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NRCHB-101-a promising Indian mustard variety for the farmers of West Tripura district

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ABSTRACT

A field study was conducted in the selected villages of West Tripura district by ICAR- KVK West Tripura during the rabi season of 2017-18, 2018-19 and 2019-20 to popularize the Indian mustard variety NRCHB-101 among the farmers. Front Line Demonstration was conducted with scientific package of practices of mustard. The variety NRCHB-101 was found superior than the farmers practice. The demonstrated variety enhanced mustard seed yield by 65.95% over the local check. The net return and benefit cost ratio were sufficiently high to motivate farmers for adoption of NRCHB-101 with scientific package of practices.

1. Introduction

Oilseed is one of the most important agricultural commodities just after cereals. India is the fourth largest producer of oilseed accounting for about 20% of the area and 10% of the global production. Oil seed crops have an important position in the farming system of India. These crops are rich source of fat and edible oils have various uses for human being and animals. About 90 per cent of the total edible oil produced in the country comes from two oil seed crops namely rapeseed-mustard and groundnut. The oil cakes are used as cattle feed and manures. In India, rape seed mustard is an important source of edible oil followed by ground nut (Panday *et al.,* 1999). Like other North East states, mustard is being cultivated in rabi season under rice fallow to utilize the residual moisture and residual nutrients. But decreasing in area and increasing of import to meet the domestic demand is of great concern now-a-days. The productivity of mustard in the state (840 kg/ha) is comparatively lower than the national average (1161kg/ha). The problem of low productivity over the year continues to be a major issues. The low productivity of mustard under Tripura condition may be attributed to cultivation of low yielding varieties, non-adoption of good agronomic practices etc. Further the north eastern region of India including Tripura is having huge deficiency in oilseeds. With this view, KVK West Tripura, taken an initiative to popularize high yielding varieties of mustard in the rice fallow of West Tripura district with an objective to increase the yield of mustard and enhance farmers' income by practicing good agronomic practices.

2. Materials and methods

The study was carried out by KVK, West Tripura during the rabi season of 2017-18 , 2018-19, 2019-20 i.e. for three consecutive year in the farmers field of four villages namely Brajabashipara, Chintaramkobrapara, Brigudasbari and Dumtibari of West Tripura district. During the study of three consecutive years, 75 ha area was covered under the demonstration with 187 farmers. Before carrying out the front line demonstration (FLD) a list of farmers was prepared through group discussion. Awareness programme followed by specific training on different aspect of mustard cultivation was imparted to the selected farmers. Soil samples were collected and analysed for major plant nutrients. The soils of the region are generally clay loam in texture, low in nitrogen and phosphorus and medium in available potash. The area specified under each demonstration was 0.4 ha. The necessary steps for selection of site and farmers and layout of demonstrations etc were followed as suggested by Choudhury (1999).To manage the assessed problems critical input like seeds, fertilizer and plant protection chemicals were provided to the farmers and scientific recommended technologies like timely sowing by 1st week of November, line sowing, life saving irrigation, intercultural operations, recommended

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fertiliser dose of 90:40:40 along with split application of nitrogen, mulching to reduce no. of irrigation were followed as interventions during the course of demonstration programme. The transplanting of previous rice crop was completed by 1st week of July for all farmers so that mustard can be sown in the rice fallow in time. The demonstrations of the farmers' field were regularly monitored by the scientist of KVK. In case of local check (control plot), existing farmers' practices were followed by the farmers. The data outputs were collected from both FLDs and control plots and finally the extension gap, technology gap, technology index, economic analysis were worked out (Samui et.al., 2000) as given below:

1. Extension gap: Demonstration yield –Farmers' practice yield
2. Technology gap: Potential yield-Demonstration yield
3. Technology index

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

Economics of the demonstration technology was also calculated to see the feasibility of the technology.

4. Result and Discussion

Demonstration technology and farmers' practice

The data in Table 1show the comparison between the Front Line Demonstration (FLD) and farmers' practice. In the farmers' practice seed treatment, plant protection measures and integrated crop management practices was not followed which were demonstrated under FLD plot. (Table 1).

Yield and gap analysis

The data (Table 2) revealed that, highest yield in three different years was obtained with demonstration plot (12.40 q ha^{-1}, 13.23 q ha^{-1}, 13.46 q ha^{-1}) and the yield increase over local check was recorded by 64.76% to 57.12%.

An extension gap of 4.98 to5.35 q ha^{-1} in yield was found between demonstrated technology and farmers practice during the different years. Average extension gap was 5.18. The extension gap was lowest(4.98 q ha^{-1}) during 2017-18 while the highest extension gap (5.35 q ha^{-1}) was in 2019-20. Overall such gap might be attributed due to introduction of improved variety of Indian mustard and adoption of improved technology in the demonstration which resulted in higher yield than the existing farmers' practice. Narrow technology gaps were observed during all the years. The average technology gap of total187 nos. of demonstration were found 0.97 q ha^{-1} which was 93.07% of the potential yield. This showed that the farmers could able to adopt the technology in a correct way. Similarly, the technology index for all the demonstration during different years was in accordance with technology gap(Table 2).The technology index of the present study reflected the adequate provesof technology for transferring to farmers and sufficient extension services for transfer of technology. This was in conformity with the study conducted by Singh *et.al.*(2001).

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

Components	Demonstrated practice	Farmers' practice
Farming Situation	Rainfed	Rainfed
Variety	NRCHB-101	Nondescriptive type
Time of sowing	Last week of October	3rd week of November
Method of sowing	Line sowing	Broadcasting
Thinning	Optimum crop geometry through thinning	Uneven high plant population
Seed rate	5-6 kg ha^{-1}	8-10 kg ha^{-1}
Fertiliser dose (kg ha^{-1})	90:40:40	50:40:40
Irrigation	Two irrigations, at branching (30-35 days after sowing) and siliqua formation stage (55 to 60 days after sowing)	Oneirrigation in between flowering and siliqua formation stage.
Seed treatment	Carbendazim 3 g kg^{-1} of seed	No seed treatment was followed
Soil amelioration	Liming as need based for pH correction	No liming
Insect Management	Need based pesticide applied (at economic threshold level) where required. If mustard aphid occurs, Spraying should be done with Dimecron 100 at the rate of 250 ml per hectare or Metasystox 25 EC at the rate of one litre per hectare or Rogor 30 EC@1L/ha in 1000 litres of water.	No or injudicious use of pesticides

Table 2. Yield and gap analysis of mustard under front line demonstration and farmers' field

Year/Season	No. of FLDs	Potential yield(q ha^{-1})	Demonstration yield (q ha^{-1})	Farmers' practice (q ha^{-1})	Increase in yield percentage%	Extension gap (q ha^{-1})	Technology gap (q ha^{-1})	Technology index(%)
2017-18	60	14	12.40	7.42	67.12%	4.98	1.6	11.42
2018-19	60	14	13.23	8.03	64.76%	5.20	0.77	5.5
2019-20	67	14	13.46	8.11	65.96%	5.35	0.54	3.86
Average		14	13.03	7.85	65.95%	5.18	0.97	6.93

Table 3. Economic impact of improved mustard production technology under real farm situation

Year/ Season	No. of FLDs	Cost of cultivation (Rs./ha)		Gross return(Rs./ha)		Net return (Rs./ha)		Benefit Cost Ratio (BCR)	
		Demonstration	Local Check	Demonstration	Local Check	Demonstration	Local Check	Demonstration	Local Check
2017-18	60	24980	23300	55800	33390	30820	10090	1:2.23	1:1.43
2018-19	60	25100	23400	59535	36135	34435	12735	1:2.37	1:1.54
2019-20	67	25300	23600	60570	36495	35270	12895	1:2.39	1:1.54

Economics

Seed, fertilizers and plant protection chemicals were considered as critical cash inputs for the demonstration as well as farmers' practice. An additional investment of of Rs.1680 to Rs.1700/-was made under demonstration. Gross return, net return and benefit cost ratio was highest under demonstration in comparison to farmers' practice (Table 3). This could be due to high yielding Indian mustard variety NRCHB-101 and adoption of scientific production techniques. It can be inferred that conductance of demonstration on new technologies help the farmers in increasing the farm income.

5. Conclusion

The Front line Demonstration conducted under the close supervision of KVK scientist is one of the most important tools of extension to demonstrate improved technologies at farmers' field. FLDs are playing important role in motivating the farmers for adoption of improved agricultural technologies resulting in increasing yield and farmers' profit. The production obtained under FLDs created awareness on new technologies and also motivated the farmers of West Tripura district to cultivate Indian mustard variety NRCHB-101 during *Rabi* season.

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