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Impact of integrated crop management practice in sunflower variety RSFH-1887 under farmers' field

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Abstract
A frontline demonstration was conducted to study the impact of sunflower variety RSFH-1887 for two years, during 2021-22 and 2022-23 by ICAR-Krishi Vigyan Kendra, Bagalkote (Karnataka) with an objective to assess the yield level with an improved package of practice over with farmers' practice and its economic impact. By adopting improved package of practice along with sunflower variety RSFH-1887, pooled data of two years recorded higher plant height (168.5 cm) and 100 seed weight (5.04 g) as compared to farmers' practice (156.9 cm and 4.67 g, respectively). The percent disease incidence (PDI) of *alternaria* leaf blight in improved practice was 8.34 per cent and in farmers practice was 11.38 per cent and the PDI of *sclerotium* stem rot in improved practice was 4.46 per cent and in farmers practice it was noticed 10.87 per cent. The per cent disease reduction of *alternaria* leaf blight and *sclerotium* stem rot was to the tune of 26.71 per cent and 58.97 per cent, respectively. Pooled data on grain yield was recorded in improved practice (9.93 q ha^{-1}) as compared to farmers' practice (8.68 q ha^{-1}). The increase in the grain yield of the sunflower variety RSFH-1887 with improved practice was to the tune of 18.14 per cent over the farmers' practice. Average of two year extension gap (1.61 q ha^{-1}), technology gap (14.55 q ha^{-1}) and technology index (58.18%) was observed in the study. Higher gross return (Rs. 533115 ha^{-1}), net return (Rs. 32143 ha^{-1}), and B:C ratio (2.54) was noticed in improved practice as compared to farmers practice (Rs. 44926 ha^{-1}, Rs. 17668 ha^{-1} and 1.65, respectively). The adoption of a sunflower variety RSFH-1887 with improved practice realized an additional income of Rs. 14475 per hectare. This kind of improved variety with improved practices motivates the other farmers to adopt for getting higher income.

Keywords: Frontline demonstration, sunflower, yield, economics, extension gap, technology gap, technology index

Introduction
Sunflower is an important oilseed crop of Karnataka after groundnut and soybean, which can be grown in all the three seasons because; it is a photo-insensitive and wider adaptable crop. The crop can be grown in well draining black soil and having salinity (pH 6.5 to 8.5), it can adapt to both cold and high temperature area. Considerable yield loss may occur due to lodging and diseases particularly in low drained clay soils.

In the world sunflower was grown in an area of 30.15 million hectare with the production of 58.57 million tonnes and productivity of 1942.8 kg ha^{-1} (Anon., 2023) [1] and in India it grown in an area of 0.27 million hectares with the production of 0.25 million tonnes and productivity of 923 kg ha^{-1} (Anon., 2020) [2] which was lesser (110.49%) than the world productivity. In Karnataka sunflower was grown in an area of 1.20 lakh hectares with the production 1.08 lakh tonne and productivity of 898 kg ha^{-1} which was lesser (2.78%) than national average. In Bagalkote district of Karnataka it is grown in an area of 0.20 lakh hectares with the production of 0.20 lakh tonnes and productivity of 981 kg ha^{-1} which is higher than the state (9.24%) and national average (6.28%) (Anon., 2020) [2].

Sunflower area was decreasing (Anon., 2020) [2] in Karnataka from 2.20 lakh hectares (2016-17) to 1.20 lakh hectares (2020-21) this may be due less yielding varieties or hybrids and pest, diseases problem and change in the weather are the major contributing factors. Sunflower variety RSFH-1887 was released in the year 2016 for cultivation in Karnataka from University of Agricultural Sciences, Raichur. This variety matures at 95-100 days after sowing (DAS) with an average yield of 12-16 q ha^{-1} and having moderately tolerance to pest and disease incidence.

From the above facts and information, a study was initiated through frontline demonstration to know the impact of integrated crop management practice with sunflower variety RSFH-1887 under farmers' field during *kharif* season under rainfed situation of Bagalkote district.

Materials and Methods

Before initiation of the frontline demonstration in sunflower the pre-seasonal group meeting was organized and interacted with the farmers of Bagalkote district, Karnataka. The study was conducted with 15 farmer's in five villages of two hoblis (Aminagad and Bagalkote) of two talukas (Ilkal, Bagalote) during 2021-22 and 2022-23, farmers' having irrigation facility by adopting purposive sampling method. During the initial year, 2021-22 information on existing cultivation practices by the farmers' was collected. The information comprises of the variety cultivated, yield, profit, and problems such as insect pest and diseases faced by the farmers in sunflower cultivation have been collected. Based on the collected information, technological gaps were identified and a suitable package of practice which was developed by University of Agricultural Sciences, Dharwad was introduced (Table 1) at Benakanavari and Mangalagudda villages of Aminagad hobli and Ilkal taluka, and Honnakatti, Keresur, Benkatti villages of Bagalkote hobli and taluka during 2021-22 and 2022-23. Other varieties of sunflower grown by participating farmer or adjoining farmer served as control (farmers' practice) for the study. For each year farmers' have been trained for adopting an improved package of practice by conducting on and off-campus training.

Data pertaining to cost of cultivation, yield were collected from each selected farmer. The price of the produce was collected from Agricultural Produce Market Committee (APMC), Bagalkote to work out the economics. From the collected data on yield; cost of cultivation, gross returns, net returns, and B:C ratio was computed. To know the overall impact of two years of study, the data were analyzed statistically using paired t-test. The extension gap, technology gap, and technology index were estimated (Samui *et al.,* 2000) [7] by the following formulae, and conclusions were drawn.

1. Extension gap = Demonstration yield - Farmers yield
2. Technology gap = Potential yield - Demonstration yield
3. Technology index = [(Potential yield - Demonstration yield)/ Potential yield] X 100

Results and Discussion

The outcome of the study on the Impact of integrated crop management practice in sunflower variety RSFH-1887 under farmers' field during 2021-22, 2022-23 and its pooled was discussed in this section.

Growth and yield parameters

Significantly higher plant height was observed in improved practice (168.5 cm) with sunflower variety RSFH-1887 as compared to farmers' practice (156.9 cm) (Table 2) of two years pooled data. A similar trend was also noticed in 100 seed weight (5.04 g and 4.67 g, respectively). The higher yield parameter such as 100 seed weight obtained in the improved practice may be due to the higher growth of the plant which was influenced by the photosynthetic activity.

Disease incidence

The management of improved practices demonstrated with integrated crop management (ICM) practices in sunflower showed the reduction in disease incidence and increases the yield levels. The incidence of *alternaria* leaf blight and *sclerotium* stem rot were recorded and presented in Table 3. The percent disease incidence (PDI) of *alternaria* leaf blight in improved practice was 8.34 per cent and in farmers practice was 11.38 per cent and the PDI of *sclerotium* stem rot in improved practice was 4.46 per cent and in farmers practice it was noticed 10.87 per cent. The per cent disease reduction of *alternaria* leaf blight and *sclerotium* stem rot was to the tune of 26.71 per cent and 58.97 per cent, respectively. The reduction of disease incidence may be due to adoption of integrated crop management approaches. These results are in line with the finding of Devkar (2011) [4] and Singh *et al*. (2022) [8] were also noticed that seed treatment and foliar spray of fungicide reduced the incidence of *alternaria* leaf blight and *sclerotium* stem rot in sunflower.

Grain yield

Among the pooled data on grain yield (Table 2), significantly higher grain yield was recorded in improved practice (9.93 q ha^{-1}) with sunflower variety RSFH-1887 as compared to farmers' practice (8.68 q ha^{-1}). In both years, a similar trend was noticed in grain yield. The increase in the grain yield of the sunflower variety RSFH-1887 with improved practice was to the tune of 18.14 per cent over the farmer's practice, this may be due increase in growth and yield parameter as well as reduction in disease incidence. These results are in line with the finding of Rajanikanthreddy *et al.* (2024) [6] and reported that high-yielding varieties with improved technology will increase the yield of sunflower.

Extension gap

The difference between improved practice and farmers' practices was worked out as an extension gap, which ranges from 1.25 to 1.96 q ha^{-1} with an average of 1.61 q ha^{-1} during the assessment period (Table 5). This wider and alarming trend of galloping extension gap needs to be addressed by educating the farmers through various extension activities for the adoption of high-yielding varieties of sunflower which are suitable for the rainfed condition of Bagalkote district. These results are in line with the findings of Singh *et al.* (2019) [9].

Technology gap

To know the technology gap, the yield difference between potential and demonstration yield of sunflower variety RSFH-1887 was worked out, which ranges from 14.02 to 15.07 q ha^{-1} with an average of 14.55 q ha^{-1} (Table 5). The variation in the yield may be due to the weather and fertility status of the area. To shrink this gap, location-specific recommendations need to be addressed. These results are in line with the findings of Hiremath and Nagaraju (2009) [5].

Technology index

The technology index will explain the feasibility of improved technology at the farmers' fields by comparing the potential yield of the variety with improved technology (Table 5). The higher feasibility of improved technology was indicated by lower values of the technology index. The lower technology index (56.08%) was observed in 2021-22, followed by 2022-23 (60.28%). During 2022-23 lower technology index appeared, this may be due to sunflower variety RSFH-1887 performed

well with improved technology in an area of higher soil fertility which was coupled with the good weather conditions. These results are similar to the findings of Hiremath and Nagaraju (2009) [5] and Anuratha *et al.* (2020) [3].

Economics

The economics is one of the important measures to know the profitability of a system. The farmer adopts such a practice which gives more profit. The pooled data on economics were worked out for each demonstrating year for both improved and farmers practice (Table 4). Over the years, economic analysis of improved practice with sunflower variety RSFH-1887 recorded significantly higher gross return (Rs. 533115 ha^{-1}), net return (Rs. 32143 ha^{-1}), and B:C ratio (2.54) as compared to farmers' practice (Rs. 44926 ha^{-1}, Rs. 17668 ha^{-1} and 1.65, respectively). The adoption of a sunflower variety RSFH-1887 with improved practice realized an additional income of Rs. 14475 per hectare. These findings were similar to the findings of Vinay *et al.* (2020) [10]. Under local agro-ecological situations, the results of the demonstrations revealed that the higher profitability and economic viability of sunflower variety RSFH-1887 with an improved package of practice.

Table 1: Comparison between improved practices versus farmers practice under sunflower frontline demonstration

Sl. No.	Particular	Frontline demonstration	Farmers' Practice	Gap
1.	**Variety**	**RSFH-1887**	**Private**	**No gap**
2.	Seed rate (kg/ha)	5	5	No gap
3.	Seed treatment	*Azospirillum*	No	Full gap
4.		Imidachloprid 70 WP@5/kg of seeds	No	Full gap
5.	Sowing method	Seed cum fertilizer drill	Seed cum fertilizer drill	No gap
6.	Spacing	120 cm x 10 cm	60 cm x 10 cm	Partial gap
7.	Depth of sowing	5 cm	Deep sowing	Full gap
8.	Sowing date	August	June	Partial gap
9.	FYM	8 t/ha	3 t/ha	Partial gap
10.	Fertilizer application	35:50:35 kg N: P_2O_5: K_2O kg ha^{-1}	10:26:26 kg N: P_2O_5: K_2O kg ha^{-1}	Partial gap
11.	Weed control	Pre-emergence application of Pendimethalin 30% EC @ 4.5 l/ha and one inter-cultivation at 35 DAS	One hand weeding at 20 days after sowing (DAS) and one inter-cultivations at 45 DAS	Partial gap
12.	Insecticide	Lambdcyhalothrin 5% EC @ 0.5 ml/l	Overdose and non-recommended brands of pesticides	Partial gap
13.	Fungicide	Hexaconazole 5% EC @ 1 ml/l		Partial gap

Table 2: Growth, yield and yield parameters of sunflower variety RSFH-1887 as influenced by integrated crop management practice under frontline demonstration

Year	Treatment / Parameter	Plant height (cm)	100 seed weight (g)	Yield (q/ha)
2021-22	IP	168.5	5.04	9.93
	FP	156.9	4.67	8.68
	t-value	7.71***	11.57***	6.85***
	p-value	0.00	0.00	0.00
2022-23	IP	171.8	5.35	10.98
	FP	158.6	4.96	9.02
	t-value	8.84***	9.68***	13.28***
	p-value	0.00	0.00	0.00
Pooled	IP	170.1	5.20	10.46
	FP	157.8	4.82	8.85
	t-value	11.30***	13.16***	13.76***
	p-value	0.00	0.00	0.00

Note: *** Significant 0.1% level, IP-Improved Practice, FS-Farmers' Practice

Table 3: *Alternaria* leaf blight and *Sclerotium* stem rot of sunflower variety RSFH-1887 as influenced by integrated crop management practice under frontline demonstration

Year	Treatment / Parameter	*Alternaria* leaf blight (%)	*Sclerotium* stem rot (%)
2021-22	IP	8.45 (3.07)	4.57 (2.36)
	FP	11.45 (3.53)	10.98 (3.46)
	t-value	-399.39***	-55.93***
	p-value	0.00	0.00
2022-23	IP	8.23 (3.04)	4.35 (2.31)
	FP	11.30 (3.51)	10.77 (3.43)
	t-value	-229.24***	-57.36***
	p-value	0.00	0.00
Pooled	IP	8.34 (3.06)	4.46 (2.34)
	FP	11.38 (3.52)	10.87 (3.45)
	t-value	-365.08***	-81.82***
	p-value	0.00	0.00

Table 4: Economics of sunflower variety RSFH-1887 as influenced by integrated crop management practice under frontline demonstration

Year	Treatment / Parameter	Cost of Cultivation (Rs./ha)	Gross income (Rs./ha)	Net Income (Rs./ha)	B:C Ratio
2021-22	IP	20808	49667	28858	2.39
	FP	27167	43417	16250	1.60
	t-value	-	6.85***	14.73***	22.88***
	p-value	-	0.00	0.00	0.00
2022-23	IP	21137	56564	35428	2.68
	FP	27350	46436	19086	1.70
	t-value	-	13.28***	21.88***	24.43***
	p-value	-	0.00	0.00	0.00
Pooled	IP	20973	53115	32143	2.54
	FP	27258	44926	17668	1.65
	t-value	-	13.84***	25.06***	33.53***
	p-value	-	0.00	0.00	0.00

Note: *** Significant 0.1% level, IP-Improved Practice, FS-Farmers' Practice

Table 5: Grain yield, extension gap, technology gap, and technology index of sunflower variety RSFH-1887 as influenced by integrated crop management practice under frontline demonstration

Year	Grain yield (q/ha)		Per cent increase in yield	Potential yield (q/ha)	Extension gap(q/ha)	Technology gap (q/ha)	Technology index (%)
	IP	FP					
2021-22	9.93	8.68	14.40	25	1.25	15.07	60.28
2022-23	10.98	9.02	21.73	25	1.96	14.02	56.08
Mean	10.46	8.85	18.14	25	1.61	14.55	58.18

Conclusion

From the study, it can be concluded that adopting a sunflower variety RSFH-1887 with improved practices increased the yield to the tune of 18.14 per cent over the farmers' practice with an additional income of Rs. 14475 per hectare. This kind of improved variety with improved practices motivates the other farmers' to adopt the improved technology for getting higher income. Thus, the frontline demonstration is an effective and feasible tool for increasing the area, production, and productivity of sunflower in the study area.

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References

1. Anonymous. Food and Agriculture Organization of the United Nations: FAOSTAT. Rome: FAO; 2023. https://www.fao.org/faostat/en/#data/QCL
2. Anonymous. Unified Portal for Agricultural Statistics. Government of India; 2020. https://upag.gov.in/primary-estimate-report
3. Anuratha A, Ramasubramanian M, Chandirakala R. Assessment of greengram varieties for better yield in Nagapattinam district of Tamil Nadu. J Krishi Vigyan. 2020;9(1):12-15.
4. Devkar SR. Studies on integrated management of Alternaria leaf spot (*Alternaria helianthi* (Hansf.) Tubaki & Nishihara) of sunflower [MSc (Agri) thesis]. Parabhani: Marathwada Krishi Vidyapeeth; 2011. p. 1-145.
5. Hiremath SM, Nagaraju MV. Evaluation of frontline demonstration trials on onion in Haveri district of Karnataka. Karnataka J Agric Sci. 2009;22(5):1092-1093.
6. Rajanikanthreddy, Ganigara BS, Shakuntala NM, Umesh H, Dayanand S, Shyamrao K, *et al*. Effect of seed treatment and foliar spray of nano DAP on plant growth and seed yield in RSFH-700 sunflower hybrid seed production. Int J Res Agron. 2024;7(11):292-295.
7. Samui SK, Maitra S, Roy DK, Mandal AK, Saha D. Evaluation of front line demonstration on groundnut. J Indian Soc Coastal Agric Res. 2000;18(2):180-183.
8. Singh A, Punia R, Vinod M, Pavitra K, Neeraj K, Abhishek K, Vipul. Sclerotium rot is a chronic disease of sunflower: a comprehensive review. Biol Forum Int J. 2022;14(1):982-989.
9. Singh AK, Singh RP, Singh RK, Upadhyay. Frontline demonstration: an effective tool for increasing productivity of pulses in Gorakhpur district of Uttar Pradesh. J Pharm Phytochem. 2019;8(2):1882-1884.
10. Vinay G, Prabhatsinh J. Impact of demonstration on productivity and profitability of greengram in Gandhinagar district of Gujarat. J Krishi Vigyan. 2020;8(2):174-177.