



Reviewed By

Dr. Raja Ram Chaudhary
ICAR-Directorate of Groundnut
Research, Regional Research
Station, Bikaner, Rajasthan, India.
Email: rajaramchoudhary26@gmail.com

*Correspondence

Narendra Chaudhary
ncfls1983@gmail.com

Received: 30 January 2024

Revision: 15 February 2024

Accepted: 16 February 2024

Citation

Chaudhary, N., Sharma, Y.K., Lal, G., Meena, R.D., Meena, N.K., Meena, R.S., Lal, S., Meena, S.S., Meena, M.D. and Jangir, C.K. 2022. Promotion of fenugreek organic farming through front-line demonstrations in Sikar district of Rajasthan. *Int J Seed Spices*.12 (1), 70-74

DOI

<https://doi.org/10.56093/IJSS.v12i1.9>

Affiliation

ICAR-National Research Centre on
Seed Spices, Ajmer, Rajasthan

Promotion of fenugreek organic farming through front-line demonstrations in Sikar district of Rajasthan

Narendra Chaudhary*, Y.K. Sharma, G. Lal, R.D. Meena, N.K. Meena, R.S. Meena, Shiv Lal, S.S. Meena, M.D. Meena and C.K. Jangir

Abstract

A field study for promotion of fenugreek organic farming through front-line demonstrations (FLDs) was conducted in Sikar district of Rajasthan during 2019-20 to 2021-22 (3 years) under Mission for Integrated Development of Horticulture (MIDH) scheme by the ICAR-National Research Centre on Seed Spices, Ajmer. A total 29 farmers of 11 villages of Sikar were identified to carry out the study. All 29 farmers were supplied improved variety of fenugreek along with organic input viz. Trichoderma, FYM and botanicals/neem oil. After harvesting and threshing of fenugreek every year, yield data was recorded from each farmer fields. As per comparison of yield data between FLDs of organic farming and farmers/traditional practice it was reported that the mean yield of FLDs of organic farming of fenugreek was 6.25, 7.41 and 18.94% higher in comparison to farmers/traditional practice during 2019-20, 2020-21 and 2021-22 respectively. Farmers were satisfied with yield and visual quality of fenugreek seed harvested under organic farming and willing to continue organic farming in fenugreek. Therefore, organic farming in fenugreek could be widely promoted in Sikar district of Rajasthan to achieve sustainable development goals.

Keywords: Organic farming, fenugreek, demonstration, sikar, MIDH

Introduction

Fenugreek (*Trigonella foenum-graecum* L.) is one of the important seed spices. It belongs to fabaceae family and mainly grown in Rajasthan and Gujarat States of country. Annually it is grown in approximately 133, 229 hectares area with production of 203, 360 tonnes and productivity of 1526 kg ha⁻¹ (DASD, 2020-21). It is widely grown for seed and leafy vegetables. Its fresh and tender leaves are rich in iron, calcium, protein and essential amino acids. In addition, it possesses a number of medical qualities, such as the ability to prevent constipation and to increase the metabolism and digestive system. Its seed also used for the treatment of diabetes, dysentery, diarrhea and rickets. Owing to its medicinal use and fresh part (leaf) of consumption it is utmost imperative to promote the organic farming in fenugreek to retain the high quality of seed as well leaves. The arid and semi-arid agricultural soils are poor in organic matter as well in water holding capacity, and are getting worse (Guo *et al.*, 2019). The

indiscriminate use of synthetic inorganic inputs such as chemical fertilizers has reflected as soil organic matter depletion, groundwater contamination, air pollution, and production quality reductions in the regions (Hernandez *et al.*, 2015). Thus, conventional farming practices in India led to land degradation of 97.85 m ha (29.7%) of the total geographical area (Sengupta, 2021). Over-reliance on agrochemicals in agri-food production systems has deteriorated the environmental sustainability (Suarez *et al.*, 2021), making it more difficult to achieve sustainable development goals (SDGs). Concurrently, the survey conducted by National Sample Survey Organization (NSSO, 2013) indicates that the dependency of farmers on seeds, fertilizers, and pesticides from outside the farms makes farming costlier. Hence, sustainable strategies, such as organic and natural farming, green manuring and crop residue recycling are important to enhance soil organic matter and plant yield (Yang *et al.*, 2013). Government of India is being implemented many schemes in order to promote organic farming like 'Mission Organic Value Chain Development North Eastern region (MOVCDNER)', 'Parampragat Krishi Vikas Yojana (PKVY)', 'Rashtriya Krishi Vikas Yojana (RKVY)', 'Mission for Integrated Development of Horticulture (MIDH)', and 'All India-Network Project on Organic Farming under ICAR (AI-NPOF)'. Nevertheless, farmers were still reluctant to switch to organic farming at the time since they didn't know enough about it, didn't know how to meet the

nutritional needs of their crops, didn't know how to control diseases and pests in organic farming, etc. In this context, an attempt has been made to promote the organic farming in fenugreek through front line demonstrations in Sikar district of Rajasthan under MIDH scheme.

Materials and Methods

The study was conducted at farmer's field to promote the organic farming of fenugreek through front-line demonstrations under MIDH scheme by the ICAR-National Research Centre on Seed Spices, Ajmer. A total of 29 farmers representing 11 villages of Sikar district namely Piprali, Katrathal, Rehnavia, Khirwa, Jor Ki Dhani, Kolida, Laxman vaas, Sihatebadi, Jhamavaas, Laadpura and Likhma Ka Vaas were identified to conduct the study during 2019-20 to 2021-22. During first (2019-20), second (2021-21) and third (2021-22) year, 10, 9 and 10 farmers respectively, were supplied input *Viz.* *Trichoderma* and botanicals/neem oil to conduct a front-line demonstration of organic farming of fenugreek. Improved variety of fenugreek 'AFg-3' in the first and second year and 'AFg-5' in the third year was supplied to the farmers to sow during the rabi season of each year. Fenugreek seeds @ 10 kg for 0.5 ha area were distributed to each farmer (seed rate @ 20 kg ha⁻¹) along with *Trichoderma Viride* @ 100 g for seed treatment and botanicals @ 3 liter for plant protection. The package of practices followed are presented in table 1.

Table 1. Package of practices followed at organic FLD vis-a-vis traditional farm

Particulars	Organic practices at FLD farm	Farmers' practices at traditional farm
Seed treatment	<i>Trichoderma viride</i> @ 2-3 g kg ⁻¹ of seed	No seed treatment
Variety	AFg-3 & AFg-5	Local or private variety
Irrigation	Irrigated	Irrigated
Seed rate	20 kg ha ⁻¹	20-25 kg ha ⁻¹
Time of sowing	October-November	October-November
Sowing method	Line sowing/broadcasting	Broadcasting
Weed management	Hand weeding	Hand weeding
Nutrient management	FYM (10 t ha ⁻¹)	NPK: 25:20:20 kg ha ⁻¹
Plant protection	Botanicals/neem oil	Pesticides/fungicide

The expert team of scientists regularly visited the front-line demonstrations plot to monitor (Fig. 1) the performance of crop. Beneficiary farmers were advised about the nutrient, pest and diseases management under organic management system. Farmers gained

hands-on experience with respect to use and dose of botanicals/neem oil in order to manage pests and diseases. Botanicals @ 10ml liter⁻¹ of water were recommended to spray on the crop in case of pests and diseases infestation.



Fig. 1: Field monitoring of organic fenugreek FLD in Sikar

Table 2. Yield of fenugreek as influenced by organic inputs during 2019-2020.

Farmer number	Variety	Farmers practice (q ha ⁻¹)	Demo yield (q ha ⁻¹)	Yield increase/decrease over farmers practice (%)
Farmer no. 1	AFg-3	16	18	12.50
Farmer no. 2	AFg-3	16	17	6.25
Farmer no. 3	AFg-3	16	19	18.75
Farmer no. 4	AFg-3	16	18	12.50
Farmer no. 5	AFg-3	16	17	6.25
Farmer no. 6	AFg-3	16	18	12.50
Farmer no. 7	AFg-3	16	16	0.00
Farmer no. 8	AFg-3	16	14	-12.50
Farmer no. 9	AFg-3	16	15	-6.25
Farmer no. 10	AFg-3	16	18	12.50
	Mean	16	17	6.25

Table 3. Yield of fenugreek as influenced by organic inputs during 2020-2021.

Farmer number	Variety	Farmers practice (q ha ⁻¹)	Demo yield (q ha ⁻¹)	Yield increase/decrease over farmers practice (%)
Farmer no. 1	AFg-3	12	10	-16.67
Farmer no. 2	AFg-3	12	4	-66.67
Farmer no. 3	AFg-3	12	11	-8.33
Farmer no. 4	AFg-3	12	7	-41.67
Farmer no. 5	AFg-3	12	20	66.67
Farmer no. 6	AFg-3	12	12	0.00
Farmer no. 7	AFg-3	12	14	16.67
Farmer no. 8	AFg-3	12	27	125.00
Farmer no. 9	AFg-3	12	11	-8.33
	Mean	12	12.89	7.41

Table 4. Yield of fenugreek as influenced by organic inputs during 2021-2022.

Crop	Variety	Farmers practice (q ha ⁻¹)	Demo yield (q ha ⁻¹)	Yield increase/decrease over farmers practice (%)
Farmer no. 1	AFg-5	6.8	7.40	8.82
Farmer no. 2	AFg-5	6.8	8.00	17.65
Farmer no. 3	AFg-5	6.8	7.50	10.29
Farmer no. 4	AFg-5	6.8	9.00	32.35
Farmer no. 5	AFg-5	6.8	8.65	27.21
Farmer no. 6	AFg-5	6.8	8.68	27.65
Farmer no. 7	AFg-5	6.8	7.50	10.29
Farmer no. 8	AFg-5	6.8	7.95	16.91
Farmer no. 9	AFg-5	6.8	8.20	20.59
Farmer no. 10	AFg-5	6.8	8.00	17.65
Mean		6.8	8.09	18.94

Results and Discussion

The Government of India has been focusing on the promotion of organic farming and natural farming. It is aimed to bring 10% of the area under organic farming by 2030 by using available organic resources such as livestock manures, cropping system diversification including green manuring, crop residue utilization for soil health restoration, sustaining crop-livestock interactions and crop productivity, reducing the water and air pollution. In this direction the present study was carried out to showcase the organic farming in fenugreek cultivation through front line demonstrations under MIDH scheme. The knowledge level of respondent farmers was improved significantly after conducting of front-line demonstrations with respect to organic farming of fenugreek. This showed the positive impact of front-line demonstrations on the knowledge of the farmers that have resulted in higher adoption of organic farming of fenugreek. Similar results have been reported by Lal (2014) in fenugreek, Meena *et al.*, (2012) in cumin and Chauhan *et al.*, (2020) in mustard.

Performance of FLD

The comparison of productivity levels between organic farming FLD and farmer's practice at traditional farm was done to determine the achievable yield of organic farming. It was reported that the mean yield of FLDs of organic farming of fenugreek was 6.25, 7.41 and 18.94% higher in comparison to farmers/traditional practice during 2019-20, 2020-21 and 2021-22 respectively (Table 2, Table 3 & Table 4). This might be due to the variation in fertility status and other management practices of individual farmers. A similar comparison of

yield between improved production technologies and farmer's practice has been documented by Singh and Sharma (2018); Meharya and Ramesh, (2018); Morwal *et al.*, (2018) and Kaur *et al.*, (2019). The quality of fenugreek seed judged by visual appearance was superior in organic farming stated by respondent farmers. The additional benefit in organic farming that organic produce may fetch premium price in the market as the consumers are ready to pay even more price due to the health issues of produce grown with the use of synthetic agro-chemicals. The extent of satisfaction level of respondent farmers over extension services and performance of FLDs was high and further willing to adopt organic farming of fenugreek.

Conclusions

Based on performance of FLDs and the quality of produce, farmers are ready to adopt organic farming of fenugreek. Even though some reports mentioned that yield may decline under organic farming to some extent however, that could be compensated by premium market price. Moreover, it is evident that long-term organic farming may bridge this yield gap owing to improvement in fertility status of soil. Therefore, large-scale and complete fenugreek cultivation under organic farming is possible in the Sikar district of Rajasthan and also in adjoining regions. Results demonstrated that fenugreek can be grown on a large scale under organic conditions in the Sikar district of Rajasthan as well as in surrounding areas.

Acknowledgement

The authors express sincere thanks to Director, Directorate of Arecanut and Spices Development,

Calicut, Kerala for providing funding under MIDH scheme to carry out the study. The authors also express gratitude to the Director, ICAR-NRCSS, Ajmer, Rajasthan for technical support and guidance to accomplish the study.

Conflicts of Interest : The authors declare no conflicts of interest.

References

- Chauhan, R.S., Singh, R.K., Singh, P. and Singh, S.R.K. 2020. Impact analysis of frontline demonstrations in mustard technology transfer and productivity in Shivpuri district of Madhya Pradesh. *Indian J Extension Education*, 20(2&3):79-82.
- DASD. 2020-2021. https://www.dasd.gov.in/adminimage/Annual_Report_20-21.pdf
- Guo, L., Shen, J., Li, B., and Li, Q.Q. 2019. Impacts of agricultural land use change on soil aggregate stability and physical protection of organic C. *Sci. Total Environ.*, 707, 136049. doi: 10.1016/j.scitotenv.2019.136049.
- Hernandez, A., Miranda, M., Arellano, E.C., Saura, S., and Ovalle, C. 2015. Landscape dynamics and their effect on the functional connectivity of a Mediterranean landscape in Chile. *Ecol Indic.*, 48, 198–206. doi: 10.1016/j.ecolind.08010.
- Kaur, J., Singh, V., Singh, G. and Raina, D. 2019. Assessment of frontline demonstrations on chickpea in Ferozpur district of Punjab. *Indian J Extension Education*, 41(3 & 4):49-52.
- Lal, G. 2014. Impact of adoption of scientific interventions in fenugreek on grain yield and farmer's income: An assessment by frontline demonstrations in arid zone of Rajasthan. *African J Agri Res.*, 9(32):2391-2396.
- Meena, M.L., Singh, D. and Sharma, N.K. 2012. Impact of frontline demonstrations on yield enhancement of cumin: A case in arid zone of Rajasthan. *Indian J Extension Education*, 48(1&2):103-104.
- Mehrya, M.L. and Ramesh 2018. Impact of frontline demonstrations on cumin farmers in Jodhpur and Nagaur district. *Chemical Science Review and Letters*, 7(26):449-453.
- Morwal, B.R., Pagaria, P., Kantwa, S.L. and Das, S. 2018. Performance of frontline demonstrations on yield enhancement of cumin in Barmer district of Rajasthan. *J Krishi Vigyan*, 6(2):76-79.
- NSSO 2013. India - situation assessment survey of agricultural households, January - December 2013, NSS 70th round. New Delhi: National Sample Survey Organization - Ministry of Statistics and Programme Implementation (MOSPI), Government of India.
- Sengupta, R. 2021. Land degradation in India hurts farmers and forest dwellers the most. Available At: <https://www.downtoearth.org.in/news/environment/landdegradation-in-india-hurts-farmers-and-forest-dwellers-the-most-78701>.
- Singh, B. and Sharma, A.K. 2018. Impact of frontline demonstrations on productivity enhancement of cumin in arid zone. *Int J Seed Sp.*, 7(2):72-76.
- Suarez, R.P., Gojman, A.P., Cappelletti, S., Solari, L.M., Cristos, D., Rojas, D. 2021. Combined effects of agrochemical contamination and forest loss on anuran diversity in agroecosystems of east-central Argentina. *Sci Total Environ.*, 759, 143435. doi:10.1016/j.scitotenv.2020.143435.
- Yang, J., Liu, X., and Shi, Y. 2013. Effect of different mixed fertilizer on yield, quality, and economic benefits in *Stevia rebaudina* Bertony. *Adv J Food Sci Technol.*, 5, 588–591. doi: 10.19026/ajfst.5.3132.