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Research Article

ASSESSMENT OF HIGH YIELDING VARIETIES AND AGRO-TECHNIQUES OF LINSEED THROUGH FRONT LINE DEMONSTRATION

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Abstract: Front Line Demonstration (FLD) on high yielding variety and improved agro-techniques of linseed was conducted by Krishi Vigyan Kendra Bastar, Chhattisgarh, India during *rabi* season of 2015 and 2016 in 3 villages of 3 blocks *viz*. Jagdalpur, Bastar and Tokapal. The improved agro technology of linseed was demonstrated in an area of 0.4 ha of 55 farmers and 0.8 ha of 10 farmers. In total 30 ha of area were covered during two years of demonstration. Yield of linseed under improved practice was 6.0 and 6.3 q/ha, whereas under farmers practice yield was 3.9 and 4.6 q/ha during 2015 and 2016 respectively. Innovative practices increased the gross returns by 53.85 and 36.96%, net returns by 62.71 and 54.39% and B: C ratio by 4.22 and 10.73% during 2015 and 2016 respectively compared to farmer's practice.

Keywords: B:C Ratio, Farmers Practice, FLD, Improved Practice and Linseed

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Introduction

In India linseed is grown in an area of 3.3 lakh hectare with annual production of 1.7 million tons, with an average yield of 523 kg/ha [1]. In the global rating, India is at the third position for the production of oilseed. The area of linseed in Chhattisgarh is 0.49 lakh hectare, production 0.19 lakh million tonnes and productivity (387.36 kg/ha). Linseed (*Linum usitatisimum* L.) is a conventional oilseed as well as a fiber crop [2]. Linseed has numerous medicinal uses. It is worldwide cultivated commercially for flax, while in India it is cultivated for oil. Linseed oil is used in the manufacturing of paints and varnish oil cloth and linoleum [3]. Every part of linseed plant is utilized commercially, either directly or after processing. Seed contains 33 to 47 per cent oil. A small quantity is directly used for edible purposes. Linseed oil, squeezed out of flax seed, used as a preservative finish on wood. Linseed oil is a drying oil, as it can polymerize into a solid form. Seeds of linseed contain high levels of dietary fibers as well as lignans, an abundance of micronutrients and omega-3 fatty acids. The oil is rich in linolenic acid (>66%) and is a perfect drying oil. The nutritive value of flax seed per 100 gram is carbohydrates 28.88 g, sugars 1.55 g, fat 42.16 g, protein 18.29 g and dietary fibers 27.39 g [4]. The main objective of Front line demonstration is to demonstrate the productivity potential of improved varieties and profitability of latest production technologies on real farm situations vis-a-vis farmers' practice to have an incremental change in net returns. More than 90 % of area under linseed is rainfed, where bold seeded and deep rooted varieties are reported. Small seed with the shallow rooted varieties are to be preferred under irrigated conditions. Frequent light irrigations are ideal and economical than heavy irrigations at longer intervals. Linseed responds well to irrigations. Irrigations at critical stages like flowering and seed development is essential under moisture stress condition. Linseed requires moderate to cool temperature during crop period. The cultivation of linseed is restricted mostly to marginal and sub-marginal land under restricted supply of fertilizer and irrigation, resulting in low crop yield [5]. Among the agro-techniques that can increase its productivity, judicious application of nutrients, particularly of nitrogen, phosphorus, potash and sulphur rank the highest [6]. The newly and innovative technology having higher production potential under the specific system can be popularized through FLD programme. The present study has been undertaken to evaluate the difference between demonstrated technologies vis-à-vis practices followed by the local farmers in linseed crop.

Material and Methods

The Front line demonstration were carried out in linseed with different location of Bastar district of Chhattisgarh, India to evaluate the difference between demonstrated technologies vis-a-vis practices followed by the local farmers in linseed crop at randomly selected villages of Bastar during *rabi* 2015 and 2016. The selected farmers of the demonstration area were of small and marginal in nature. Front line demonstration of linseed variety, *Indiravati Alsi (RLC 92)* was conducted in 30 ha area. 65 farmers were selected from different villages. The soil samples from each adopted farmer were analyzed. It was found to be sandy to clay-loam in texture with pH 5.9, medium in organic C high in available nitrogen and medium in available phosphorus. No. of capsules/plant, plant height at maturity (cm) was measured and branches (No.) were counted. The purpose of this FLD'S was to know the yield gap between improved practice and farmers practice, to determine the difference in their yield attributing characters, to find out the extension gap and to know reasons for low yield and specific constraints with the practicing farmers.

Formula used are-

Percent increase in yield (Yield gap) =

100 × (Yield of Improved Practice-Yield of Farmers Practice) / Yield of Farmers Practice

Benefit-cost ratio=Gross return/Gross cost

Technology gap = Potential yield-Demonstration yield

Extension gap = Demonstration yield-Yield under existing practice

Fig-1 Linseed crop sown in line

Fig-2 Linseed crop at Bastar block

Fig-3 Visit of monitoring team

Fig-4 Field Day Celebration under FLD

Table-1 *Particulars showing the details of linseed grown under FLD and existing farmers practice*

SN	Operation	Existing practice	Improved practice demonstrated
1	Use of seed	Local seed	Improved variety *Indiravati Alsi (RLC 92)* Released by IGKV, Raipur in 2008
2	Sowing method	Broadcasting	Line sowing by seed cum fertilizer drill with inter-row spacing of spacing 30 cm
3	Problem / Characteristics identified	Local varieties used by the farmers have low yield potential, they are prone to powdery mildew attack	Test variety is responsive to fertilizer, non lodging type and resistant to shattering. Suitable for early, normal and late sown conditions. Resistant to Rust, Wilt & powdery mildew and medium resistant to Alternaria blight and Bud fly.
4	Seed treatment	No seed treatment	Seed treatment with Carbendazim @ 3 g/kg seed and *Trichoderma harzianum* @ 4-6 g/kg seed
5	Fertilizer application	Imbalanced use of fertilizers	Balanced fertilization on the basis of soil testing

Table-2 *Mean values of growth and yield attributing characters under improved and farmers practice*

SN	Characters	Improved practice	Farmers practice	% increase
1	Plant height at maturity (cm)	57.29	52	10.17
2	No. of branches/plant	15.3	11	39.09
3	No. of capsules/plant	62	43	44.19

Table-3 *Technological impact of improved variety and agro-techniques on yield of linseed*

Crop season	Variety	No. of FLD	Area (ha.)	Yield (q/ha.)		Yield gap (%)	Extension gap (q/ha)	Technology gap (q/ha)
				Improved practice	Farmers practice			
Rabi, 2015	*Indiravati Alsi (RLC 92)*	20	10	6	3.9	53.85	2.1	8
Rabi, 2016	*Indiravati Alsi (RLC 92)*	45	20	6.3	4.6	36.96	1.7	7.7
Mean		32.5	15	6.15	4.25	44.71	1.9	7.85

Table-4 *Economic performance of improved practices over farmers practices*

Crop season	Cost of cultivation (Rs./ha)		Gross returns (Rs./ha)		Net returns (Rs./ha)		Benefit: cost ratio	
	IP	FP	IP	FP	IP	FP	IP	FP
Rabi, 2015	15992	10806	27600	17940	11608	7134	1.73	1.66
Rabi, 2016	14804	11978	28980	21160	14176	9182	1.96	1.77
Mean	15398	11392	28290	19550	12892	8158	1.84	1.72

Where, IP = Improved Practices (Use of improved seeds, seed treatment with carbendazim @ 3 g/kg seed and *Trichoderma harzianum* @ 4-6 g/kg seed, line sowing by seed cum fertilizer drill, maintaining inter-row spacing of 30 cm and balanced use of fertilizer on the basis of soil testing) FP = Farmers Practices

Results and Discussion

The data presented in [Table-2] shows the comparison between improved practice and farmers practice in the mean values of growth yield attributing characteristics of two year (*Rabi*; 2015 and 2016). The data reveals that plant height at maturity; number of branches/plant and number of capsules/plant were higher by 10.17, 39.09 and 44.19% respectively compared to farmers practice. Yield of linseed under improved practice was 6.0 and 6.3 q/ha, whereas yield under farmers practice was 3.9 and 4.6 q/ha during 2015 and 2016 respectively [Table-3].

The yield enhancement due to technological intervention was 53.85% and 36.96% during 2015 and 2016 respectively over farmers practice. Grain yield was found positively correlated with yield-attributing traits. Use of improved variety, seed treatment before line sowing, soil test based optimal supply of nutrients and other agro-techniques might have helped in better crop growth and portioning of photosynthates. Data pertaining to economics of linseed are presented in [Table-4]. Higher gross returns (Rs. 27600 and 28980/ha), net returns (Rs. 11608 and 14176 /ha) and returns per rupee invested (1.73 and 1.96) were recorded with technological intervention during 2015 and 2016, respectively. Innovative practices increased the gross returns by 53.85 and 36.96%, net returns by 62.71 and 54.39% and B: C ratio by 4.22 and 10.73% during 2015 and 2016 respectively compared to farmer's practice. The higher profitability under innovative practices was attributed to higher values of yield attributes and grain yield of linseed compared to farmers practice. Costs of cultivation were higher under innovative practice during both the year owing to sowing by seed drill, costs of improved seed and fungicides used for seed treatment. Higher growth and yield attributes, grain yield and economics of linseed with response to line seeding, seed treatment, balanced fertilization and other agro-techniques has also been advocated [7, 8].

Conclusion

This investigation revealed that potential yield can be achieved by imparting scientific knowledge to the farmers, providing the need-based quality inputs and proper application of inputs.

Application of research: Horizontal spread of improved technologies may be achieved by the successful implementation of frontline demonstration and various extensions activities like training programme, field day, exposure visit organized in FLDS programmes in the farmers's fields. For wide dissemination of technologies recommended by SAUS and other research institute, a greater number of FLDS should be conducted.

Research Category: Agronomy

Abbreviations: FLDs- Front Line Demonstrations
CFLDS- Cluster Front Line Demonstrations

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