs/ha)	B:C ratio	
	DP	FP	DP	FP	DP	FP		DP	FP
2016	35500	34950	145900	102200	110400	67250	43150	4.11	2.92
2017	37550	37050	177000	123720	139450	86670	52780	4.71	3.34
2018	38790	38250	208040	143640	169250	105390	63860	5.36	3.76
2019	40050	39020	225300	155100	185250	116080	69170	5.63	3.97
Mean	37973	37318	189060	131165	151088	93848	57240	4.95	3.50

Technology gap (q/ha)

It means the differences between potential yield and demonstration practices yield. The demonstration practices yield was 6.1q/ha, 4.5q/ha, 3.4g/ha and 1.8q/ha during summer season 2016, 2017, 2018 and 2019, respectively (Table 4). On an average technology gap of four years front line demonstration programme was 3.95qha. The technology gap observed might be attributing to the dissimilarity in soil fertility status and weather conditions. Hence, location specific recommendations are depending on identification and use of farming situation, specific interventions and greater implications in enhancing system productivity. These findings are similar to Aklade *et al*., (2018) [3], Sivakumar *et al*., (2020) [10], Kachari and Barooah (2020) [6], Ray *et al*., (2020) [8] and Bhati *et al*., (2021) [4] in *solanaceous* vegetables.

Extension gap (q/ha)

Extension gap means the differences between demonstration practice yield and farmers practice yield. Extension gap 43.7q/ha, 44.4q/ha, 46.0q/ha and 46.8q/ha was observed during the summer season 2016, 2017, 2018 & 2019, respectively (Table 4). An average of extension gap under front line demonstration programme was 45.23q/ha which is emphasized the need to educate the farmers through various techniques for the adoption of improved agricultural production technologies to reverse this trend of extension gap. More and more use of latest production technologies with high yielding variety will subsequently change this alarming trend of galloping extension gap. These findings are similar to Aklade *et al*., (2018) [3], Sivakumar *et al*., (2020) [10], Kachari and Barooah (2020) [6], Ray *et al*., (2020) [8] and Bhati *et al*., (2021) [4] in okra.

Technology Index (%)

Technology index indicates the feasibility of the involved technology on farmers' fields. The technology index varied from 1.18–4.01 per cent (Table 4). An average technology index was observed 2.60 per cent during the four years front line demonstration programme, which showed the efficacy of good performance of technical interventions. This will accelerate the adoption of demonstrated technical intervention to increase the yield performance of okra. Technology index shows the feasibility of evolved technology at the farmer's field and lower the value of technology index more is the feasibility of the technology. The elevated range of technology index could be due to awareness and use of improved varieties and adoption of recommended scientific package of practices during the period of the study period. Importance of extension techniques for communicating to the farmers about the improved agro techniques for enhancing the productivity plays an essential role. The technology index showed the economic feasibility of the demonstrated technology at farmer's field. Bhati, *et al*., (2021) [4] also reported similar findings in okra under agro ecological conditions of in Banswara District of Rajasthan. Therefore, it concluded that understanding and using improved varieties/hybrids with recommended scientific package of practices enhanced the yield during implementation of FLD study period. Results of the current field trial are in agreement with the results of Aklade *et al*., (2018) [3], Kachari and Barooah (2020) [6], Sivakumar *et al*., (2020) [10], Ray *et al*., (2020) [8] and Bhati *et al*., (2021) [4].

Table 4: Yield gap and technology index in front line demonstrations

Year	No. of FLDs	Technology gap (q/ha)	Extension Gap (q/ha)	Technology Index (%)
2016	50	6.1	43.7	4.01
2017	100	4.5	44.4	2.96
2018	100	3.4	46.0	2.24
2019	100	1.8	46.8	1.18
Mean	350	3.95	45.23	2.60

Potential Yield (q/ha) = 152

Conclusion

The FLD produced a significant positive result and provided an opportunity to demonstrate the productivity potential and profitability of the latest technology (intervention) under the real farming situation. By conducting demonstrations of improved scientific technologies, yield potential of okra can be increased to a great extent. This will substantially increase the income as well as the livelihood of the farming community. There is a need to adopt multi-pronged strategy that involves enhancing okra production through improved technologies in tribal area of Dungarpur district of Rajasthan.

References

1. Anonymous. Horticulture Statistics Division, Department of Agriculture, Cooperation & Farmers Welfare, Horticultural Statistics at a Glance. 2018, 196.
2. Adhikari A, Piya A. Effect of Different Sources of Nutrient on Growth and Yield of Okra (*Abelmoschus esculentus* L. Monech). International Journal of Environmental & Agriculture Research. 2020;6(1):45-50.
3. Aklade SA, Dobariya JB, Thesiya NM. Impact of Front Line Demonstrations of INM in Okra During Off Season in the Dang District of Gujarat. International Journal of Economic Plants. 2018;5(3):123-126.
4. Bhati BS, Rathore RS, Kumar L. Impact of Front Line Demonstration on Yield and Economics of Okra (*Abelmoschus esculentus* L.) in Banswara District of Rajasthan. Asian Journal of Agricultural Extension, Economics & Sociology. 2021;39(5):114-119.
5. Irulandi S, Anitha T, Shanmugapakkiam S, Manivannan MI, Solaimalai A. Impact of bio-intensive management strategies for major pests of okra. Journal of Entomology and Zoology Studies. 2020;8(2):1499-1501.
6. Kachari M, Barooah L. Comparative study on use of organic inputs in Okra [*Abelmoschus esculentus* (L). Moench]. Journal of Pharmacognosy and Phytochemistry. 2020;9(5):292-295.
7. Papnai G, Sachan VK, Nautiyal P, Manisha. Performance of Front Line Demonstrations in Hill Region of Uttarakhand. Indian Journal of Hill Farming. 2017;30(2):286-289.
8. Ray PK, Singh KM, Kumar Anjani, Singh RR. Enhancing Yield and Economics of Okra through Front Line Demonstration. Chemical Science Review and Letters. 2020;9(33):125-127.
9. Shelke AA, Wadatkar SB, Beldar RM. Effect of Different Levels of Fertilizer on Growth and Yield of Okra. International Journal of Current Microbiology and Applied Sciences. 2019;8(12):1363-1367.
10. Sivakumar V, Praneetha S, Balakumbahan R, Meena B, Thiyagarajan G, Alagar M. Performance assessment of Bhendi hybrid Co 4 cultivation over local check variety under Front Line Demonstration. GSC Biological and Pharmaceutical Sciences. 2020;13(01):189-196.