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Impact of technology adoption on productivity of Indian mustard, *Brassica juncea* (L) Czern & Coss under Front Line Demonstrations

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ABSTRACT

The Front Line Demonstration (FLD) is an applied approach to accelerate the dissemination of proven technologies at farmers' fields in a participatory mode with an objective to explore the maximum available resources of crop production and also to bridge the productivity gaps by enhancing the production in national basket. Krishi Vigyan Kendra, Kotwa, Azamgarh, UP conducted 45 demonstrations on Indian mustard variety Pusa Jai Kisan from 2009-10 to 2012-13 during four consecutive years. The critical inputs were identified in existing production technology through meetings and discussions with farmers. Delayed sowing, use of higher seed rate resulting into dense plant population, uneven plant population, uncontrolled weeds, ignorance about fertilizers and sulphur management and lack of plant protection measures were the predominant identified causes of low productivity of oilseeds in eastern Uttar Pradesh. In the same sequence the other parameters like technology gap, extension gap and technology index were analyzed for assessment of technology adoption rate with extension activities and feasibility of demonstrated technologies at grassroots levels. The results of four years revealed that the yield under demonstration plots was 16.95 q ha^{-1} as compared to 11.7 q ha^{-1} in traditional practices plots. This additional yield of 5.25 q ha^{-1} and the increase in average mustard productivity by 45 per cent may contribute to present oilseed requirement on national basis. The average of technology gap and technological index were found to be 8.05 and 32.2 per cent respectively. The results clearly indicate the positive effects of FLDs over the existing practices. Benefit:cost ratio was recorded to be higher under demonstrations against control treatments during all the years of experimentation.

Keywords: Mustard; extension gap; demonstration; FLD

INTRODUCTION

Indian mustard, *Brassica juncea* (L) Czern & Coss is the principal oilseed crop of the state of Uttar Pradesh. The problem of low productivity continues to be a major issue for agricultural planners and researchers along with extension agencies. The R&D institutions have developed a number of location specific proven technologies suited to microclimatic situations of different zones of India. Now

it is the real time for all agro-based extension agencies to educate the growers by means of transfer of technologies, interactions, advisory services and other extension activities in participatory mode (Singh and Singh 2005). The best way to increase the productivity of mustard is by improving crops' nutrition through balanced fertilization. Besides NPK mustard has an additional requirement of sulphur due to the presence of several natural volatile sulphur and nitrogenous compounds (Seiji and Kameoka 1985) and for normal growth of plants it plays an important role in production of protein and activation of enzymatic and metabolic processes during active plant growth.

In UP mustard was raised on 604 thousand ha with total production of 717 thousand tons and productivity of 1,188 kg ha^{-1} during 2010-11. Still the productivity of mustard in Azamgarh is far lower than the several districts of other states. However rapeseed-mustard group of crops occupy prominent position in the state oilseed production scenario but vast yield gap exists between potential yield and yield under real farming situation. District Azamgarh falls under the poor productivity because resource poor farmers are reluctant towards proper scientific management of the crop.

MATERIAL and METHODS

The study was carried by KVK, Azamgarh during Rabi season of 2009-10 to 2012-13 in the farmers fields of five adopted villages (Gopalpur, Sikraur, Bhagwanpur, Pandri and Newada) belonging to four blocks of Azamgarh district. During these four years of study an area of 17.0 ha was covered under FLD with active participation of 45 farmers. Before conducting FLDs a list of farmers was prepared through group meetings and specific skill training was imparted to the selected farmers regarding different aspects of cultivation (Venkattakumar et al 2010). The difference between the demonstration package and existing farmers practices are given in Table 1.

In general the soils under study were clay loam in texture with neutral in reaction with 7.2 to 7.6 pH. The available nitrogen, phosphorus and potassium were low to medium and also deficient in sulphur. In demonstration plots use of quality seeds of improved variety Pusa Jai Kisan, optimum crop geometry, timely sowing, weeding, irrigation, need based pesticides as well as balanced fertilization including sulphur was done and comparison was made with the existing practices. The necessary steps for selection of site and farmers and layout of demonstrations etc were followed as suggested by Choudhary (1999). The traditional practices were maintained in case of local checks. The data outputs were collected from both FLDs and control plots and finally the extension gap, technology gap, technology index along with the Benefit:Cost etc were worked out (Samui et al 2000) as given below:

$$\text{Technology gap} = \text{Potential yield - Demonstrated yield}$$

$$\text{Extension gap} = \text{Demonstrated yield - Yield under existing practice}$$

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

RESULTS and DISCUSSION

The data presented in Table 2 clearly reveal that the yield of mustard was fluctuated successively over the years in demonstration plots. The maximum yield was recorded (17.8 q ha^{-1}) during 2011-12 and minimum in year 2009-10 (16.1 q ha^{-1}) while the average yield of five years was 16.95 q ha^{-1} to that of local check (11.7 q ha^{-1}) equivalent to average productivity state. The increase in per cent of yield ranged between 41.2 to 48.7 q ha^{-1} during four years of study. On an average 45 per cent increase in yield was registered as considerable bonus yield over traditional practices and also helpful for productivity enhancement of the district. The results are in conformity with the findings of Tomar et al (2003). The results clearly indicate the positive effects of FLDs over the existing practices towards enhancing the productivity of rapeseed-mustard in the region of eastern UP. Benefit:Cost ratio was recorded to be higher under demonstration against control during all the years of study.

The extension gap showed an increasing trend that ranged from 4.9-5.6 q ha^{-1} during the period of study that emphasizes the need to educate the farmers through various means for adoption of improved production technologies to minimize the extension gap. The trend of technology gap (ranging between 7.2-8.9 q ha^{-1}) reflects the farmers' cooperation in carrying out such demonstrations with encouraging results in subsequent years. The technology gap observed may be attributing to the dissimilarity in soil fertility status and weather conditions. Similar finding was recorded by Mitra and Samajdar (2010). Technology index showed the feasibility of the evolved technology at the farmers' fields. The lower value of technology index indicates more feasibility of the technology. As such fluctuation in technology index (ranging between 28.8 35.6) during the study period in certain regions may be attributed to the dissimilarity in soil fertility status, weather conditions, improper intercultural operations and pest management etc.

CONCLUSION

From the above findings it can be concluded that use of scientific methods of

Table 1. Comparison between demonstration package and existing practices in mustard

Particulars	Mustard crop	
	Demonstration	Farmers practice
Farming situation	Rainfed	Rainfed
Variety	Pusa Jai Kisan	Non descriptive
Time of sowing	20-28 October	10-22 November
Method of sowing	Line sowing through Desi plough, slit open by cultivator	Broadcasting of seed mixed with fertilizers
Thinning	Optimum crop geometry through thinning	Uneven high plant population
Seed treatment	Carbendazim 3g kg^{-1} seed	No seed treatment
Seed rate	5 kg ha^{-1}	6-7 kg ha^{-1}
Fertilizer dose (kg ha^{-1})	N,P,K, and S (80:40:40:40)	N,P,K, and S (50:40:00:00)
Irrigation	Two irrigations, at branching (30-35 DAS) & siliqua formation stage (60-65 DAS)	One irrigation in between flowering and siliqua formation stage
Plant Protection	Need based pesticides applied (Mencozeb 2.5 g/liter of water)	Injudicious use of pesticides
Weed management	Pendimethalin 3.5 lit ha^{-1} as pre-emergence applicationfollowed by one hand weeding at 35 DAS if needed	Occasionally manual weeding at own interest

Table 2. Effect of adoption of proven technologies on productivity, technology gap, extension gap and technological index (%) in mustard

Year	Area (ha)	# of farmers	Seed yield (q ha^{-1})			% change in yield	Extension gap (q ha^{-1})	Technological gap (q ha^{-1})	Technological index (%)	BCR
			Potential	Demo	Control					
2009-10	5.0	13	25.0	16.1	11.2	43.8	4.9	8.9	35.6	3.31
2010-11	2.0	7	25.0	16.8	11.5	46.1	5.3	8.2	32.8	3.12
2011-12	5.0	13	25.0	17.8	12.6	41.2	5.2	7.2	28.8	3.84
2012-13	5.0	12	25.0	17.1	11.5	48.7	5.6	7.9	31.6	3.42
Total	17.0	45	-	-	-	-	-	-	-	-
Mean	-	-	25.0	16.95	11.7	44.95	5.25	8.05	32.2	3.42

mustard cultivation can reduce the technology gap to a considerable extent thus leading to increased productivity of rapeseed-mustard in the district. Moreover extension agencies in the district need to provide proper technical support to the farmers through different educational and extension methods to reduce the extension gap for better oilseed production.

REFERENCES

Choudhary BN 1999. Krishi Vigyan Kendra - a guide for KVK managers. Division of Agricultural Extension, ICAR, pp 73-78.

Mitra Biplab and Samajdar T 2010. Yield gap analysis of rapeseed-mustard through Front Line Demonstration. Agricultural Extension Review, April-June, pp 16-17.

Samui SK, Maitra S, Roy DK, Mandal AK and Saha D 2000. Evaluation of front line demonstration on groundnut. Journal of Indian Society of Coastal Agricultural Research **18(2):**180-183.

Seiji Hashimoto and Kameoka Hiromu 1985. Sulphur- and nitrogen-containing neutral volatile components of cruciferae. Journal of Food Science **50:** 847-848.

Singh AK and Singh Lakhan 2005. Managing field extension: Krishi Vigyan Kendra. Directorate of Extension, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur, UP, pp 69-77.

Tomar LS, Sharma BP and Joshi K 2003. Impact of front line demonstration of soybean in transfer of improved technology. Journal of Extension Research **22(1):**139.

Venkattakumar R, Rammana Rao SV, Padmaiah M and Madhuri P 2010. Production constraints and information needs of growers in Andhra Pradesh. Agricultural Extension Review April-June, pp 21-24.

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