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Assessment and impact of front line demonstration on production and productivity of niger (*Guizotia abyssinica* L.f Cass) district Chhindwara in Madhya Pradesh

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Abstract

The present study was conducted to investigate the costs involved and returns obtained from the cultivation of niger and compare the performance of niger variety JNS-28 with the local variety of farmer in the district Chhindwara. The demonstration were conducted by Zonal Agricultural Research Station at the farmers fields of many villages during the kharif season from 2018-2021 in district Chhindwara of Madhya Pradesh. The average yield of FLD was 549.6 Kg/ha as compared to farmers practices 259.4 Kg/ha. The average yield increased 112.7 per cent over farmers practices during the four years. The average of extension gap 290.2 Kg/ha has been found during this period while the average highest extension gap 319.0 Kg/ha was recorded during the year 2021-22. The average technology gap was 100.3 Kg/ha during the four years, while it was highest 143 Kg/ha during the year 2018-19. The minimum technology gap has been recorded 71 Kg/ha during the year 2021-22. The technology index for all the demonstrations during different year were in accordance with technology gap. The highest technology index per cent of 22.0 was recorded in the year 2018-19 and the lowest was observed in the year 2021-22 which is 10.9 per cent. The average higher net return of Rs. 25263.2/ha as compared to farmers practices Rs. 11257/ha. The average B:C ratio of niger under improved technology was 3.0 as compared to 2.4 under farmers practices.

The farmers of the Chhindwara have been motivated by the improved agriculture technologies applied in the FLD these findings are in corroboration with the finding of many others.

Keywords: Front line demonstration, niger

Introduction

Niger (*Guizotia abyssinica* L.f Cass) is an important minor oilseed crop grown in Tropical and Subtropical countries like India, Ethiopia, East Africa, West Indies and Zimbabwe. India ranks first in area, production and export of niger in the world. Niger seeds contain about 40% edible oil with fatty acid composition of 70-80% linoleic acid, 7-8% palmitic and steric acids, and 5-8% oleic acid⁴. Niger is an important oil seed crop, the seed which is pale yellow with nutty taste and pleasant odour. Its keeping quality poor due to high content of unsaturated fatty acids. The oil of niger crop is very deficient in India. It is suitable for rainfed condition. The crop is cultivated by poor farmers in the interiors of villages in scattered fields, the extension agencies could not work efficiently in providing the necessary package of practices to the farmers besides quality seed and required inputs. The front lines demonstration on farmers field are helpful to show the potential of full package of practices and the component technologies has been an efficient method of technology transfer to farmers (DOR, 2013).

The main objective of FLD'S is to show the production potential and profitability of improved technologies via farmers practices under real farm situation. Hence, this is a challenging task for the scientist and farmers under such condition it is quite imperative that reasons for the technological gap in niger should be identified and studied critically in order to face the existing challenge of low productivity. In this context the present study has been undertaken to evaluate the difference between demonstrated technologies vis a vis practices followed by the local farmers in niger crop.

Materials and Methods

The present study was conducted to investigate the costs involved and returns obtained from the cultivation of niger and compare the performance of niger variety JNS-28 with the local

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variety of farmer in the district Chhindwara. Front Line Demonstration on niger was carried out under All India Coordinated Research Project on Niger, Zonal Agricultural Research Station, Chhindwara, at the farmers fields of Blocks and Villages like, Tamia, Junnardev, Amarwada, Harrai etc and Murmari, Mehatersa, Amarwah, Jogimuar, Umruwah, Tendinidhana etc. during the kharif season from 2018-19 to 2021-22 in district Chhindwara of Madhya Pradesh. During four years of study, an area of 40 ha. Was covered under front line demonstration with active participation of total 100 farmers. (Table: 1).

Table 1: Detail of Front Line Demonstration conducted during 2018-2021

S.No	Year	No. of farmer	Conducted FLD	Area (ha.)
1	2018-19	25	25	10
2	2019-20	25	25	10
3	2020-21	25	25	10
4	2021-22	25	25	10
Total		100	100	40

Before conducting FLD's a list of farmers was prepared from group meeting and specific skill training was imparted to the

selected farmers regarding different aspects of cultivation. The demonstration of improved technologies was taken in an area of 0.4 ha of each farmers. In each demonstration one control plot was kept where farmers practices were carried out. The critical inputs such as seed and fertilizers were supplied to the farmers free of cost for demonstration purpose. Niger variety JNS-28 was demonstrated on total area of 40 ha. Similarly, equal numbers of control plots were also laid. In FLD's emphasis was given on use of improved agronomical practices including proper seed rate, seed treatment, blanced fertilizer and plant protection etc. the data were collected from both FLD plots as well as plots of farmers using their traditional practices. Finally the extension gap, technology gap along with the benefit cost ratio were worked out. The technology gap, extension gap and technology index were calculated using the following formula.

Extension gap = Demonstration yield - farmers practices yield.

Technology gap = Potential yield of variety – Demonstration yield.

Technology index (%) = Technology gap x 100/Potential yield.

Table 2: Details of package of practices followed under FLD vs. Farmers Practices.

Particulars	Front Line Demonstration	Farmers Practices
Varieties	JNS-9, JNS-28	Local Variety
Sowing time	IInd week of July to IInd week of Aug	-
Sowing method	Line Sowing (Spacing=30 x 10 cm)	Broadcast Method.
Seed treatment	Seed traetment with fungicide Carbendezim 5 g/Kg or Trichoderma viride 10 g/Kg of seed before sowing	No seed treatment.
Weed management	By hand hoe/bullock drawn blade at an interval of 15 days commencing from 15-20 DAS.	-
Thinning	Thinning should be done 15 DAS for maintaining plant population.	-

Result & Discussion

The average yield of FLD was 549.6 Kg/ha as compared to farmers practices 259.4 Kg/ha. The average yield increased 112.7 per cent over farmers practices during the four years. The average highest yield has been recorded 579 Kg/ha. during 2021-22 year, while the average yield was 273 Kg/ha in farmers practices during the year 2018-19. The farmers of the district have been motivated by the improved agriculture technologies applied in the FLD these findings are in corroboration with the finding of many others.

Extension Gap: The average extension gap 290.2 Kg/ha has been found during this period while the average highest extension gap 319.0 Kg/ha was recorded during the year 2021-22. This emphasized the need to educate the farmers through different means for the enhancement of adoption of improved technologies to reverse this trend of wide extension gap use of innovation production technologies with high yielding varieties will subsequently change this alarming trend to extension gap. The results of technologies will ultimate lead to the discussion of farmers to discontinue the old technology to adopt the new technology.

Technology Gap: The average technology gap was 100.3 Kg/ha during the four years, while it was highest 143 Kg/ha during the year 2018-19. The minimum technology gap has been recorded 71 Kg/ha during the year 2021-22. The observed technology gap may be attributed dissimilarly in soil

fertility status, rainfall distribution, disease and pest attack as well as the change in the location of demonstration plots every year. The differences in technology gap during different years could be due to more feasibility of recommended technologies during different years.

Technology Index: The technology index for all the demonstrations during different year were in accordance with technology gap. The highest technology index per cent of 22.0 was recorded in the year 2018-19 and the lowest was observed in the year 2021-22 which is 10.9 per cent. The technology index shows the feasibility of the evolved technology at the farmers fields and the lower the value of technology index more in the feasibility of the technology.

Economic Analysis: The input and output prices of commodities prevailed during the demonstration were taken for calculating gross return, cost of cultivation, NMR and benefit cost ration. Use of pricy seeds for crops sowing date, sowing method, seed treatment, seed rate, recommended dose of fertilizer, proper pest management etc, all of these are the main reasons for high cost of cultivation in demonstration fields than local check. There fore, the average cost of cultivation of 4 years increased in demonstration practices 8613.7 Rs/ha as compared to farmer practices 4635.5 Rs/ha. The cultivation of niger crop under improved technology gave average higher net return of Rs. 25263.2/ha as compared to farmers practices Rs. 11257/ha. The average B:C ratio of

niger under improved technology was 3.0 as compared to 2.4 under farmers practices. Ahirwar *et al.*, (2018) ^[1] and Bhoite

et al., (2019) ^[2] and also reported similar results.

Table 3: Seed yield and gap analysis of FLD's on niger at farmers field.

Year	No. of FLD's	Variety	Potential yield (Kg/ha)	Demonstration yield (Kg/ha)	Farmers Practices (Kg/ha)	% increase yield	Extension gap (Kg)	Technology gap (Kg)	Technology index (%)
2018-19	25	JNS-28	650	507.0	273.0	86	234.0	143	22.00
2019-20	25	JNS-28	650	537.5	250.8	116	286.7	112.5	17.30
2020-21	25	JNS-28	650	575.2	254.0	126	321.2	74.8	11.50
2021-22	25	JNS-28	650	579.0	260.0	123	319.0	71.0	10.90
Average 100			650	549.6	259.4	112.7	290.2	100.3	15.4

Table 4: Economic analysis of demonstration plots and farmers practices in Niger

Year	Cost of cultivation (Rs/ha)		Gross Return (Rs/ha)		Net Return (Rs/ha)		B:C Ratio	
	IT	FP	IT	FP	IT	FP	IT	FP
2018-19	8000	4000	29411	15868	21410	11868	2.68	2.97
2019-20	8000	4000	32254	15052	24854	11053	3.03	2.56
2020-21	9000	5000	34512	15242	25512	10242	2.83	2.05
2021-22	9455	5542	38732	17407	29277	11865	3.00	2.10
Mean	8613.7	4635.5	33727.2	15892.2	25263.2	11257	3.0	2.4

Conclusion

The above results showed that the integration of improved technology along with active participation of farmers has a positive effect in increase the seed yield and economic return of niger crop production. The suitable technology for enhancing the productivity of niger crop and need to conduct such demonstration may lead to the improvement and empowerment of farmers. The demonstration traits also enhance the relationship and confidence between farmers and ZARS scientists. The recipient farmers of FLD's also play an important role as source of information and quality seeds for wider dissemination of the improved varieties of niger for other nearby farmers. It is concluded that the FLD's programme is a successful tool in enhancing the production and productivity of niger crop through changing the knowledge, attitude and skill of farmers.

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