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Impact of Frontline Demonstrations (FLDs) on Oilseed Crops in South Konkan Coastal Zone of Maharashtra

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Abstract

Frontline demonstration is the long-term educational activity conducted by agricultural scientists in a systematic manner on farmers' field to show the worth of new practice/technology under the micro-farming situation. The Krishi Vigyan Kendra, Ratnagiri had conducted the frontline demonstrations (FLDs) on oilseeds during 2011 to 2016. The KVK had organized 93 FLDs on Groundnut (*Arachis hypogaea*) in two villages *viz.,* Asage and Gawane and 26 FLDs on Niger (*Guizotia abyssinica*) in Gawane village from Lanja Block of Ratnagiri district. Therefore, the aim of present study was to determine the impact of frontline demonstrations (FLDs) on yield, adoption, varietal replacement of oilseed crops and its horizontal spread in Konkan region of Maharashtra state. To get the adequate size of the sample, 119 FLDs beneficiary farmers (93 Groundnut + 26 Niger) were selected as the sample for the present study. The study was conducted in experimental designs (Before-After and Control-Treatment) of social research. The findings showed that significant increase in the average yield of demonstration plot (20.57q ha^{-1}) over the control plot (13.75 q ha^{-1}) of groundnut crop. Average yield of niger was 2.75 q ha^{-1} , which increased to 3.11 q ha^{-1} in demonstration year. FLDs showed a positive impact on the adoption of production technologies in groundnut and niger. The 'Local' and 'SB-11' variety of groundnut were replaced by improved varieties such as 'Konkan Trombay Tapora', 'TG 26' and 'Konkan Gaurav'. Similarly, improved 'IGP-76' and 'Phule Karala' varieties of niger replaced the 'Local' low yielding varieties. The area under improved varieties increased periodically. Thus, it can be inferred that FLD is an effective extension intervention to demonstrate the production potential of improved technologies in oilseed crops on farmers' field. Therefore, it is recommended that the extension agencies engaged in transfer and application of agricultural technologies on farmer's field should give priority to organize frontline demonstrations (FLDs) on cluster basis for harnessing the productivity potential of oilseed crops in the country.

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Introduction

Indian Council of Agricultural Research (ICAR) had established Krishi Vigyan Kendras (KVKs) - 'Agriculture Science Centers' all over the India, is an institutional innovation for application of agricultural technologies at the farmer's field with the help of a multi-disciplinary team. The first KVK of the country was established in 1974 at erstwhile Pondicherry and initial mandate of KVKs was confined only to impart training. Krishi Vigyan Kendras (1974) actually originated as one of the four first line extension systems of ICAR that included National Demonstration (1964), Operational Research Projects (1974-75), and Lab to Land Programme (1979). As long as the need for close interaction between farmers, extensionists and researchers in the participatory diagnosis of problems and location specific recommendations, emphasizing joint action and education rather than prescription has been increasingly felt, the Krishi Vigyan Kendra (KVK) network started spread enormously in the country. The immense policy reforms in the KVK mandates and its activities were brought about only after a thorough realization of the importance of micro-eco situation perspectives of technology suitability and its adoption.[12] All the first line extension services were merged with the KVKs during the 1990s with new structural and organizational arrangements. With a decision of establishing KVKs in all the rural districts of the country in Xth five-year plan, the KVKs revised mandate. At present, there is a network of nearly 700 KVKs in the country. Therefore, the main mandate of the KVKs are to plan and carry out on-farm trials (OFTs) to verify, test, validate and refine location-specific technologies developed by the National Agricultural Research System (NARS). The purpose is to have an appropriate technology, which may be economically profitable, ecologically sustainable, technically feasible and culturally compatible. Another important activity of KVKs is to conduct frontline demonstrations (FLDs) on flagship technologies developed by NARS on farmer's field. Therefore, KVKs system emphasizes the frontline demonstration as a long-term educational activity in a systematic manner on farmers' field under the close supervision of agricultural scientists to show the worth of new practice/technology.

India holds a significant share in world oilseed production. It is the second largest producer of groundnut after China and third largest producer of rapeseed after China and Canada. The area under major oilseeds' *viz.,* groundnut, sesamum, rapeseed and mustard, linseed, castor, soybean, cottonseed, sunflower, safflower and niger seed occupied 20% net area sown. It must, however, be noted that the production of oilseeds has always fallen short of our demand and there has always been a need to import oilseeds or their products. The total oilseeds production in the country during 2016-17 was estimated at 35.40 million tons (MT). With limited scope of bringing additional area under oilseeds, an increase in oilseed production will have to come primarily from land saving to technologies highlighting. Further, there is a large-scale regional variation in the area, production and productivity of oilseeds in India. Few states like Haryana, Madhya Pradesh, Rajasthan and West Bengal increased their oilseed production both through area expansion and productivity improvement. The states like Maharashtra, Tamil Nadu and Himachal Pradesh can increase their oilseed output mainly through productivity improvement. Therefore, KVKs in these states are being emphasized to organize large scale FLD programs on oilseed crops for harnessing its productivity potential. It is, therefore, the concerned stakeholders should know that how many FLDs help to increase the productivity of oilseeds, to what extent FLDs spreads improved varieties of oilseeds in the operational area and to find out the adoption of different technologies by the farmers after exposure to FLDs. With this background, the study was undertaken to assess the impact of frontline demonstrations organized by the KVKs with specific objectives; to study the impact of FLDs on yield and adoption of oilseed crops and to know the varietal replacement of oilseed crops and its horizontal spread due to FLDs.

Materials and Methods

The study sites

The study was conducted in Lanja block of Ratnagiri district in Maharashtra State. A Lanja block is located at 16.85°N 73.55°E with an average elevation of 166 meters above mean sea level. National highway NH66 popularly known as 'Mumbai-Goa' highway passes through Lanja. Nearest rail head is Adivali on Konkan railway is around 15 km away. As of 2011 India census, Lanja had a population of 2,37,000. The males constitute 51.00% and females 49.00%

of the population. Lanja has an average literacy rate of 73.00% is nearly equal to the national average 74.04%. The male literacy is 78.00% and female literacy is 69.00%. This region is having red lateritic soil and receiving about 3500-4000 mm rainfall annually. The temperature varies from 10 degrees Celsius in winter and 40 degrees Celsius in summer. Mango, cashew, arecanut and coconut are major horticultural crops, however; rice, horse gram and finger millet are principal field crops grown in the district.

Experimental Detail

To make crop diversification, Krishi Vigyan Kendra, Ratnagiri had conducted the FLDs on oilseed crops during 2011 to 2016. Before organizing actual FLDs, the KVK scientists had collected baseline information from two adopted villages in the year 2010-11. During 2011-2016, KVK had organized FLDs of groundnut (*Arachis hypogaea*) on 34.50 ha area in Asage and Gawane village and niger (*Guizotia abyssinica)* on 10.00 ha area in Gawane from Lanja block of Ratnagiri district. Therefore, the present investigation was carried out in two adopted villages purposively. The FLDs had organized on farmers' field according to a package of practices recommended by Dr. Balasaheb Sawant Konkan Agricultural University, Dapoli. The farmer practice was considered as control plot/local check in demonstration cluster. These control plots were maintained by the farmers according to their own traditional cultivation practices. The KVK scientists had provided critical inputs such as seed, fertilizers, IPM, implements and bio-fertilizers to the farmers for demonstration plots. The demonstrations were laid out under the close supervision of KVK Scientists. Total 119 farmers were selected for the organization of FLDs on groundnut and niger crop in Asage and Gawane village. Therefore 119 beneficiary farmers were selected purposively as the samples for present investigation. The study was conducted in experimental designs ('Control-Treatment' and 'Before-After') of social research.

Data Collection and Analysis

The yield data of demonstration plots as well as control plots were collected immediately after harvesting to assess the impact of FLDs intervention on the yield of oilseed crops (2011-16). However, structured and pre-tested interview schedule was used to elicit the information from beneficiary farmers about adoption, varietal replacement and horizontal spread of oilseed crop technologies in adopted villages. The personal interview was conducted with the beneficiary farmers in the year of 2016-17. Collected data were subjected to descriptive statistical analysis using SPSS software. The following formulae were used to assess the impact of FLDs on the different parameters of oilseed crops.

Impact on yield

$$\text{Impact on yield (\% Change)} = \frac{\text{Yield of demonstration plot (ha}^{-1}\text{)-Yield of control plot(ha}^{-1}\text{)}}{\text{Yield of control plot (ha}^{-1}\text{)}} \times 100$$

$$\text{Impact on adoption (\% Change)} = \frac{\text{No. of adopters after demonstration- No. of adopters before demonstration}}{\text{No. of adopters before demonstration}} \times 100$$

$$\text{Impact on horizontal spread (\% Change)} = \frac{\text{Area after demonstration (ha) – Area before demonstration (ha)}}{\text{Area before demonstration (ha)}} \times 100$$

Results and Discussion

Impact of FLDs on crop yield

The findings of the impact of FLDs on yield enhancement of oilseed crops *viz.,* groundnut and niger are presented in this part. It is evident from table 1 that the average pod yield of demonstration plot of groundnut 'TG-26' variety was 22.70 q ha^{1} in winter 2011-12 and 21.30 q ha^{-1} in rainy 2013-14. However, the average pod yield of control plot was 14.04 q ha^{-1} and 13.90 q ha^{-1} in winter 2011-12 and winter 2013-14, respectively. A similar trend was observed during subsequent years with 'Konkan

Gaurav' variety of groundnut. Average pod yield of groundnut demonstration plot of 'Konkan Gaurav' variety was increased to 19.51 q ha^{-1} in rainy 2014-15 and 23.17 q ha^{-1} in winter 2014-15 over farmer practice i.e. control plot yield 13.24 q ha^{-1} in rainy 2014-15 and 15.81 q ha^{-1} in winter season 2014-15. As regards to 'Konkan Trombay Tapora' variety, the significant increase in the average pod yield of groundnut demonstration plot was 16.20 q ha^{-1} over the control plot yield 9.26 q ha^{-1} in rainy season of 2015-16. This showed that there was a positive and significant increase in the mean yield of groundnut demonstration plots over the farmer practice by 60.00, 53.00, 47.00, 46.00 and 74.00% for the year 2011-12, 2013-14, 2014-15 and 2015-16, respectively. Similar results were reported while studying the impact of FLDs on oilseed crops. It was observed that the farmers yield before FLDs was 2.1, 9.5 and 5.96 q ha^{-1} for sesame, soybean, and mustard, respectively, which was increased by 6.2, 15.67 and 14.01 q ha^{-1} after the FLDs, respectively.[17] Also, it was found that yield of sesame, soybean and mustard crop increased by 195.0, 63.34 and 135.0%, respectively.[17] The main reasons of the low yield of groundnut control plots in adopted villages were the use of poor quality seeds and traditional cultivation methods with poor nutrient and weed management practices. However, KVK scientists had used improved varieties of groundnut, seed treatment with *Rhizobium*, use of PSB and *Trichoderma*, adopted scientific cultivation practices like mulching and timely sowing, recommended spacing, balanced use of manure and fertilizers with time to time weed management for demonstration plots recorded 56.20% higher mean yield over a control plot mean yield. There was a positive impact of NFSM-Pulses on lentil yield by use of improved variety and scientific package of practices.[6] The study brought out the increase in the yield of lentil by 28.56 to 49.24%. The percentage increase in the grain and stover yield of maize was recorded 47.20 and 24.98%, respectively over the traditional farming system.[10] Further, there was increase in yield of groundnut crop due to adoption of scientific farming system than the traditional farming system under the frontline demonstrations.[5,23,24]

Table 1: Impact of frontline demonstrations on yield of groundnut

Season & year	Technology interventions	Number of farmers	Demonst-rated area (q ha^{-1})	Average yield (q ha^{-1})		Impact (% Change)
				Control plot (q ha^{-1})	Demons-trationplot (q ha^{-1})	
Winter - 2011-12	TG-26 variety + Seed treatment +Rhizobium, PSB & Trichoderma + Earthling up operation after one month	25	10.00	14.04	22.70	+61.00
Rainy - 2013-14	TG-26 variety + Seed treatment +Rhizobium, PSB & Trichoderma + Earthling up operation after one month	13	5.00	13.90	21.30	+ 53.00
Rainy -2014-15	Konkan Gaurav variety+ Seed treatment +Rhizobium, PSB & Trichoderma before sowing	20	7.00	13.24	19.51	+ 47.00
Winter - 2014-15	Konkan Gaurav variety + Seed treatment + Rhizobium, PSB & Trichoderma before sowing	25	10.00	15.81	23.17	+ 46.00
Rainy -2015-16	Konkan Trombay Tapora + seed treatment + Rhizobium, PSB & Trichoderma before sowing	10	2.50	9.26	16.20	+ 74.00
Total		93	34.50	13.25	20.57	+ 56.20

Source: Field survey of 2011-2016)

Table 2: Impact of frontline demonstrations on yield of niger

Season & year	Technology interventions	Number of farmers	Demonst-rated area (q ha^{-1})	Average yield (q ha^{-1})		Impact (% Change)
				Control plot (q ha^{-1})	Demons-trationplot (q ha^{-1})	
Rainy - 2013-14	IGP 76 varierty + seed treatment with fungicide	13	5.00	1.80	2.75	+52.00
Rainy -2014-15	Phule Karala varierty + seed treatment with fungicide	13	5.00	2.17	3.11	+43.00
	Total	26	10.00	1.98	2.93	+47.50

Source: Field survey of 2011-2016

Data from table 2 revealed that the average yield of niger was increased from 1.80 q ha^{-1} (control plot) to 2.75 q ha^{-1} (demonstration plot) in rainy season of 2013-14. Similarly, the demonstration plots gave higher yield 3.11 q ha^{-1} over control plots average yield 2.17 q ha^{-1} in the rainy season of 2014-15. It means there was a consequent increase in the average yield of niger by 47.50% during two years. This shows a positive impact of FLDs on the yield of niger crop.

The farmers used low yielding local varieties, improper doses of fertilizers, no intercultural operation and improper plant population measures might be the reasons for low yield of control plots. However, in the case of demonstration plots, the factors leading to enhancing the yield of the crop are timely sowing, use of recommended varieties, seed treatment, and balanced nutrient management. Similar observations were noted at KVK Chitrakoot during 1998-2002 with the introduction of crop production technologies through frontline demonstrations. The increase in lentil crop yield varied from 55-65% over the traditional practices.[16] The average yield of improved varieties of lentil (Barimasur) was 10.73 q ha[1], a yield increase of about 25% in the demonstration plot1. The average increase in yield of lentil was 23.14%. The above findings of niger are in agree with the results of rice[8], in oilseed crops[19], in gram[20] and in potato reported enhancement of crop yield due to frontline demonstrations.[22,13] Intensification of crop yield by using technological interventions in FLD plots had been documented in sesame[14], onion[9] and pulses.[2]

Impact of FLDs on Adoption of Groundnut Production Technologiest

Data on adoption of groundnut production technologies by the beneficiary farmers are presented in table 3. It was found that a number of adopters for land preparation and application of FYM to groundnut were 80.64% before demonstrations, which increased to 100.00% after frontline demonstrations in adopted villages. A similar trend was also observed in the case of weed management practices as an increase in the percentage of adopters from 74.19 to 100%. The number of adopters for application of NPK (25:50:00) fertilizers and use of improved varieties of groundnut *viz.,* 'TG 26/Konkan Tapora/ Konkan Gaurav' were increased significantly during pre and post-demonstrations period from 47.31 to 97.84% and from 13.97 to 93.54%, respectively. Similarly, 90.83% of farmers adopted high yielding varieties of oilseeds such as sesame, soybean and mustard crop after FLDs activities.[17] The FLDs intervention made highly positive impact on adoption of important intercultural operations of groundnut i.e. drum rolling practice during peg formation stage (336.36%) and earthing up 30 DAS (155.0%) and seed treatment with Thiram, *Rhizobium*, PSB culture and *Trichoderma* (273.68%) in study area. Besides, the percentage of adopters for the use of recommended seed rate also increased from 36.55% before to 70.96% after frontline demonstrations in Asage and Gawane village. In this line, it was found that majority of the participant farmers in FLD program had full adoption of improved practices *viz.,* land preparation, use of high yielding varieties, sowing time, pre-sowing irrigation and application of manures and fertilizers.[15]

Table 3: Impact of frontline demonstrations on adoption of groundnut production technologies

S.No	Technology	Number of Adopters (N=93)		Change in no. of Adopters	Impact (% Change)
		Before Demonstration	After Demonstration		
1	Land preparation and application of 10 T FYM	75(80.64)	93(100.00)	+ 18	24.00
2	Improved varieties (TG 26/Konkan Tapora/ Konkan Gaurav)	13(13.97)	87(93.54)	+ 74	569.23
3	Seed rate(100-125 Kg/ha)	34(36.55)	66(70.96)	+ 32	94.12
4	Seed treatment + Rhizobium, PSB & Trichoderma	19(20.43)	71(76.34)	+ 52	273.68
5	Sowing time and spacing (30×15 cm)	67(72.04)	81(87.09)	+ 14	20.90
6	Fertilizer management NPK (25:50:00)	4(47.31)	91(97.84)	+ 47	106.82
7	Weed management(Use of Butachlor)	69(74.19)	93(100.00)	+ 24	34.78
8	Earthing up operation 30 DAS	20(21.50)	51(54.83)	+ 31	155.00
9	Drum rolling during peg formation stage	11(11.82)	58(62.36)	+ 47	336.36
10	Recommended yield	24(25.80)	71(76.34)	+ 47	195.83
			Overall impact		181.72

* Figures in parentheses indicate percentage Source: Field survey of 2016-17

However, observed that non-participating farmers had low adoption in the case of above improved practices of brown *sarson*. The mean adoption level of groundnut production technologies increased by 181.72% due to FLDs organized by the KVK in adopted villages. These results are in close conformity with the findings recorded in the case of jute crop.[4] Significant difference was observed between the adoption of FLDs beneficiary farmers and non-beneficiary farmers towards soybean production technology.[7]

Table 4: Impact of frontline demonstrations on adoption of niger production technologies

S. No.	Technology	Number of adopters (N=93)		Change in No. of Adopters	Impact (% Change)
		Before Demonstration	After Demonstration		
1	Land preparation and application of 10 tonne FYM	4(15.38)	11(42.30)	+7	175.00
2	Improved varieties(IGP 76/ Phule Karala)	00(0.00)	11(42.30)	+11	1100
3	Seed rate(3-4Kg/ha)	5(19.23)	9(34.61)	+4	80.00
4	Seed treatment	00(0.00)	4(15.38)	+4	400
5	Sowing time	8(30.76)	10(38.46)	+2	25.00
6	Spacing (30 cm)	7(26.92)	11(42.30)	+4	57.14
7	Fertilizer management	6(23.07)	9(34.61)	+3	50.00
8	Earthing up operation 30 DAS	20(21.50)	51(54.83)	+ 31	155.00
9	Weed management	3(11.53)	7(26.92)	+4	133.34
10	Recommended yield	5(19.23)	9(34.61)	+4	80.00
			Overall impact		233.38

* Figures in parentheses indicate percentage Source: Field survey of 2016-17

Impact of FLDs on Adoption of Niger Production Technologies

The FLDs made a significant impact on the adoption of recommended varieties 'IGP 76' and 'Phule Karala' of niger crop in the study area. Before the frontline demonstrations, 100% farmers in adopted villages had used 'Local' varieties, however, they shifted to improved varieties *viz.,* 'IGP 76' and 'Phule Karala' of niger crop after exposure to the demonstrations. The number of adopters for land preparation and application of FYM were raised from 15.38 to 42.30%, use of recommended seed rate from 19.23 to 34.61% and fertilizer management from 23.07 to 34.61% in demonstration cluster. In other words, FLDs made a positive impact on the adoption of seed treatment with fungicides (400%), land preparation and application of FYM (175%), weed management (133.34%), use of recommended seed rate (80%) and maintaining 30 cm plant spacing (57.14%). In all, FLDs had created 233.38% change in the adoption of recommended niger production technologies in both villages. Most of the farmers in adopted villages were marginal and small holders, cultivating niger as subsistence oilseed crop and unaware about improved oilseed technologies. But after exposure to frontline demonstrations, they were motivated to use improved varieties and realized the potential of niger as principle oilseed crop. The higher average grain yield in demonstration plots of pigeon pea over the local check was found due to adoption of improved variety such as TS3R, timely sowing, seed treatment with biofertilizers, use of balanced fertilizers, method and time of sowing, weed management and use of need-based plant protection measures.[18]

Impact of FLDs on Varietal Replacement of Oilseed Crops

The FLDs are proven extension intervention for changing existing/traditional practice of farmers. Therefore, efforts were made to know the varietal replacement in selected cluster due to FLDs and data depicted in table 5. It was found that the previously grown varieties of groundnut such as 'SB-11' and 'Local' were replaced by improved varieties *viz.,* 'Konkan Trombay Tapora', 'TG 26' and 'Konkan Gaurav' on a large scale in adopted villages. The 'Local' varieties of niger were replaced by high-yielding 'IGP 76' and 'Phule Karala' varieties in demonstration cluster. The FLDs beneficiary farmers had received a good yield in demonstration plots by the adoption of improved varieties of these oilseed crops. Therefore, they have motivated and continued the adoption of improved varieties of oilseed crops on a large scale for succeeding years. The replacement of local varieties with improved varieties of maize, paddy and wheat due to FLDs was reported.[3] The yield of soybean was increased with the intervention on varietal replacement i.e. JS-97-52 in the Umaria district.[21]

Impact of FLDs on Horizontal Spread of Different Varieties of Oilseed Crops

In the present study, efforts were made to study the impact of FLDs on the horizontal spread of different varieties of oilseed crops. It was evident from table 6 that FLDs organized on oilseed crops helped to increase the area under improved varieties in adopted villages. There was a significant increase in area from 1.00 to 7.60 ha under 'Konkan Trombay Tapora', from 2.00 to 9.00 ha under 'Konkan Gaurav' and from 4.00 to 6.00 ha under 'TG 26' variety of groundnut crop in demonstration cluster. The maximum area was expanded under 'Konkan Trombay Tapora' and 'Konkan Gaurav' varieties of groundnut. The reasons might be their agronomical attributes such as high yielding nature, semi-spreading type of varieties, less maturity duration (120 days) and especially both varieties are recommended for rainy as well as winter season in Maharashtra state. Similarly,

Table 5: Impact of frontline demonstrations on varietal replacement of oilseed crops

Sl. No	Crop	Previously grown varieties	Newly introduced varieties
1	Groundnut	SB-11, Local	Konkan Trombay Tapora, Konkan Gaurav, TG 26
2	Niger	Local	IGP 76 and Phule Karala

Source: Field survey of 2016-17

Table 6: Impact of frontline demonstrations on horizontal spread of varieties of oilseed crops in demonstration cluster

S. No.	Crop	Area (ha)		Change in Area (ha)	Impact (%Change)
		Before Demonstration	After Demonstration		
1	Groundnut				
	Konkan Trombay Tapora	1.00	7.60	+6.60	660.00
	Konkan Gaurav	2.00	9.00	+7.00	350.00
	TG 26	4.00	6.00	+2.00	50.00
2	Niger				
	IGP 76	0.40	2.00	+1.60	400.00

Source: Field survey of 2016-17

the area under niger was increased from 0.40 to 2.00 ha under 'IGP 76' variety in demonstration cluster due to FLD program. This leads to revealed that FLDs organized by KVK made a significant impact on horizontal spread of oilseed crop varieties in adopted villages.

Conclusions

The frontline demonstrations (FLDs) organized by the KVK had enhanced the yield of oilseed crops vertically and ensured rapid spread of recommended technologies of oilseed crops horizontally. The FLDs made a positive and significant impact on yield of groundnut by 56.20% and niger by 47.50%. The FLDs showed a great impact on the use of improved varieties, intercultural operation *viz.,* earthing-up & drum rolling and adoption of other recommended practices of oilseed crops under study. In a nutshell, the overall trend in adoption of groundnut production technologies was increased by 181.72% and niger crop production technologies by 233.38% in adopted villages. The 'Local' varieties of oilseed crops were replaced by improved cultivars like 'Konkan Tapora', 'Konkan Gaurav', 'TG-26' and 'IGP 76' on a large scale in demonstration cluster. The area under 'Konkan Trombay Tapora' variety of groundnut was increased from 1.00 ha to 7.60 ha and 'Konkan Gaurav' variety from 2.00 to 9.00 ha. Therefore, it can be conclude that FLDs are a proven extension intervention to demonstrate the production potential of oilseed crops varieties on farmer's field. There was a positive impact of the FLD program in enhancing the oilseed crops productivity.[11,17] Therefore, it is recommended that extension agencies engaged in transfer and application of agricultural technologies on farmers' field should give priority to organize frontline demonstrations (FLDs) on large scale by adopting cluster approach for harnessing the productivity potential of oilseed crops and to ensure rapid spread of flagship technologies developed by National Agricultural Research System (NARS). Most of the 'Low Yielding-Local Varieties' were replaced due to FLDs in adopted villages. Therefore, it is suggested that policy maker may provide adequate financial support to frontline extension system for organizing FLDs under the close supervision of agricultural scientists and extension professionals. This varietal replacement strategy through FLDs may help to increase the oilseed crops productivity at micro, meso and macro level.

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