

## Impact of Cluster Front Line Demonstration on Oilseed Crops in Chatra District of Jharkhand

Ranjay Kumar Singh, Dharma Oraon, Kumar Priya Ranjan,  
U. K. Singh, Z. Alam, J. Oraon

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**Abstract** The study was conducted in 4 purposively selected blocks (Chatra, Gidhour, Simariya, and Pratappur) in Chatra district of Jharkhand where Cluster Frontline Demonstration on oilseed conducted in the year 2016-17 and 2017-18. Covering two villages in each blocks i.e. 8 villages in the district. In demonstrating farmers, 150 numbered of farmers i.e. 30 farmers for each crops Sesame, Groundnut, Niger, Linseed and Mustard selected as a respondent in the study. The demonstration consisting of two treatments one is control (farmers practices) and another, demonstration of improved varieties with full recommended package of practices. The cluster front line demonstration (CFLD) was conducted in 233 farmers field in 2016-17 and 2017-18 respectively, covering 90 ha and 200 ha crops area of different oil seed crops, like Sesame, Groundnut, Niger, Linseed and Mustard respectively. The demonstration was conducted on randomized block design with 0.5 acre plot size for 1 deconstruction. The productivity and economic return of Sesame, Groundnut, Niger, Linseed and Mustard in improved technologies were calculated and compared with the corresponding

farmers practices (Local checks). All oil seed crops recorded higher gross return, net return and benefit cost ratio in improved technologies as compared to the farmers practice. It is suggested that improved varieties and critical input like micro nutrient make available on local level, so that farmers get easily according to their needs, appropriate extension methodology for faster dissemination and diffusion of technologies in the district.

**Keywords** KVK, CFLD, *Kharif*, *Rabi*, Technology index.

### Introduction

Krishi Vigyan Kendra (KVKs) are the last mile public sector unit of frontline extension delivery mechanism at the district level established by ICAR. These agriculture science center to further technology dissemination under national agricultural research system (NARS) at the grass roots. The network of KVK works towards a common aim of conducting technology assessment, refinement and demonstration through various activities. The KVKs also play a critical role in knowledge, skill and technological empowerment of farmers based on their local needs challenges and requirement. The KVKs refine and spread agriculture technologies between farmers of the district to improved production and productivity as per the local needs. Oilseed crops is one of the important crops of the Jharkhand, it is grown in about 278.14 lakh ha area. It is also important crops of the Chatra District and it covers about 1,660 ha in *kharif* and 17,030 ha in *rabi* season. Oilseed crops is best

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Ranjay Kumar Singh<sup>1\*</sup>, Dharma Oraon<sup>2</sup>, U. K. Singh<sup>4</sup>, Z. Alam<sup>5</sup>  
Krishi Vigyan Kendra, Chatra, BAU, Ranchi (Jharkhand), India

Kumar Priya Ranjan<sup>3</sup>  
DNS, Regional Institute of Cooperative Management, Shastri  
Nagar, Patna 23, India

J. Oraon<sup>6</sup>  
Director Extension Education, BAU, Ranchi, Jharkhand, India  
e-mail: kvkchatra2012@gmail.com

\*Corresponding author

**Table 1.** Area production and productivity of oilseed crops cultivated in the district 2017-18.

Crop	Area (ha)	Production (quintals)	Productivity (q/ha)
<i>Kharif</i>			
Sesame	326	834.56	3.5
Groundnut	370	3792.5	9.8
Niger	172	1722.71	3.25
<i>Rabi</i>			
Linseed	1640	4920	3.1
Mustard	12580	116365	9.25

suited to areas having low to moderate rainfall and mild cold weather.

Indian Government imports large quality of oilseed to fulfill domestic requirement. In this regards, to balance this production and consumption of edible oil, the department of agriculture, cooperation

and farmers welfare government of India had sanctioned the project, Cluster Front Line Demonstration (CFLD) on oilseed in every KVKs of India. Similarly this project was implemented by KVK Chatra with objective to boost the production and productivity of oilseed through appropriate improved varieties and location specific tested technologies.

## Materials and Methods

There are 3 major oilseed crops grown in the district in *kharif* and 2 in *rabi* season in Chatra District of Jharkhand.

Table 1 shows the area total production and productivity of oilseed crops in the district during 2017-18. The district, block and villages was purposively selected for the study because cluster front line demonstration (CFLD) conducted by the Krishi Vigyan Kendra to transfer improved production technologies in farmers field.

The data on production cost and monetary returns

**Table 2.** Detail area coverage and number of farmers covered under Cluster Front Line Demonstration within two years under oil seed crops.

Crop	Farmers practice	Technology demonstrated	2016-17		2017-18		Total	
			Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. farmers
Sesame	Farmers variety (Kala til) with farmers management	Improved variety (GT-2). ( $N_{40}P_{40}K_{20}$ ), line sowing	10	25	10	15	20	40
Groundnut	Farmers variety (.....) farmers management	Improved variety (TG-37A) with ( $N_{60}P_{40}K_{20}$ ), and line sowing (30×10 cm)	20	35	20	38	40	73
Niger	Farmers variety (Kala Sarguja) with farmers management	Improved variety (JNC)-6 with ( $N_{40}P_{40}K_{20}$ ), and line sowing (30 × 15 cm)	30	58	15	36	45	94
Linseed	Farmers variety (Desi tisi) under para cropping	Improved variety –Shekhar with seed treatment with Carbendazim 50, INM ( $N_{30}P_{20}K_{20}$ ) kg/ha and IPM	20	55	15	42	35	97
Mustard	Farmers variety (Pila Rai) local varieties under farmers management	Improved variety–PM-30) with seed treatment with Azotobactor IPM & INM ( $N_{80}P_{60}K_{40}$ ) kg/ha	30	60	30	67	60	127
Total			110	233	90	198	200	431

**Table 3.** Productivity of oil seed crops, yield gaps and technology index (Average over year).

Crop	Number of demonstration	Area	Yield (q/ha)		Local check	Percentage increase over local	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
			Potential	Demonstration					
Sesame	20	40	6	4.63	2.56	80.85	1.37	0.07	22.83
Groundnut	40	73	19	17.36	10.25	69.36	1.64	7.11	8.63
Niger	45	94	6	4.94	2.71	82.28	1.06	2.23	17.66
Linseed	35	97	7	4.92	3	64	2.08	1.92	29.71
Mustard	60	127	16	14.31	9.25	54.70	1.69	5.06	10.56

was collected for two years (2016-17 and 2017-18) from Cluster Front Line Demonstration (CFLD) plots to work out the economic feasibility of improved and scientific cultivation of oilseed crops over the local checks. The technology gap extension gaps and technology index were calculated as given by Samui et al. (2000) as :

1. Technology gap= Potential yield–Demonstration yield
2. Extension gap = Demonstration yield–Yield from farmers practice (Local check)
3. Technology index =  $\frac{\text{Potential yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$

## Results and Discussion

Cluster Frontline Demonstration on Oilseed crops conducted by KVK, Chatra are given in Table 2. In each crops under Cluster Front Line Demonstration, the improved varieties which found suitable and given better result under on farm trails (OFT) in local bio-physical and socio economic condition in Chatra District will be selected for demonstration with recommended package of practices. Technologies which are demonstrated under Cluster Front Line Demonstration (CFLD) is given in Table 2.

During demonstration period study revealed that in cluster front line demonstration improved technologies increases productivity over local checks Table 3 revealed that improved technologies found higher productivity of Sesame, Groundnut, Niger, Linseed

and Mustard. 4.63 q/ha, 17.36 q/ha, 4.94 q/ha, 4.92 q/ha and 14.31 q/ha respectively compare to farmers practices (Local check) 2.56 q/ha, 10.25 q/ha, 2.71 q/ha 3.00 q/ha and 9.25 q/ha respectively. The increasing in productivity of Sesame, Groundnut, Niger, Linseed and Mustard over respectively local checks were 80.85%, 69.36%, 82.28%, 64.00% and 54.70% respectively. Higher productivity of different oilseed crops was found in Cluster Front Line Demonstration (CFLD) due to demonstration of improved varieties with full package of practices, Similar finding was also reported by Haque (2000), Jeengar et al. (2006), Balai et al. (2013). The year wise slight fluctuation in yield on demonstration was observed only due to farmers wise variation on skill and management practices.

Yield of the Cluster Front Line Demonstration and potential yield of the oilseed crops was compared to estimate the yield gaps which were further categorized into technology and extension gaps. The technology gap shows the gap in the demonstration yield over potential yield and it was highest in linseed (2.08 q/ha) comparison to Sesame, Groundnut, Niger and Mustard (1.35 q/ha) (1.64 q/ha) Niger (1.06 q/ha) and Mustard (1.69 q/ha) respectively. The technology gap was observed due to uncontrolled condition in demonstration plot. Farmers are not following the same practices which are recommended even sowing time, application of nutrient, irrigation schedule, weeding. Further higher extension gap 7.11 q/ha was recorded in Groundnut, after Mustard (5.06 q/ha) and Niger (2.23 q/ha), Sesame (2.07 q/ha) and Linseed (1.92 q/ha) respectively. It is also due to unawareness

**Table 4.** Economics of oilseeds crops production under Cluster Front Line Demonstration and farmers practices.

Sl. No.	Particular		2016-17					2017-18				
			Se-same	Gro-und-nut	Ni-ger	Lin-seed	Mus-tard	Se-same	Gro-und-nut	Ni-ger	Lin-seed	Mus-tard
1	Yield	DP	4.48	18.09	4.78	4.73	14.62	4.78	16.64	5.1	5.12	14
		FP	2.5	16	2.5	3	9	2.63	1.5	2.92	3	9.5
2	Cost of cultivation (Rs/ha)	DP	4200	35000	4200	4200	17000	4200	35000	4200	4200	17000
		FP	32600	20500	3600	3600	14600	3600	20500	3600	3600	14600
3	Additional cost of cultivation over local (Rs/ha)	DP	600	14500	600	600	2400	600	5500	600	600	2400
4	Gross return (Rs/ha)	DP	17920	54270	11950	11825	36550	19120	49920	12750	12800	35000
		FP	10000	30000	6250	7500	22500	10520	31500	7300	7500	23750
5	Net returns (Rs/ha)	DP	13720	19270	7750	7625	19550	14920	14920	8550	8600	18000
		FP	6400	9500	2650	3900	7900	6920	11000	3700	3900	9150
6	Additional net return over local (Rs/ha)	DP	7320	9770	5100	3725	11650	8000	3920	4850	4700	8850
7	BC ratio	DP	4.26	1.55	2.84	2.81	2.15	4.55	1.42	3.03	3.04	2.05
		FP	2.77	1.46	1.73	2.08	1.54	2.92	1.53	2.02	2.08	1.62

**Table 4.** Continued.

Sl. No.	Particular		Sesame	Groundnut	Over all Niger	Linseed	Mustard
1	Yield	DP	4.63	17.36	4.94	4.92	14.31
		FP	2.56	10.25	2.71	3	9.25
2	Cost of cultivation (Rs/ha)	DP	4200	35000	4200	4200	17000
		FP	3600	20500	3600	3600	14600
3	Additional cost of cultivation over local (Rs/ha)	DP	600	5500	600	600	2400
4	Gross return (Rs/ha)	DP	18520	52095	12350	IE + 06	35775
		FP	10260	30750	6775	7500	23125
5	Net returns (Rs/ha)	DP	14320	17095	8150	8112	18775
		FP	6660	10250	3175	3900	8525
6	Additional net return over local (Rs/ha)	DP	7660	6845	4975	4212	10250
7	BC ratio	DP	4.4	1.48	2.93	2.92	2.1
		FP	2.84	1.49	1.87	2.08	1.58

of improved technology of oilseed crops of farmers, it is also observed that the improved varieties, micronutrient, are not available in local market. Table 3 indicates that the technology index was minimum

(8.63%) compare to Mustard (10.56%) and Niger (17.66%), Sesame (22.83%) and Linseed (29.71%) respectively. Technology index shows the suitability of technologies in farmer's micro farming and eco-

conomic situation and lower value of technology index shows more suitability of the technologies (Jeengar et al. 2006).

The input and outputs prices of commodities prevailed during each year of demonstrations were taken for calculating cost of cultivation.

Table 4 further shows that average yield of two years of different oilseed crops under Cluster Frontline Demonstration is Sesame (4.68 q/ha), Groundnut (17.36 q/ha), Niger (4.94 q/ha), Linseed (4.92 q/ha) and Mustard (14.31 q/ha) compared to farmers practices (Local check) 2.56 q/ha, 10.25 q/ha, 2.71 q/ha, and 9.25 q/ha respectively. This increase over productivity over farmers practices (Local check) was 80.85%, 69.36%, 82.28%, 64.00% and 54.70% respectively of Sesame, Groundnut, Niger, Linseed and Mustard crops respectively.

Table 4 shows that economic analysis of the data cover two years groundnut under frontline demonstration recorded higher gross returns (Rs 52,095/ha) net return (Rs 17,095/ha) and BC ratio (1.55) as compare to the local check where farmers got gross returns, Net returns and BC ratio of (Rs 30,750/ha), (Rs 10,250/ha) and (1.46) respectively. Sesame also recorded higher gross returns (Rs 18,520/ha) net return (Rs 14,320/ha) and BC ratio (4.40) as compare to the local check where farmers got gross return (Rs 10,260/ha), Net return (Rs 6,660/ha) and BC ratio (2.84) respectively. Niger also recorded higher gross return Rs 12,350/ha, net return Rs 8,150/ha and BC ratio of 2.93 in improved technologies as compared to the local check where farmers get gross return, net return and BC ratio of Rs 6,775, Rs 3,175 and 1.87 respectively. Similarly linseed recorded higher gross return Rs 12,312.50/ha net return Rs 8,112/ha and BC ratio of 2.92 in Cluster Front Line Demonstration as compare to farmers practices gross return, Net return and BC ratio of Rs 7,500/ha, Rs 3,900/ha and 2.08 respectively. In case of Mustard highest gross return

of (Rs 35,775/ha), Net return Rs 18,775/ha and BC ratio 2.1 as compare to farmers practice gross return, net return and BC ratio Rs 23,125/ha, 8,525 and 1.58 respectively. This finding supported with the finding of Tomar (2010) and Mokidue et al. (2011).

## Conclusion

Result shows that the grain yield of different oilseed crops i.e. Sesame, Groundnut Niger, Linseed and Mustard under Cluster Demonstration was increasing up to 80.85, 69.36, 82.28, 64.00 and 54.70% respectively compare to control farmers practice. It is due to demonstration of improved and high yielding varieties with full package of practices. The technological and extension gap was also minimized due to combination of appropriate technologies extension methodologies with strategy and extension services. Net income and cost benefit ratio was also increased in demonstration plot due to improved package of practices and reducing cost of cultivation of oilseed crops.

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