

## RESEARCH ARTICLE

**Farmers' Characteristics Effecting the Yield Gap in Oilseed Crops****Garikamukkala Asha Latha Sri<sup>1</sup>, G.D.S. Kumar<sup>2</sup> and M.A. Khan<sup>3</sup>**

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**ABSTRACT**

*Frontline demonstrations (FLDs) are among the important technology transfer programs to illustrate the profitability and productivity potential of improved technologies. FLDs are being conducted for the past many years in oilseed crops and significant yield gaps between improved technology and farmers practice fields were reported. The yield gaps were due non-availability of critical inputs, labour intensive nature using technology, requirement of additional investment and non-remunerative prices for the crop itself apart from individual farmers' characteristics which influence his adoption behaviour. Hence, it is important to evaluate the farmers' characteristics affecting the yield gaps. The current study was carried out during the year 2021-22 in eight villages of the Prakasam and Raipur districts of Andhra Pradesh and Chhattisgarh states, respectively with objectives to evaluate the yield gaps of the FLD and non-FLD farmers and understand the farmers' characteristics affecting the yield gaps. The information was gathered from 160 randomly selected oilseeds cultivating farmers consisting of FLD and non-FLD farmers. There were significant differences in yield gaps between the FLD and non-FLD farmers. The yield gap was affected by farmers' characteristics such as education, annual income, innovativeness, social participation, mass media exposure, and extension participation.*

**Key words:** Yield gap; Frontline demonstrations; Castor; Sunflower; Sesame; Oilseeds.

**O**ilseeds are the second most important agricultural crops in the world. India ranks among the biggest producer and consumer of vegetable oils about 12% of the global surface area, contributing 7% of production with only 57% of world's productivity (FAO, 2021). In India also, oilseed crops are the second most important determinant of the agricultural economy, next only to cereals within the segment of field crops with 14.28% of gross cropped area. Grown the area under major viz., Major oilseeds groundnut, sesame, rapeseed and mustard, linseed, castor, soybean, sunflower, safflower, and niger was grown in an area of 266.7 lakh ha. The country recorded the highest ever production of 361 lakh t of oilseeds during the year 2020-21 (Directorate of Economics and Statistics, 2021). Since expanding the area planted with oilseeds is not an option, productivity gains made possible by technology adoption will be the main source of a rise in oilseed production. Oilseed crops are grown in Andhra

Pradesh on an area of 8.53 lakh hectares, featuring a production of 31.65 lakh t, in Chhattisgarh on an area of 0.79 lakh hectares, featuring a production of 0.40 lakh t (Directorate Agriculture, Chhattisgarh Raipur, 2021). The oilseed crops in these states have low productivity.

Frontline demonstrations (FLDs) a single important technology transfer programs to show the potential productivity and profitability of improved technologies. FLDs are being conducted by various AICRP and voluntary centres for the past many years in oilseed crops and significant yield gaps between improved technology and farmers practice fields were reported. It was estimated that a 31.4% yield gap was observed between national and FLDs yields Kumar et al. (2014). The yield gaps were due non-availability of critical inputs, due to the technology's labour-intensive nature, requirement of additional investment and non-remunerative prices for the crop itself apart from

individual farmers' characteristics which influence his adoption behaviour. Hence, it is important to evaluate the farmers' characteristics affecting the yield gaps. The current study was carried out during 2021–2022 in Prakasam and Raipur districts of Andhra Pradesh and Chhattisgarh states, respectively with objectives to assess the yield gaps of the FLD and non-FLD farmers and understand the farmers' characteristics affecting the yield gaps.

## METHODOLOGY

Two states, Andhra Pradesh and Chhattisgarh, where FLDs were conducted by REEDS, a voluntary centre and AICRP-safflower, Raipur centre were purposively selected for the study. Taking into account number of FLDs conducted, one district from each state and two mandals from each district were selected. From each selected mandal, two villages were selected thus, totalling eight villages altogether. Thamballapale and Burujupalle villages from Giddalur mandal, Nallaguntla and Kistampalle villages from Komarolu mandal in Prakasam district of Andhra Pradesh, and Baktara and Mungi villages from Arang block and Pachari and Math villages from Tilda blocks in Raipur district of Chhattisgarh were chosen for the research. From each selected village, 10 each of FLD and non-FLD farmers were randomly selected making a total of 160 respondents. Out of the total FLD farmers, 15.0%, 12.5%, 2.5%, and 70.0% of farmers conducted FLDs on castor, sunflower, safflower, and sesame crops, respectively. Among non-FLD farmers, 13.7%, 8.75%, 2.5%, and 75.0% farmers cultivated castor, sunflower, safflower, and sesame crops, respectively.

The yield gap was defined as the difference between yield obtained in FLD plots and farmers practice plots expressed in %. The yield gaps was calculated between FLD and non-FLD farmers, the following equation was employed:

$$\text{Yield gap} = \frac{\text{Av. yield in FLD plots} - \text{Av. yield in farmers plot}}{\text{Av. yield in farmers plot}} \times 100$$

Based on the yield gap, scores were assigned as follows:

Yield gap of 1-10%, a score of 6, 11-20%, a score of 5, 21-30%, a score of 4, 31-40%, a score of 3, 41-50%, a score of 2 and 51-60% a score of 1 were assigned.

Appropriate variables indicating farmers' social, economic and psychological characteristics were

chosen in accordance with the experts. The information was gathered using a semi-structured, a personal interview with each respondent to test the interview schedule. Frequency, percentage, mean and correlation coefficient were used to analyze the data statistically

## RESULTS AND DISCUSSION

The results of farmers' characteristics showed that majority of the FLD (66.2%) and non-FLD farmers (58.7%) were in the middle age group similar finding was reported by *Mohanty et al. (2013)*. Majority of the FLD farmers (38.8%) had an intermediate level of education and non-FLD farmers (31.2%) had secondary level of education, The same outcomes were reported by *Rathod et al. (2013)*. The majority of FLD (38.7%) and non-FLD farmers (50%) were possessing small land holdings. Similar findings were reported by *Sipai et al. (2017)*. Regarding the size of family, majority of the FLD (75%) and non-FLD farmers (61.2%) was in the medium family category. Thirty per cent each of FLD and non-FLD farmers were in Rs. 60,001 to 70,000/- and Rs.50,001 to 60,000/- annual income category, respectively. While in the case of farming experience, 30% each of FLD and non-FLD farmers had 13 to16 years of farming experience. Most of the FLD farmers (46.2%) had a high level of innovativeness, subsequently the medium (35.0%) and low (18.7%) innovativeness. Majority of non-FLD (73.7%) had a medium level of innovativeness, subsequently a high (13.7%) and low (12.5%) innovativeness. Majority of the FLD farmers (42.5%) had high level of social participation followed by medium (40.0%) and low (17.5%) social participation. Majority of non-FLD (51.2%) had medium level of social participation, subsequently low (25.0%) and high (23.7%) social participation. The majority of FLD farmers (55.0%) were in medium level of mass media exposure category subsequently a high (33.7%) and low mass media exposure (11.2%).

The majority of non-FLD farmers (73.7%) had medium level mass media exposure followed by high (13.7%) and low (12.5%) mass media exposure. Majority of FLD farmers (60.0%) had a medium level extension participation, followed by a high (31.2%) and low (8.75%) extension participation, whereas majority of non-FLD farmers (58.7%) had medium level of extension participation, followed by low (28.7%) and high (12.5%) extension participation. These results are consistent with those of *Chouhan*

**Table 1. Characteristics of FLD and non-FLD farmers**

Farmers' characteristics	Category	FLD	non-FLD
		(n=80)	(n=80)
		No. (%)	No. (%)
Age	Young (up to 35 years)	11 (13.7)	15 (18.7)
	Middle (36-55 years)	53 (66.2)	47 (58.7)
	Old (above 55 years)	16 (20.0)	18 (22.5)
Education	Illiterate	9 (11.2)	15 (18.7)
	Primary school	15 (18.7)	12 (15.0)
	Secondary school	15 (18.7)	25 (31.2)
	Intermediate	31 (38.7)	16 (20.0)
	Graduation	10 (12.5)	11 (13.2)
	Post graduate	0 (0)	1 (1.25)
Land holding	Marginal (< 1 ha)	8 (10.0)	11(13.7)
	Small (1-2 ha)	31 (38.7)	40 (50.0)
	Semi-medium (2-4 ha)	29 (36.2)	19 (23.7)
	Medium (4-10 ha)	11 (13.75)	9 (11.2)
Size of family members	Small (1-3)	16 (20.0)	19 (23.7)
	Medium (4-6)	60 (75.0)	49 (61.2)
	Large (>7)	4 (5.00)	12 (15.0)
Annual income	Up to Rs. 50,000	7 (8.75)	14 (17.5)
	Rs. 50,001- 60,000	17 (21.2)	24 (30.0)
	Rs. 60,001- 70,000	24 (30.0)	18 (22.5)
	Rs. 70,001- 80,000	13 (16.2)	14 (17.5)
	Rs. 80,001- 90,000	7 (8.7)	5 (6.25)
	Rs. 90,001>1 lac	12 (15.0)	5 (6.25)
Farming experience	Up to 3 years	4 (5.0)	3 (3.75)
	4-8 years	13 (16.2)	18 (22.5)
	9-12 years	12 (15.0)	15 (18.7)
	13-16 years	24 (30.0)	24 (30.0)
	17-20 years	9 (11.2)	4 (5.0)
Innovativeness	>20 years	18 (22.5)	16 (20.0)
	Low	15 (18.7)	11 (13.7)
	Medium	28 (35.0)	59 (73.7)
Social participation	High	37 (46.2)	10 (12.5)
	Low	14 (17.5)	20 (25.0)
	Medium	32 (40.0)	41 (51.2)
Mass media exposure	High	34 (42.5)	19 (23.7)
	Low	9 (11.2)	10 (12.5)
	Medium	44 (55.0)	59 (73.7)
Extension Participation	High	27 (33.7)	11 (13.7)
	Low	7 (8.75)	23 (28.7)
	Medium	48 (60.0)	47 (58.7)
Farmers perception on FLDs	High	25 (31.2)	10 (12.5)
	Low	18 (22.5)	15 (18.7)
	Medium	43 (53.7)	51 (63.7)
	High	19 (23.7)	14 (17.5)

et al. (2013). Regarding the perception on conduct of FLDs, majority of the FLD farmers (53.7%) had medium level perception, followed by high (23.7%) and low (22.5%) perception and whereas in non-FLD farmers majority (63.7%) of them had medium level of perception followed by low (18.7%) and high (17.5%) perception.

Data from Table 2 showed that the majority of FLD farmers (48.7%) had a yield gap of 21-30 per cent and non-FLD farmers had a yield gap of 31-40 per cent. Almost 30 per cent of non-FLD farmers were in high yield gap category (41-60%), where as a meagre 2.4% of FLD farmers were in high yield gap category indicating the effects of FLDs in reducing the yield gaps at field level.

**Table 2. Distribution of the respondents according to their yield gap**

Yield Gap (%)	FLD farmers	non-FLD farmers
	(n=80)	(n=80)
		No. (%)
1-10	3 (3.7)	2 (2.5)
11-20	28 (35.0)	7 (8.7)
21-30	39 (48.7)	19 (23.7)
31-40	8 (10.0)	28 (35.0)
41-50	1 (1.2)	7 (8.7)
51-60	1 (1.2)	7 (21.2)

*Relationship between farmers' characteristics and the yield gaps* : It is clear from Table 3 that the correlation coefficient (r) between farmers' characteristics of FLD and non-FLD farmers and yield gap regarding oilseed crop production technology revealed that FLD farmers age, education, land holding, annual income, innovativeness, social participation, mass media exposure, extension participation was negative and significant. Similar outcomes were reported by Sunil (2007). Among non-FLD farmers, education, annual income, innovativeness, social participation, mass media exposure, extension participation, farmers' perception on conduct of FLDs were negatively and significantly related to yield gap. The psychological characteristics of farmers such as innovativeness, social participation, mass media exposure and extension participation were important for reducing the yield gaps and realizing higher yields of oilseed crops. Identifying farmers with these characteristics and nurturing them in developing these characteristics through various modes will result in realizing higher yields and reducing the yield gaps.

**Table 3. Relationship between farmers characteristics with the yield gap**

Profile characteristics	Correlation coefficient (r)	
	FLD (n= 80)	non-FLD (n= 80)
Age	-0.294**	-0.194 <sup>NS</sup>
Education	-0.572**	-0.330**
Land holding	-0.470**	0.208 <sup>NS</sup>
Size of family	0.036 <sup>NS</sup>	-0.087 <sup>NS</sup>
Annual income	-0.495**	-0.501**
Farming experience	-0.210 <sup>NS</sup>	-0.210 <sup>NS</sup>
Innovativeness	-0.579**	-0.512**
Social participation	-0.650**	-0.460**
Mass media exposure	-0.339**	-0.439**
Extension participation	-0.362**	-0.283*
Farmers perception on FLDs	-0.193 <sup>NS</sup>	-0.290**

\*\*r is significant at the 0.01 level;

\*r is significant at the 0.05 level (2-tailed).

## CONCLUSION

The study brought out that non FLD farmers had higher yield gaps compared to FLD farmers and the personal, social and psychological characteristics were correlated negatively with yield gaps. The most important characteristic identified were education, innovativeness and social participation, which influenced the yield gaps in oilseed crops. Hence, efforts need to be intensified in improving these characteristics of the farmers and encourages them to adopt recommended production technology for reducing the yield gap.

## CONFLICT OF INTEREST

Authors have no conflict of interest.

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