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Performance of Frontline Demonstration on Okra (*Abelmoschus esculentus L.)*In different agroclimatic situation in M.P.

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Abstract
Okra (*Abelmoschus esculentus* (L.) is an annual vegetable crop belongs to family Malvaceae. It available throughout the year at steady and stable market price and sometimes fetches higher price particularly in kharif season.The main objective of FLDs is to demonstrate newly YVMV resistant variety of okra crop with production and protection technologies at farmer's field under different agroclimatic farming situations in Hoshangabad (Powarkheda) and Sagar District which comes under "Central Narmada Valley and Vindhya plateau of Madhya Pradesh, respectively. Total 30 front line demonstrations were laid down on various locations on farmers' fields during the year of 2010-11 to 2012-13 in these districts. During the period yield and its contributing characters also recorded as shown in Table 2.It was recorded that the average yield performance of okra crops in an area of 6 hectares ranged from 83 to 110 q / ha. The average yield of 30 demonstrations of okra crop for three years was found to be 94.33 q / ha, whereas for local crop, it was found to be 67.33 q / ha. There was 40 per cent on an average yield increase in demonstration over local check during all the three years. On an average yield attributing characters in FLD were found significant effect i.e. Plant height (127.45 cm), days to 50 % flowering (36.57), days to first picking of fruit (44.12), length of fruit (10.89 cm), weight of fruit (10.78g) over farmers practice. The farmers have incurred average higher returns of Rs. 94833 /ha through these demonstration over farmers practice of Rs. 55166.67 as net return. The comparative results of the demonstration highlight the cost benefit ratio of 3.03 as against the local crop which recorded 2.20, respectively. Results of the demonstration had shown that the use of YVMV resistant improved variety VRO 6 (Kashi Pragati), improved cultivation practices, recommended dose of fertilizers, seed treatment, proper spacing, proper post-harvest management and use of need base plant protection measures resulted in higher productivity of okra (Bhindi) crop.

Keywords: Agroclimatic situations, Yield, YVMV, Okra, B:C ratio, Kashi Pragati, B:C ratio

Introduction
Okra (*Abelmoschus esculentus* L.) generally grown in tropical and subtropical regions of the world as well as in India also. India is the largest producer of Okra in the world. The area production and productivity of Okra in India was 521 Million ha, 6212 MT and 119.27 q/ha respectively during 2011. (Anonymous 2012). Its adaptability to as wide range of growing condition makes it popular among vegetable growers. It is widely grown for its immature tender fruit which was used as vegetable. Okra is a good source of Vitamin A & Vitamin B and Vitamin C also. It is a rich source of protein and mineral elements. It is useful for the control of goiter due to rich source of iodine. It is also good for people suffering from weakness of heart. It is used in curries, stewed with meat and cooked into soup. Fruits are also used for cleaning of the cane juice in the manufactures of jiggery and sugar (Chauhan, 1972). The crop was very much susceptible to whitefly transmitted yellow mosaic virus. The low productivity of the Okra crop was attributed to number of yield affecting factors such as no use YVMV Variety, low soil fertility, do not aware of this, lack of knowledge on improved technologies and also not adoption of recommended cultivation practices (Bhagat, A.P., 1977) FLD is the one of the most powerful tools of extension because of farmers in general are driven by the perception of "seeing and believing". The main objective of the adoption of improved technologies such as use of high yielding variety with Yellow Vein Mosaic Virus (YVMV) Okra crop with adaptation of recommended package and practices with the use of more or less expenditure in resemble to farmers practice. Keeping in few of

an effective extension approach of FLD for dissemination of Okra technology, it was thought that impact of FLD conducted by KVK Sagar and KVK Hoshangabad during the three consecutive year 2010-11 to 2012-13 to be assessed.

Therefore, the present study was conducted with the specific objectives to evaluate the performance of technology in terms of adoption of recommended Okra production technology and to know the impact of FLD on Okra growing farmers.

Materials and Methods

The present study was conducted in kharif season during the three consecutive years 2010-11 to 2012-13 on farmer's field of Hoshangabad district (2010 & 2011) and in Sagar district during the year of 2012.

These districts Hoshngabad and Sagar situated in different agroclimatic zone namely central Narmada Valley Zone and Vindhya Plateau Zone, respectively. Total 30 demonstration were laid down on various location of both districts. The demonstration was conducted in irrigated condition and the soil of demonstrated plots ranged from medium to black soil. In the demonstration mainly focused on selection of YVMV resistant high yielding variety included low input technologies like as seed treatment, Line sowing, proper spacing, use of balance dose of fertilizers (N:P:K- 100:50:40) need base plant protection measures, proper harvest time etc. as shown in Table 1. The average of yield and its attributing characters like that plant height (cm), days to 50 flowering, days to first picking of fruits, individual length of fruit (g), occurrence of YVMV (%) and number of sucking pest per 5 leaves of Okra crop on demonstration plot as well of farmers practices field to know the impact and economics of Okra crop.

Result and Discussion

The details of improved technologies were presented in Table 1, with compare to farmers practices for Okra cultivation. The farmers were generally not adopted improved technologies (Package & practices) due to lack of knowledge and awareness and their impact on yield and its economics. So they were not getting the more profit even after spent of their money on critical input as more or less as to improved practices.

The FLD was conducted to study the impact of yield and economics gaps between improved technologies and farmers practices. In the present study, the data on output of Okra cultivation were recorded from FLD plots, besides the data on local variety adopted by farmers in this district were also collected. The significant differences found between FLD and local check of yield and its attributing characters of Okra crop, however, the expenditure on other critical inputs was did similar or less more. The demonstrated farmers were facilitated by KVK Scientist in performing field operation i.e., proper use of seed rate and seed treatment, proper time of sowing and spacing recommended dose of fertilizers, irrigation and other intercultural operation done at proper time, use of need base insecticides and regular and frequently harvesting of fruits of okra crop.

After adopting of demonstrated package and practices for Okra cultivation by farmers the average and pooled data of three consecutive year 2010-11 to 2012-13 was presented in Table 2 and Table 3.

The data showed in tables that the yield performance of 30 demonstration of Okra crop in an area of 6 hectares ranges from 80 q to 110 q /ha. The average yield of three years for Okra crop in both districts was found 94.33 q /ha over farmers practice, that was found to be 67.33 q /ha. There was 40 percent average yield increase in demonstration over local practices during all the three years. During this time yield attributing were also recorded. The average of demonstrated plots were found i.e., plant height (127.45 cm), days to 50% flowering (36.57), days to first picking of fruits (44.12), length of individual fruits (10.89 cm), weight of and individual fruits (10.78 g), over farmers practice as local check 11.60, 40.50, 51.20, 9.35 and 9.95, respectively. These results were also directly or indirectly affect to increase the yield of Okra crops. The similar result of yield enhancement found by Dhemre, J.K. and Dosale, S.B. (2010) and Kalabhandi *et. al.,* (2006) in Chili crop. The yield of Okra crop has more effected by Yellow Vein Mosaic Virus (YVMV) & Sucking insect types pest which ultimately reduce the yield. Hence, occurrence of YVMV affected plants and sucking pest observation also taken which was found 0.01% and 4.15 in number of five leave over local check i.e., 17.34 and 21.44, respectively.

In this study, the average performance of the economic impact of demonstrated Okra crop technology was worked out by calculating total cost, gross return, net return and B:C ratio also shown in Table 4. It revealed that before FLD the average yield of Okra was 67.33 q /ha while after FLD the yield was 94.33 q /ha. The profitability was calculated which showed that net returns from Okra crops before FLD was Rs. 55167 /ha while the net returns from Okra crop after FLD was 94834 /ha. The B:C ratio for before FLD was 2.20, increased from after FLD to 3.30. Similar finding was reported by Sharma (2003) in the moth bean. It was evident from the results that B:C ratio of Okra crop in FLD was higher than before FLD. The factor responsible for low B:C ratio before FLD was adopted as not properly recommended package of practices for Okra crops in the region. Hence, there is a wide scope to increase the area and production of Okra crop by providing need-based training and demonstration on improved production technology to the farmers.

Conclusion

The result finds out that yield of Okra crop could be increase from 32.35 percent to 52.78 percent with intervention of YVMV resistant variety like VRO6 and with other improved practices like that seed treatment, RDF, integrated pest management etc., Hence, adopting integrated approach in cultivation of Okra will increase the income as well as the livelihood of the farmers.

Table1: Technological intervention of improved package of practices and farmers practices for okra cultivation in 2010-11 to 2012-13.

S. No.	Particulars	Improved practices (IP)	Farmers Practice (FP)
1.	Sowing Season & Time of sowing	Kharif , 20 June to 10 July	Kharif , 10 – 30 July

2.	Variety	VRO 6 (Kashi Pragati) YVMV resistant and high yielding	Local variety or unknown hybrid YVMV susceptible variety
3.	Seed treatment	With Thiuram + Carbendazim (2:1) after soaking of seed over night	Not followed
4.	Seed rate and spacing	15 Kg /ha., sown at 45 x 20 Cm	20 Kg /ha., Sown at 30 x 20 Cm
5.	Sowing method	Line sowing or ridge furrow	Not all farmers followed line sowing.
6.	Recommended dose of fertilizers	100 Kg N + 50 Kg P_2O_5 + 40 Kg K_2O /ha. use as balance dose of fertilizers along with FYM	Use of imbalance dose of fertilizers 200 Kg DAP.
7.	Plant protection measures	Need bas application of insecticides and fungicides used.	Used an application of indiscriminate manners
8.	Irrigation & Weeding	As per need	As per need
9.	Harvesting	Harvesting at proper stage and each after 3-4 days regularly	Weekly or Irregular picking of fruit.

Table 2: Impact of improved technology (FLD) on yield and its contributing characters of Okra as compared with farmer's practices during the year of 2010-11 to 2012-13 (Average data).

Treatments	Area (ha)	Total no. of demo	Average performance on various parameters										
			Plant height (cm)	Individual length of frutis (cm)	Days to 50% flowering	First picking of fruit (days)	Length of fruit in individual (cm)	No. of fruits /plants	Weight of fruits individuals (g)	Yield (q/ha)	Percent increase in yield	Occurrence of YVMV in percentage	No of Sucking pest/5 leaves
T1 (Farmers Practices)	6	30	111.60	9.35	40.50	51,20	9.35	14.88	9.95	67.33	-	17.34	21.44
T2 (Improved Practices)	6	30	127.45	10.89	36.57	44.12	10.89	18.90	10.78	94.33	40	0.01	4.15

Table 3: Yield performance of okra demonstration in different agro climatic zone in MP during 2010-11 to 2012-13

Year	Season	District	No. of trails/ location	Area (ha)	Yield (q/ha)		Increase yield (%)
					FP	IP	
2010-11	Kharif	Hoshangabad	10	2	68	90	32.35
2011-12	Kharif	Hoshangabad	10	2	72	110	52.78
2012-13	Kharif	Sagar	10	2	62	83	33.88
2010-13 (Average)	**Kharif**	Hoshangabad + Sagar	**30**	**6**	**67.33**	**94.33**	**39.67**

Table 4: Economic impact of okra under different agroclimatic zones

Year	Gross cost of cultivation (Rs.)		Gross return (Rs.)		Net return (Rs.)		B:C Ratio	
	FP	IP	FP	IP	FP	IP	FP	IP
2010-11	46000	48000	102000	135000	56000	87000	2.21	2.81
2011-12	48000	52000	108000	165000	60000	113000	2.25	3.17
2012-13	43500	40000	93000	124500	49500	84500	2.13	3.11
Average	**45833.33**	**46666.67**	**101000**	**141500**	**55166.67**	**94833.33**	**2.20**	**3.03**

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