DOI: 10.15740/HAS/AU/11.4/385-389
Agriculture Update
Volume **11** | Issue 4 | November, 2016 | 385-389
Visit us : *www.researchjournal.co.in*
e ISSN-0976-6847

RESEARCH ARTICLE :

Impact of front line demonstrations on productivity of fennel cv. R.F.-143 in Bharatpur district of Eastern Rajasthan

DILIP SINGH

ARTICLE CHRONICLE :
Received :
27.07.2016;
Revised :
23.09.2016;
Accepted :
09.10.2016

KEY WORDS :
Front line demonstration, Farmers practice, Fennel, Technology, Yield

SUMMARY : The present study was carried out at Bharatpur district of Eastern Rajasthan during *Rabi* 2015-16. Fennel is one of the most important seed spice crops of the country. The development of the agriculture is primarily depends on the application of the scientific technologies by making the best use of available resources. One of the major constraints of traditional fennel farming is low productivity because of non-adoption of advanced technologies. To increase the production, productivity and quality of agricultural produce, front line demonstrations were conducted at various farmer's field. All the recommended practices were provided to the selected farmers. The data related to the cost of cultivation, production, productivity, gross return and net return were collected as per schedule and analyzed. Result of the present study revealed that the high yielding variety of fennel R.F. -143 recorded the higher yield (19.21 q/ha) as compared to farmers practice (16.50 q/ha) traditionally adopted by the farmers. The percentage increase in the yield over farmers practice 16.42 was recorded.The technology gap in terms of productivity(1.79 q/ha.) was computed. The technology index values 8.52 per cent was recorded.The result of the study indicated the gap existed in the potential yield and demonstration yield is due to soil fertility and weather conditions. By conducting front line demonstration (FLDs) of proven technologies, yield potential of fennel can be increased upto great extent. This will substantially increase the income as well as the livelihood of the farming community.

How to cite this article : Singh, Dilip (2016). Impact of front line demonstrations on productivity of fennel cv. R.F.-143 in Bharatpur district of Eastern Rajasthan. *Agric. Update*, **11**(4): 385-389; **DOI : 10.15740/HAS/AU/11.4/385-389.**

Author for correspondence :
DILIP SINGH
Krishi Vigyan Kendra (S.K.N.A.U.), Kumher, BHARATPUR (RAJASTHAN) INDIA
Email: dilipsingh.1970@rediffmail.com

BACKGROUND AND OBJECTIVES

Fennel (*Foeniculum vulgare* Mill) is one of the most important seed spice crops grown in India. The plants are annual,biennial or perennial aromatic herb.Fennel seeds are aromatic with a pleasant taste and widely used for flavouring and garnishing material in culinary preparation. It is also used for chewing.They are used against diseases affecting chest, spleen, kidney and cure of cholic pain. Seeds are rich in protein (9.5 %), minerals (13.4%) and also rich in vitamins such as vitamin A,C, thiamin, riboflavin and niacin. The seeds contain essential oil, which is used

as flavouring agent in manufacturing of pickles, cakes perfumes, soap, liquors and cough drop. Its seeds contain 0.7 to 1.9 per cent volatile oil. The chief constituents of oil is an ethole (50-70%).The volatile oil is used for manufacturing cordials and fennel water which is given to infants as medicine. It is also used for scenting soap and flavouring material for cakes. It requires dry and cool climate for better seed production with quality. It is susceptible to frost particularly at flowering stage. It can be grown on wide varieties of soil (except sandy soil). A well drained loamy and black cotton soil containing lime is preferred (Singh and Singh,2015). During 2012-13 share of seed spices in India's spice area and production was 7.02 per cent and 11.82 per centm, respectively.

India is the largest producer of fennel which is cultivated in 0.99 lakh hectare with a production of 1.43 lakh tonnes and productivity of 17.1 q/ha. The fennel seeds were exported to the tune of 17300 tonnes values worth Rs.16001 lakh with the 6.82 per cent share in quantity and 6.51 per cent share in values of seed spices exported from India during 2013-14 (Anonymous, 2015). The major markets for export are U.S.A., U.K., U.A.E., South Africa, Malaysia etc.

Rajasthan and Gujarat are also known as 'seed spices bowl' and contributes more than 80 per cent of the total seed spices produced in india. Rajasthan is the second largest producer of fennel after Gujarat. Rajasthan produced 14277 tonnes fennel from 15161 ha area during 2013-14. But the average productivity of fennel crop (942 kg/ha) in the Rajasthan is very low as compared to other parts of the country (Anonymous, 2015).Fennel producing other states are Madhya Pradesh, Haryana, Punjab and Uttar Pradesh. In Rajasthan major fennel growing districts are Tonk, Sirohi Jodhpur,Ajmer,Udaipur Pali Swai Madhopur and Bharatpur. India is exporting only 10.80 per cent of its seed spice production. If our consumption level remains same then to meet global demand and to retain our prime position as seed spices export we have to double our production within five year period. This is a great challenge for as other country like Egypt for fennel is competing with higher yield per unit area. Since there is a large scope of seed spices by introducing them in new areas, the higher yields can also be taken effortlessly by implementing new technologies and introducing modern cultural practices, enhancing the knowledge of latest techniques to the farmers and putting more area under these seed spices crops. Keeping this in view, seed spices are considered not only cash crops but also they can be termed as "dynamic crop comodities" particularly in the view of their great export potential. Therefore, there is an emerging need not only to increase the productivity but also to improve the quality and other related parameters for gaining more foreign exchange to the national wealth.The shift or increase in average productivity has remained low for seed spices crop like fennel mainly due to lack of sufficient number of improved varieties suitable for different regions with higher yield,resistant to different biotic and abiotic stresses with better quality attributes.

Therefore, improved varieties with desired attributes are the need of the day. Most of the seed spices are severely damaged by soil borne fungus like *Fusarium* or *Pythium*. If the farmers are going for deep summer ploughing in the month of May or June or if they are using the soil solarisation process then we can certainly reduce the acute problem of wilt and other soil borne fungus, additionally solarisation reduces the weed populations by deactivating the weed seed bank in the soil. For solarisation transparent plastic sheet probably having thickness of 20-25 micron is used at least for a period of three weeks during May or June. Similarly two-three ploughing upto 30-40 centimeter are effective for reducing the incidence of wilt during the ensuing season of its cultivation. Integrated approach taking into account degradable chemicals and bio-agents are very much required to raise a healthy crop with required standards.

Therfore,a proper standardization of available integrated pest management and integrted disease management packages is needed that can be made readily available to farmers for increasing our export potential. Hence, a IPM and IDM programme should involve a bio-intensive approach including sanitation, mechanical barriers, scouting, GAP (Good Agriculture Practices) protocols, biocontrol and selected pesticides whenever necessary. India has its own GAP standards formulated in the year 2011 namely ''India GAP-2011" which covers all the crops and commodities for their safe cultivation, handling and consumption (Singh *et al*., 2013).

The fennel variety R.F.-143 is highly responsive to optimum dosage of fertilizer, has high volatile oil content (2.375) (Babu *et al.*, 2013). It is medium duration, medium tall, recommended for loamy and black cotton soil (Anonymous,2015). A field trial was carried out at the six farmer's field at Bharatpur district of Rajasthan

comes in agro-climatic zone of Rajasthan III B Flood Prone Eastern Plane. Here, generally in winters minimum temp. goes to 2-3° and in summer maximum temp. reaches to 47°C., annual rainfall is 600-650 mm per year. If there is facility of irrigation then fennel crop is more profitable than other traditional crops like mustard and wheat.There is no damage by stray animals,higher yield potential and attractive market price is encouraging farmers to adopt fennel cultivation to increase their socio economic condition. There is lot of scope of fennel growing in winter season under assured irrigation facility.

The main objective of front line demonstration (FLD) to introduce suitable agriculture practices like high yielding varieties, seed treatment, spacing, timely sowing, nutrient management, pest and disease management etc. among the farmers accompanied with organizing extension programmes (field day) for horizontal dissemination of the technologies. FLD is playing a very important role for transfer of technologies and changing scientific treatment of the farmers by seeing and believing principle. In order to have better impact of the demonstrated technologies for farmers and field level extension functionaries, front line demonstrations was conducted in a cluster of five hectare land.

Generally, the agricultural technology is not accepted by the farmers as such in all respects. There is always gap between the recommended technology by the scientist and its modified form at the farmer's level which is major absentee in the efforts of increasing agricultural production in the country. It is need of the hour to reduce this technological gap between the agricultural technology recommended by the scientists or researchers and its acceptance by the farmers on their field. In view of the above facts, front-line demonstrations were undertaken in a systematic manner on farmer's field to show the worth of a new technology and convince the farmers to adopt in their farming system.

RESOURCES AND METHODS

The present study was conducted in Bharatpur district of eastern Rajasthan during 2015-16. The genuine seed of fennel variety R.F.-143 was procured and distributed to six selected farmers. All the participating farmers were trained on various aspects of fennel production technologies. The field was prepared by deep ploughing and harrowing after *Kharif* crops. The seeds were sown in well prepared field during first week of November. All the recommended practices *i.e.* seed treatment by carbandazim @ 2g/kg seed, sowing by seed cum fertilizer drill maintaining row spacing of 40-50cm and by thinning keep plants at 25-30 cm spacing with in rows, recommended dose of manure and fertilizers (10 tonnes FYM,N:P 90:40 kg/ha, respectively), weed management, need based plant protection chemicals were used to manage the problem. Locally cultivated variety of fennel as practiced by the farmers with their own management system was taken as the farmers practice The data related to cost of cultivation, production, productivity, total return and net return were collected in both treatments as per schedule from all selected farmers. An average of cost of cultivation, yield, net returns of different farmers was analyzed by the formula.

$$\text{Average} = \frac{[F_1+F_2+F_3.....Fn]}{N}$$

F_1 = Farmer

N = No. of farmers (6)

In the present study, technology index was operationally defined as the technical feasibility obtained due to implementation of front line demonstrations in fennel. To estimate the technology gap, extension gap and technology index following formula used by Samui *et al*. (2000) and Sagar and Chandra (2004) have been used.

Technology gap = Pi (Potential yield) – Di (Demonstration yield)

Extension gap = Di (Demonstration yield) – Fi (Farmers yield)

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

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Performance of FLD :

A comparison of productivity levels between demonstrated variety with full package of practices and farmers practice is shown in Table 1. During the period of study, it was recorded that front line demonstrations, the improved fennel variety R.F. -143 recorded the higher yield (19.21q/ha) than farmers practice (16.50 q/ha).

The percentage increase in the yield (16.42) over

farmers practice was recorded. Similarly, yield enhancement in different crops in front line demonstration had apply been documented by Hiremath *et al.* (2007); Mishra *et al.* (2009); Kumar *et al.* (2010); Suryawanshi and Prakash (1993) and Dhaka *et al.* (2010). From these results it is evident that the performance of the technology demonstrated was found to be better than the farmers practice under same environmental conditions. The farmers were motivated by seeing the results in term of producitivity and they are adopting the technologies. The yield of the front line demonstrations and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index and technology gap.

Technology gap :

The technology gap shows the difference between potential yields over demonstration yield of the technology. The potential yield of the technology (variety R.F. -143) is 21.00 q/ha. The technology gap (1.79 q/ha) was recorded. The front line demonstration was laid down under the supervision of Krishi Vigyan Kendra Specialists at the farmers field, there existed a gap between the potential yield and demonstration yield. This may be due to the soil fertitlity and weather condition. Hence, location specific recommendations are necessary to bridge the gap. These findings are similiar to the finding of Sharma and Sharma (2004) in oil seeds at Baran district of Rajasthan.

Comparative high extension gap (2.71) indicates that there is need to educate the farmers and help them for optimizing the seed yield by adopting improved practices. More use of improved technolgies by the farmers will subsequently change existing trend of extension gap.

Technology index :

Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index, more is the feasibility of the particular technology. This variety performed well and will help to increase the productivity of fennel through the adoption of improved practices. The result of study depicted in Table1 revealed that the technology index value was 8.52. It means the technology is suitable for the Bharatpur district of Eastern Rajasthan. The result of the present study are in consonance with the findings of Singh *et al.* (2007) and Hiremath and Nagaraju (2009) in onion.

Economics of frontline demonstrations :

Economics of fennel production under front line demonstrations was recorded and the results of the study have been presented in Table 2. The results of economic analysis of fennel production revealed that front line demonstration recorded higher gross return (Rs.124865/ ha) and net return (Rs. 99865) with higher benefit cost ratio (1:5.0) as compared to farmers practice. These results are in accordanc with findings of Hiremath *et al.* (2007) and Hiremath and Nagaraju (2009), further, additional cost of Rs. 1000 per ha in demonstration has increased additional net return Rs. 16615 per ha with incremental benefit cost ratio 16.62 suggesting its higher profitability and economic viability of the demonstration. More and less similar results were also reported by Hiremath and Nagaraju (2009) and Dhaka *et al* (2010).

Table 1 : Yield, technology gap and technology index of demonstration

Variables	Yield (q/ha)	Increase (%) over farmers practice	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
Farmers practice	16.5	-	-	-	-
Demonstration R.F.-143	19.21	16.42	1.79	2.71	8.52

Table 2 : Economics of front line demnstrations

Variables	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	Benefit : cost ratio
Farmers practice	24000	107250	83250	1:4.47
Demonstration	25000	124865	99865	1:5.0
Additional in demonstration	1000	17615	16615	16.62 •

• incremental benefit : cost ratio

REFERENCES

Anonymous (2015). Annual progress report 2014-15 National research centre on seed spices,Ajmer. Annexture II pp102.

Anonymous (2015). Indian Institute of Spices Research.

Anonymous (2015). Spice Board of India.

Babu, Kandipundi Nirmal, Johny, A.K. and Thank, Kamani C.K. (2013). Scientific production technologis for enhancement of productivity and quality of spices. National Seminar on Production,Productivity and Quality of Spice (2-3 February,2013) Souvenir.National Research Center on Seed Spices. Ajmer pp. 92.

Dhaka, B.L., Meena, B.S. and Suwalka, R.L. (2010). Popularization of improved maize production technology through front line demonstrations in South Eastern Rajasthan. *J. Agric. Sci.*, **1**(1) : 39 - 42.

Dhaliwal, M.S. (2014). *Handbook of vegetables crops*, Kalyani Publishers, pp.213- 214.

Hiremath, S.M., Nagaraju, M.V. and Shasidhar, K.K. (2007). Impact of frontline demonstration on onion productivity in farmers field. Paper presented In*:* Nation sem appropriate extn strat manag rural resource, p.100. University of Agricultural Sciences, Dharwad (KARNATAKA) INDIA.

Hiremath, S.M. and Nagaraju, M.V. (2009). Evaluation of front line demonstration on onion in Haveri district of Karnataka. *Karnataka J. Agric. Sci*., **22** (5):1092-1093.

Kumar,A., Kumar, R., Yadav, V.P.S. and Kumar, R. (2010). Impact assessment of frontline demonstrations of bajara in Haryana State. *Indian Res. J. Extn. Edu*., **10** (1) : 105-108.

Mishra,D.K.,Paliwal,D.K.,Tailor,R.S.and Deshwal, A.K. (2009). Impact of front line demonstrations on yield enhancement of potato. *Indian Res. J. Extn. Edu.*, **9** (3) : 26-28.

Sagar R.L. and Chandra, G. (2004). Evaluation of front line demonstrations on mustard in Sunderban, West Bengal. *Indian J. Extn. Edu.*,**40** : 96-97.

Samui, S.K., Maitra, S., Roy, D.K., Mondal, A.K. and Saha, D. (2000). Evaluation on front line demonstration on groundnut (*Arachis hypogaea* L.). *J. Indian Soc. Coastal Agric. Res*., **18** : 180- 183.

Sharma,R.N. and Sharma,K.C. (2004). Evaluation of front line demonstration trials on oilseeds in Baran district of Rajasthan. *Madhya J. Extn. Edu.*,**7** : 72-75.

Singh, Balraj, Singh, Ravindra and Solanki,R.K. (2013). *Adoption of modern techniques for increasing productivity and quality in seed spices*. Souvenir, National Seminar on production, productivity and quality of spice (2-3 February,2013) Souvenir. National Research Centre on Seed Spices.Ajmer, pp. 72-83.

Singh, I.S. and Singh, Vinod (2015). *Production, handling and processing of spices*.Westville Publishing House,NEW DELHI, INDIA.

Singh, R.P., Dhania, G., Sharma, A. and Jaiwal, P.K. (2007). Biotechnological approach to improve phytoremediation efficiency for environmental contaminants. In: *Environmental bioremediation technologies*. (Eds. Singh, S.N. and Tripathi, R.D.). *Springer*. pp. 223-258

Suryawanshi, S.D. and Prakash, M. (1993). Impact of viable technology of promoting oil seeds in Maharastra. *Indian J. Agric. Econ.*,**48** (420) : 102-106.

11th Year
★★★★★ of Excellence ★★★★★