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Technological and Extension Yield Gaps in Oilseeds Crops in Mandsaur District of Madhya Pradesh

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ABSTRACT

The technological and extension yield gaps of oilseeds were studied during *kharif* and *rabi* seasons of year 2016-17 to 2018-19 under cluster front line demonstrations programme of oilseed crops in Mandsaur district of Madhya Pradesh. It was revealed that there was a wide yield gap between potential and demonstrations yields in oilseed crops mainly due to technology and extension gaps. The maximum extension gap was found in mustard followed by linseed. By adopting the improved production technology of different crops, the productivity can be raised up to 24.42 per cent in soybean, 46.88 per cent in mustard and 52.83 per cent in linseed crops, respectively.

Key Words: Cluster front line demonstration, Extension gap, Technology index, Technology gap.

INTRODUCTION

India accounts 24.65 Mha area in oilseed crops and 31.31 Mt production with a productivity of 1270 kg/ha. The total requirement of oil in India is about 274.2 Lakh ton while total availability is about 103.80 Lakh tons through primary (73.56 lakh ton) and secondary resources of oil. The main primary sources of oil in India were groundnut (20.82 Lakh ton), mustard (25.81 Lakh ton), soybean (17.59 Lakh ton) and linseed (0.44 Lakh tons) during 2017-18. Thus, there was an acute shortage of edible oil because of low productivity. In Madhya Pradesh, during 2017-18, 6.64 Mha area with production of 6.95 Mt and productivity of 1046 kg/ha was under oilseed crops out of which an area of 5.01 Mha in soybean and 0.75 Mha area in mustard with a production of 5.32 Mt in soybean and 0.98 Mt in mustard with a productivity of 1062 and 1305 kg/ha, respectively (Anonymous, 2018).

The field demonstrations conducted under the supervision of scientists is called front line demonstrations. Technologies are demonstrated first time by the scientist themselves before being fed into the main extension system of the State Department of Agriculture. Front line demonstration is the most powerful tool of extension because farmers, in general, are driven by the perception that is Seeing is Believing. The basic objective of cluster front line demonstration is speedy spread of new technology and its management practices in the farmer's field under different agro-climatic zone and farming situation of different crops in the district. While, demonstrating the technologies at farmer's field, the scientists are required to study the factor constraints of production of any crop. Keeping all these in mind, demonstrations of different oilseed crops were conducted at farmers' field with the aim to achieve the maximum production of oilseed in district by adopting improved technology.

MATERIALS AND METHODS

Cluster front line demonstrations (CFLD) on oilseed crops namely soybean, rapeseed and mustard and linseed were conducted by RVSKVV, Krishi Vigyan Kendra, Mandsaur during *kharif* and *rabi* seasons of 2016-17 and 2018-19. In this programme, 75 demonstrations on 30.0 ha area of each crop were conducted with a cluster approach. In cluster front line demonstrations (CFLD) plot, full package of practice was adopted with critical

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Table 1. Demonstration package and farmer's practice under CFLD on oilseeds.

Crop	Component	Demonstration plot	Farmer's plot
Soybean	Variety	JS 9560, RVS 2001-4	Local mixture (JS 9305)
	Seed rate	80 kg/ha	100-120 kg/ha
	Fertilizer dose	20:60:40:20 kg NPKS/ha	18:126:0:60 kg NPKS/ha
	Seed treatment	Carbendazim @ 2.5 g/kg seed	No seed treatment
	Plant protection	Need based application	Indiscriminate use
	Technical guidance	Time to time	Nil
Mustard	Variety	NRCDR 2, NRCHB 101	Local mixture
	Seed rate	5 kg/ha	10-12 kg/ha
	Fertilizer dose	90:45:20:20 kg NPKS/ha	46:80:0:60 kg NPKS/ha
	Seed treatment	Carbendazim @ 2.5 g/kg seed	No seed treatment
	Plant protection	Need based application	Indiscriminate use
	Technical guidance	Time to time	Nil
Linseed	Variety	Azad Alsi 1, Kartika	Local mixture
	Seed rate	40 kg/ha	60-80 kg/ha
	Fertilizer dose	60:40:20:20 Kg NPKS/ha	18:46:0:0 kg NPKS/ha
	Seed treatment	Carbendazim @ 2.5 g/kg seed	No seed treatment
	Plant protection	Need based application	Indiscriminate use
	Technical guidance	Time to time	Nil

input provided by the KVK and rest of the inputs by farmers on participatory mode. For the comparison of improved technology, the adjoining farmer's field was served / treated as control plot or farmers' practice. The detail of technology adopted in CFLD and farmer's plot are given in Table 1. The soils of demonstration area were medium black soil with 125 to 176 kg N/ha, 13 to 23.4 kg P_2O_5/ha and 345 to 653 kg K_2O/ha in fertility status. The data related to yield and economics of crops were collected from the beneficiary farmers through personnel interview. The cost of cultivation and value of produce were calculated on the basis of present market price. The estimation of technology gap, extension gap and technology index were calculated using following formulae suggested by Kadian *et al* (1997) and Samui *et al* (2000).

RESULTS AND DISCUSSION

Grain Yield

During *kharif* 2016, 2017 and 2018, the grain yield of soybean crop was 18.18, 24.42 and 19.47 per cednt higher under demonstration plots as compared to the grain yield of farmer's plot. Similarly, it was revealed that under demonstration plots of mustard crop, grain yields were 33.79, 46.88 and 21.06 per cent higher as compared to farmer's plot during *rabi* 2016-17, 2017-18 and 2018-19. Whereas, under linseed crop demonstration plots, grain yields were 40.00 and 52.83 per cent higher as compared to farmer's plot during *rabi* 2016-17 and 2017-18, respectively. This indicates that with adoption of improved technology in oilseed crops can be raised by 18.18 to 24.42 per cent in soybean, 21.06 to 46.88 per cent in mustard and 40.00 to 52.83 per cent in linseed over farmer's plots. The

Table 2. Technology gap, extension gap, technology index and economic analysis of CFLD on oilseeds.

Crop / Variety	Season/ Year	Yield (kg/ha)			% Increase over FP	Technology Gap (kg/ ha)	Extension Gap (kg/ ha)	Technology Index (%)	Cost of cultivation (Rs/ ha)		Gross Return (Rs/ha)		Net Return (Rs/ ha)		Additional Return (Rs/ ha)	IBCR
		Potential	Demonstration	Farmers' Practice					Demo	F P	Demo	F P	Demo	F P		
Soybean – JS 9560	Kharif, 2016	1800	1664	1408	18.18	136	256	7.55	31400	28400	49920	42240	18520	13840	4680	1.56
Soybean – JS 9560	Kharif, 2017	1800	1406	1130	24.42	394	276	21.88	31400	28400	42180	33900	10780	5500	5280	1.76
Soybean – RVS 2001-4	Kharif, 2018	2200	1362	1140	19.47	838	222	38.09	32500	31600	48946	41763	16446	10163	6283	6.98
Mustard – NRCDR 2	Rabi, 2016-17	2200	1940	1450	33.79	260	490	11.82	18000	17000	67900	50750	49900	33750	16150	16.15
Mustard – NRCDR 2	Rabi 2017-18	2200	1880	1280	46.88	320	600	14.55	18000	17000	63920	43520	45920	26520	19400	19.40
Mustard – NRCHB 101	Rabi 2018-19	2200	1713	1415	21.06	487	298	22.13	26000	25146	61859	50670	35859	25524	10335	12.10
Linseed – Azad Alsi 1	Rabi, 2016-17	1700	1540	1100	40.00	160	440	9.41	16500	16000	63140	45100	46640	29100	17540	35.08
Linseed – Kartika	Rabi, 2017-18	1700	1620	1060	52.83	80	560	4.71	16500	16000	66420	43460	49920	27460	22460	44.92

yield advantages have also been reported in soybean crop by Kumar *et al* (2009), mustard crop by Ahmad *et al* (2013), Dayanand *et al* (2012) and Kumar (2013) and in sesamum crop by Yadav *et al* (2020).

Yield Gaps

The technological yield gap and extension yield gap were calculated under present study. The data (Table 3) revealed that technological yield gap was maximum in soybean crop variety RVS 2001-4 (838 kg/ha) during *kharif* 2018 followed by mustard crop variety NRCHB 101 (487 kg/ha) during *rabi* 2018-19 while the lowest technological yield gap was observed in linseed crop variety Kartika (80 kg/ha) during rabi 2017-18. The technological yield gaps appear when any demonstration is laid out at farmer's field even if the demonstration is conducted under the supervision of scientist. This technological yield gaps may be attributed due to variation in soil fertility and local specific management problems to attaining the potential and demonstration yield of crops. These results were in close conformity with the Yadav *et al* (2020), Choudhary *et al* (2009) and Kumar *et al* (2009).

The maximum extension yield gap of 600 kg/ha was observed in mustard crop variety NRCDR 2 during *rabi* 2017-18. The lowest extension yield gap of 222 kg/ha was observed in soybean crop variety RVS 2001-4 during *kharif*, 2018. The higher extension yield gap indicates that there is a strong need to motivate the farmers for adoption of improved technology over their local practices (farmer's practice). The extension gaps in cluster front line demonstrations on oilseeds have been reported by many

extension workers (Kumar *et al,*2009; Kumar,2013) which observed that extension gap was maximum due to lack of awareness in adoption of improved and recommended package of practice in oilseed crop production.

Technology Index

The data (Table 2) revealed that technology index varied from 4.71 to 38.09 in the oilseed crops during the *kharif*, 2016 to *rabi*, 2018-19. The lowest technology index 4.71 per cent was recorded in linseed variety Kartika during *rabi* 2017-18 followed by 7.55 per cent in soybean variety JS 9560 during *kharif,* 2016. Further, highest technology index value was observed with soybean variety RVS 2001-4 during *kharif,* 2018 followed by mustard variety NRCHB 101 during *rabi*, 2018-19. The technology index indicates the feasibility of evolved technology in the farmer's field. If the value of technology index is lower, there is higher the feasibility of improved technology. Thus, this indicates that linseed crop is more popular among the farmers of Mandsaur district in comparison to other crops demonstrated at farmer's field. The similar results with regards to technology index of different oilseed crops were observed by Yadav *et al* (2020), Choudhary *et al* (2009) and Kumar *et al* (2009).

Economic

It was evident from data (Table 3) that highest gross return Rs 67,900/ha was observed with mustard variety NRCDR 2 during *rabi* 2016-17 followed by Rs 66,420/ha with linseed variety Kartika during *rabi* 2017-18. Further, highest net return of Rs 49,920/ha with linseed variety Kartika during *rabi* 2017-18 followed by Rs 49,900/ha were observed with mustard variety NRCDR 2 during *rabi* 2016-17. The lowest gross and net return were recorded Rs 33,900/ha and Rs 5,500/ha with soybean crop at farmer's plot during *kharif*, 2017.

CONCLUSION

It was concluded from the present study that there is a wide technology yield gap and extension yield gap in oilseed crops which reflect in potential and demonstration yield of different oilseed crops in study at Mandsaur district of Madhya Pradesh. The profitability and productivity of different oilseed crops can be improved by adopting improved production technology under agro-climatic conditions of Mandsaur district of Madhya Pradesh.

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