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IMPACT ANALYSIS OF FRONT-LINE DEMONSTRATIONS ON MUSTARD CROP IN NORTHERN ZONE OF TELANGANA INDIA

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ABSTRACT

Regional Agricultural Research Station (RARS), Jagtial conducts cluster demonstrations every year as per target assigned by ICAR-DRMR. The study evaluates impact of 105 demonstrations on mustard crop in 42-hectare area conducted by RARS, Polasa, Jagtial since 2019-20 to 2022-23 in different villages of the Northern Telangana Zone. The extension gaps in technologies were identified through field days, farmers meetings and group discussions with the farmers. The findings indicated significant increase in the average yield of demonstrated plot (24.63%) over the farmer's practice plot of mustard crop. Average yield of demonstration plots was recorded higher by 28.00 per cent, 22.70 per cent 26.99 per cent and 16.86 per cent in years 2019-20, 2020-21, 2021-22 and 2022-23, respectively. The extension gap was 3.76 q/ha, 2.86 q/ha, 3.53 q/ha and 1.44 q/ha while technology gap was 1.08 q/ha, 0.58 q/ha, 0.06 q/ha and 2.02 q/ha during consecutive years respectively. During these four years, yield increase in demonstration plots expressed as additional income over check plots accounted for Rs. 28063/ha, Rs. 32257/ha, Rs. 34358/ha and Rs. 27770/ha respectively during various years.
***Keywords*:** Mustard, FLDs, Extension gap, Technology gap, B:C ratio.

Introduction

India is the third largest rapeseed-mustard producer in the world after China and Canada with 12 per cent of world's total production. Rapeseed-mustard group of crops is the major oilseed crop of India. Among the nine annual oilseeds cultivated in India, rapeseed-mustard (1st Rank) contributed 13.16MT (33.24 %) in the total production of oilseeds 39.59MT (DA&FW, 2023-24). Globally, India account for 19.8 % and 9.8% of the total acreage and production (USDA). This group of oilseed crops is gaining wide acceptance among the farmers because of adaptability for both irrigated as well as rainfed areas and suitability for sole as well as mixed cropping. Besides, it offers higher return with low cost of production and low water requirement. Being a major rabi (winter season) oilseed crop and having an advantage of soil moisture conserved during monsoon, it has greater potential to increase the availability of edible oil from the domestic production. Despite the high quality of oil and meal and also its wide adaptability for varied agro-climatic conditions, the area, production and yield of rapeseed-mustard in India have been fluctuating due to various biotic and abiotic stresses coupled with India's domestic price support programme.

In Telangana, Mustard crop is cultivated on approximately 5,000 to 7,000 acres, particularly in the Northern Telangana Zone during the *rabi* season, under cropping systems such as Rice–Mustard, Maize–Mustard, and Mung bean–Mustard. However, farmers in Telangana are experiencing poor yields and low oil content due to the lack of region-specific improved

varieties or hybrids, inadequate package of practices, and insufficient adoption of Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) strategies. The imbalanced application of fertilizers, particularly the non-use of single super phosphate (SSP) and sulphur-based fertilizers, negatively affects oil content. Similarly, indiscriminate use of insecticides leads to the death of pollinators and natural enemies, ultimately impacting both yield and oil quality. Additionally, the absence of a comprehensive approach to complete the mustard value chain further limits its potential. To address these challenges and enhance the area, production, and productivity of mustard in Telangana, PJTAU has initiated research aimed at identifying suitable varieties and developing improved production practices. Mustard typically matures in 100–110 days, and early-maturing varieties (less than 110 days) are particularly suitable for extending cultivation to non-traditional areas like Telangana. The crop thrives under low temperatures, with an average day and night temperature of around 25°C required at sowing for optimal germination conditions that are prevalent in the Northern Telangana Zone so, it is need to conduct the frontline demonstrations (FLD's) in farmers fields to record the potentiality of the mustard crop in Telangana state. In this connection, Oilseeds production can be improved through various central government schemes like NFSM - OS and NMEO - OP to increase the domestic production and to meet the local demand for the oils in Telangana state.

Materials and Methods

Regional Agricultural Research Station, Jagtial is situated at an elevation of 243.4 meters above mean sea level in the sub-tropical zone with average rainfall of 977.4 mm. The temperature raises around 34°C-40^{0}C with hailstorms during March and April. Front Line Demonstrations on mustard (NRCHB-101) have been organized every year from 2019-20 to 2022-23 in different villages of the Jagtial, Karimnagar, Siricilla, Mancherial, Nirmal districts of Northern Telangana Zone. The villages were selected in different blocks on the basis of high sown area of mustard. The main aim of these demonstrations is to showcase advanced technologies so that adoption gaps should be minimized in non-traditional area. Before demonstrations, surveys in adopted villages were conducted and technology gaps were identified by following methods:

Extension gap = Demonstrated yield – Farmer's practice yield

Technology gap = Potential yield–Demonstration yield

Additional return = Demonstration return – farmer's practice return

$$\text{Technology index} = \frac{\text{Potential yield - Demonstration yield}}{\text{Potential yield}} \times 100$$

$$\% \text{ Increase yield} = \frac{\text{Demonstration yield – Farmers yield}}{\text{Farmers yield}} \times 100$$

After identifying the gaps, group meetings were organized to make farmers aware about advanced technologies. In all 105 numbers of demonstrations were organized during various years viz. 2019-20, 2020-21, 2021-22 and 2022-23 at different locations of Northern Telangana Zone with a coverage of 42 ha. The recommended amount of fertilizers was applied and crops were sown in lines. Before sowing, pendimethalin @ 1L or Oxadiarzil @ 1.5 L per hectare was applied (pre-emergence) to control the weeds. All the Clusters were monitored from time to time during entire cropping season and farmers were guided accordingly. At the end of cropping season yield and economics was calculated. A control viz., farmer practice was run simultaneously to have an idea of impact of these techniques in increasing yield and improving income of farmers which was calculated in terms of economics.

Results and Discussion

The results presented in Table 1 describes about the economic analysis of the demonstrations conducted during various years. The expenditure incurred on cultivation practices viz. land preparation, seed cost, herbicide, fertilizers and miscellaneous costs was slightly higher in demonstration. The average gross return of Rs. 73063/ha, Rs. 73257/ha, Rs. 81358/ha and Rs. 79819/ha was obtained in the year 2019, 2020, 2021 and 2022 respectively. The average net return for respective years to the tune of Rs. 50563/ha, Rs. 52757/ha, Rs. 57858/ha and Rs. 56181/ha during the study period. Further, it was also found that additional return of demonstration farmers ranged from Rs. 27770/ha to Rs. 34358/ ha. This may be attributed to the use of improved technologies in demonstration plots. Benefit-cost ratio (BCR) was at par in all the years. While, the farmers participated in FLD got approximately Rs. 30612/ha additional income as compared to farmer's practice. Similar findings were stated by Sunil Kumar *et al*. (2022), Takur *et al*. (2022), Singh *et al*. (2019) in oilseeds, Sangwan *et al*. (2021) revealed that the B: C ratio was in range of 0.95 to 1.60 during their study period. These results corroborate with the earlier findings of Sunil Kumar *et al*. (2022).

Table 1 : Economic analysis of CFLDs and farmers practice of mustard

Year	Average cost of cultivation (Rs./ha)		Average gross return (Rs. /ha)		Average net return (Rs. /ha)		Additional return (Rs/ha)	B: C Ratio	
	FLD	FP (Check)	FLD	FP (Check)	FLD	FP (Check)		FLD	FP (Check)
2019-20	22500	26250	73063	60157	50563	33907	28063	1.20	0.30
2020-21	20500	24250	73257	64345	52757	40095	32257	1.60	0.70
2021-22	23500	26250	81358	67710	57858	41460	34358	1.46	0.58
2022-23	23638	25124	79819	73845	56181	48721	27770	0.95	0.78

Table 2 : Yield, extension and technology gap analysis of CFLDs and farmers practice of mustard.

Year	Yield (q/ha)			Increase over farmers practice (%)	Extension gap (q/ha)	Technological gap (q/ha)	Technology index (%)
	Potential	FLD	Farmer practice				
2019-20	12.5	11.42	7.66	28.00	3.76	1.08	8.64
2020-21	12.5	11.92	9.06	22.70	2.86	0.58	4.64
2021-22	12.5	12.44	8.91	26.99	3.53	0.06	0.48
2022-23	12.5	10.48	9.04	16.86	1.44	2.02	16.16

Table 3 : Technological gap in CFLDs and farmers practice of mustard.

Technology	Recommended practice	Farmer's practice	%Gap
Variety	NRCHB-101	Local/Black gold	85
Seed rate	6.25 kg/ha	7 kg/ha	60
Seed treatment	Carbendazim @ 3g/kg seed	No treatment	100
Fertilizers (kg/ha)			
N	60	40	60
P	40	30	90
K	40	No application	100
Zn	10	No application	100
Weed Management	Pre-emergence application of Oxadiarzil 6% E.C. @ 1.5 ltr/ha	No application	100
Disease Management	Spay Acetamiprid 100 g/ha at vegetative to flowering stage to control aphids	No application	100

Analysis of Gap

An extension gap of 3.76 q/ha, 2.86 q/ha, 3.53 q/ha and 1.44 q/ha during 2019-20, 2020-21, 2021-22 and 2022-23 was found respectively (Table 3). The average extension gap (the target was to reduce) was to be reduced with the help of different extension activities like training programmes on latest/improved production and protection technologies with high yielding varieties, awareness programmes, kisan mela and field days on integrated pest and nutrient management etc. These programmes have the potential to help the farmers to adopt new and improved practices for crop production which lead to reduction in extension gap. The findings are also line with Takur *et al*. (2022), Singh *et al*. (2019) in moong bean. The existed technology gap was 1.08 q/ha, 0.58 q/ha, 0.06 q/ha and 2.02 q/ha in years 2019-20, 2020-21, 2021-22 and 2022-23, respectively. This gap may be attributed to prevailing micro farming situation i.e. variation in soil fertility, weather conditions at maturity of mustard crop, crop management practices etc. Therefore, there is an urgent need to recommend location specific crop management practices to pass over the potential demonstration yield. The similar findings were observed by Sunil Kumar *et al*. (2022), Kalita *et al*. (2019) in moong bean and Chaudhary *et al*. (2018) in mustard. Technology index varied from 8.64, 4.64, 0.48 and 16.16 per cent during 2019-20, 2020-21, 2021-22 and 2022-23, respectively. It indicates that there exists a gap between the generated technology in mustard cultivation at the research institution and its dissemination to the farmers. Similar findings were reported by Kalita *et al.* (2019), Kumar *et al.* (2014). Technology index can be reduced with proper adoption of demonstrated technical interventions to increase the yield performance of mustard crop. The results indicated in Table 3 showed that there was 100 per cent gap in seed treatment by farmers. In adoption of improved variety and proper seed rate, the gap was 85

and 60 per cent respectively. While in case of weed and disease management a key concern to be addressed also 100 per cent farmers' used recommended practice. So there was an urgent need to minimize the gap by creating awareness among the farmers which could ultimately lead to increase in yield and returns. Regarding those problems has been discuss with farmers by university (PJTAU) flagship programme "Raithu mungitlo shasravethalu" to reduce the technology gap. The results were corroborated with the earlier findings of Kumar G D S (2014), Biyan *et al*. (2012); Sangwan *et al*. (2021); Dhillion (2016), Thakur *et al*. (2022)

References

Anonymous. (2023-24). Government of India Department of Agriculture Cooperation and Farmers Welfare (DA & FW), www. agricoop.nic.in

Biyan, S. C., Chintapalli, B., Dhuppar, P., & Rao, D. S. (2012). Summer mung crop production in the context of climate change: An Appraisal, Indian Research Journal of Extension Education, II(Special Issue), 46-48.

Chaudhary, R. P., Chaudhary, G. K., Prasad, R., Singh, R., & Chaudhary, A. K. (2018). Impact assessment of frontline demonstrations on mustard crop, *International Journal of Current Microbial Application Science*, **7**, 4737-4742.

Dhillon, G.S. (2016). Boosting summer mung productivity through front line demonstrations, *Agriculture Update*, **11**(1), 59-64.

Kalita, S. K., Chhonkar, D. S., & Kanwat, M. (2019). Assessment of cluster front line demonstrations on rapeseed (*Brassica campestris* L.) in Tirap district of Arunachal Pradesh, *Indian Journal of Extension Education*, **55**(3), 17-22.

Kumar, G.D.S., Padmaiah, M. and Ramana Rao, S.V. (2014). Frontline demonstrations on need based plant protection in oilseeds: impact in enhancing productivity and profitability under farmers' conditions. *Indian Journal of Plant Protection*, **42**(2): 105-109.

Gandhimathy, B. (2022). Growth and instability of oilseeds in India. *Journal of Oilseeds Research*, **39**(3 & 4): 265-267.

Meena, H. S., Kumar, A., Ram, B., Singh, V. V., Singh, B. K., Meena, P. D., & Singh, D. (2015). Combining ability and heterosis for seed yield and its components in Indian mustard (*B. juncea*), *Journal of Agriculture Science and Technology*, **17**, 1861-1871.

Sangwan, M., Singh, J., Pawar, N., Siwach, M., Solanki, Y. P., & Ramkaran (2021). Evaluation of front-line demonstration on mustard crop in Rohtak district of Haryana, *Indian Journal of Extension Education*, **57**(2), 6-10.

Singh, K. K., Singh, R. P. N., & Mishra, D. (2019). Evaluation of front-line demonstration of oilseeds in Raebareli District, *Indian Journal of Extension Education*, **55**(3), 49-52.

Sunil Kumar and Jakhar, D.S. (2022). Impact of Front-Line Demonstrations on Mustard Crop in Sirsa District of Haryana. *Indian Journal of Extension Education*. **58**(1), 192-195.

Thakur, S., Shiv, R. and Nayak, M.K. (2022). Dissemination and impact assessment of improved technology and scientific interventions through front line demonstrations among sesame farmers of Tikamgarh, Bundelkhand Region in Madhya Pradesh. *Journal of Oilseeds Research*, **39**(3&4): 253-255.