Progressive Research – An International Journal
Vol. 5 (Special Issue) : 413-416 (2010), ISSN : 0973-6417

Society for Scientific Development in Agriculture and Technology, Meerut (U.P.) INDIA

ASSESSMENT OF TECHNOLOGY ADOPTION GAP ON MUSTARD PRODUCTION IN KOSHI REGION OF BIHAR

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ABSTRACT

The present study was conducted to assess the performance of newly developed late variety of mustard Rajender Suflam and technology gap in mustard production in Madhepura district of Bihar. It was aimed to measure and analyze the extent of adoption and technology adoption gap in specific components of mustard cultivation. The study was carried out by the Krishi Vigyan Kendra, Madepura in the district during the rabi season 2008-09 and 2009-10 in 5 villages spreading over 4 blocks to disseminate the improved cultivation practices technology of mustard for boosting productivity and to assess the economic viability and technological feasibility of the latest production technologies over the existing one. It was observed that the highest yield of R. Suflam was recorded during Rabi 2008-9 and 2009-10 were 12.12 and 12.30 qt/ha respectively whereas the average yield were 11.34 and 11.83 qt/ha and increase in yield over farmers variety were recorded as 8.72 and 13.42 percent during the same period. Knowledge gap in line sowing (86.42%), herbicide application (76.2%), seed treatment (75.32%), mixed cropping (66.23%) and inter-cultural operations (66.0%) were assessed. If these knowledge gaps are addressed well, mustard productivity in the district may be increased.

India is one of the major oilseeds grower and importer of edible oils. India's vegetable oil economy is world's fourth largest after USA, China and Brazil. The oilseed accounts for 13% of the Gross Cropped Area, 3% of the Gross National Product and 10% value of all agricultural commodities. This sector has recorded annual growth rate of area, production and yield @ 2.44%, 5.47% and 2.96% respectively during last decade (1999-2009). Rapeseed-mustard group of crops account for 21.6 and 23.2% of the total oilseed crop area and production, respectively, during 2006-07. Rajasthan, Uttar Pradesh, Haryana and Madhya Pradesh, together contribute 78.5 and 82.93% to the total national acreage and production, respectively. The yield ranged from as low as 487 kg/ha in Assam to as high as 1343 kg/ha in Haryana with overall yield of 1095 kg/ha in 2006-07. The National picture of rapeseed and mustard is given in Table-1. Bihar contributed only 0.09 in both national acreage and production as well but the yield of Bihar is at par with national average.

The total geographical area of Bihar is 94,163 km^2 and the state is located between 24020'10" N 27031'15" N latitude and between 83019'50" E 88017'40" E longitudes. Its average elevation above sea level is 173 feet. Bihar enjoys a continental monsoon type of climate with average annual rainfall of 1200 mm. Rainfall is the most significant factor in determining the nature of vegetation in the state. The topography of Bihar can be described as a fertile alluvial plain occupying the Gangetic Valley with rich farmland and lush orchards. This agro-ecological situation favors mustard cultivation. Oilseed production in the state has shown a fluctuating trend of production over the post-bifurcation period, achieving the highest production level in 2006-07. After an initial fall from 130 thousand MT in 2000-01 to 104 thousand MT in 2002-03, its production increased to 148 thousand MT in 2006-07. There have been significant productivity gains in these crops as is reflected by an increase in production despite a fall in acreage in 2005-06. Oilseeds production increased from 116 thousand MT in 2004-05 to 133 thousand MT despite a marginal fall in acreage from 136 thousand hectares to 135 thousand hectares. About two-third part of state is prone to water logging which delays the sowing of Rabi crop (ESR-2007-08-EN).

Seed are the carrier of genetic resources for food, agriculture, health and industry. The seed provides a genetic base for crop production and therefore, has a central role in food security and development of human civilization. The availability of good quality seeds at affordable prices having desired genetic trait combinations like distinctiveness, uniformity and stability for high yield and good quality combinations are the dire needs of all the field growers but most of the farmers in the developing world are still facing

Table-1: Status of Rapeseed & Mustard during year 2006-07.

State	Area	National share	Production	National share	Yield
Rajasthan	3.21	47.28	3.81	51.21	1185
Uttar Pradesh	0.83	12.22	0.87	11.69	1057
Haryana	0.60	8.84	0.80	10.75	1343
Madhya Pradesh	0.69	10.16	0.69	9.27	999
Gujarat	0.36	5.30	0.50	6.72	1396
West Bengal	0.42	6.19	0.34	4.57	803
Assam	0.24	3.53	0.12	1.61	487
Bihar	0.09	1.33	0.09	1.21	1029
Punjab	0.04	0.59	0.05	0.67	1122
IparAll India	6.79	100.00	7.44	100.00	1095

Source : Agricultural Statistics at a Glance-2008

Table-2: Characteristics of Rajendera Suflam.

Sl. No.	Particular	Descriptions
1.	Name of the Cultivar	Rajendra Sufalam (RAURDL 02-01)
2.	Address of Originating Source/ Institute	Rajendra Agricultural University, Pusa (Samastipur) – 848 125, Bihar
3.	Recommended Region/ Areas	Bihar
4.	Cultivar descriptor	Descriptor Plant height : 145 cm Seed size : 5.8 – 6.6 g/1000 grain Oil content : 36.9 – 43.1 % Maturity : 104-119 days Potential yield 1310 kg/ha Average Yield 636 – 1002 kg/ha
5.	Special Attributes, if any	Suitable for late sown (rice – fallow)

Table-3 : Comparative performance of R Suflam with farmers' variety.

Season	No. of Farmers	Area (ha.)	Demo. Yield qt/ha			Check qt./ha	Increase in yield (%)
			H	L	A		
Rabi 2008-09	15	6.0	12.12	11.41	11.34	10.43	8.72
Rabi 2009-10	15	6.0	12.3	11.3	11.83	10.43	13.42

scarcity of access to quality seed of improved varieties. Many mustard varieties have been developed for late sown conditions. It is reported that Rajendra Suflam variety is doing good as compared to very popular varieties. Keeping these in view, KVK, Madhepura started demonstration of this variety for stabilizing productivity and quick dissemination of technology.

MATERIALS AND METHODS

The mustard variety Rajendra Suflam was provided to 15 farmers of Madhepura district for assessment and dissemination under Front Line Demonstration (FLD) programme in different village of Madhepura district of Bihar during Rabi 2008-09 and 2009-10 crop seasons. Seed rate was kept 5 kg/ ha and sowing was done by broadcasting. Two irrigations were applied in both the year. Soil of the district is sandy loam having 275 Kg of nitrogen, 30 Kg of phosphorus and 235 Kg of available potash in soil at the time of sowing. Farmers' feedbacks were recorded during field days through well structured questionnaire. Basic attributes of R. Suflam is given in Table-2 (Chauhan et al., 2006). Yield attributing characters were also recording during field days. Data were analysed using the analyzing features of MS-excel.

RESULTS AND DISCUSSION

The results of the trials are described into two parts as follow :

1. Performance of variety as compared to local check : Performance of the variety was recorded in both the years in terms of yield and yield attributing characteristics of the variety. Highest yield during Rabi 2008-9 and 2009-10 were recorded as 12.12 and

Table-4 : Economic performance of R Suflam with farmers' variety.

Particulars	Rabi 2008-09		Rabi 2009-10	
	Local	Demo	Local	Demo
Average Cost of cultivation, Rs/ha	10120	10750	10400	10900
Average Gross return, Rs/ha	15645	17010	15645	17745
Average Net return, Rs/ha	5525	6260	5245	6845
Benefit–cost ratio	1.54	1.58	1.5	1.63

Table-5 : Economic performance of R. Suflam with other crops.

Crops	Mustard	Wheat	Green gram	Sunflower	Maize	Lentil
Benefit–cost ratio	1.50	1.54	1.76	1.67	1.99	1.89

Table-6 : Distribution of age group and education level of the surveyed farmers.

Farmer's Age (Years)	Number of Farmers	Percent of Farmers	Education	No of Farmers	Percent Farmers
< 30	8	9	No schooling	11	13%
30 – 40	22	25	Up to 5	13	15%
41 – 50	22	26	Up to 10	34	40%
> 50	34	40	10+2	15	17%
			Bachelor	11	13%
			Master	2	2%

Table-7 : Technology adoption gap among the respondents regarding rapeseed-mustard.

Sr. No.	Recommended practices	Mean technology (%)	Rank
1.	Varieties for cultivation	18.36	XV
2.	Sowing time	19.50	XIII
3.	Seed spacing	45.20	XII
4.	Line sowing	86.42	I
5.	Seed rate	52.12	VIII
6.	Seed treatment	75.32	III
7.	Amount of FYM given	62.03	VII
8.	Fertilizer dose: Nitrogen, phosphorus, potash	46.25	X
9.	Duration of fertilizer applied	63.20	VI
10.	Irrigation	48.20	VIV
11.	Inter-cultural operation	66.0	V
12.	Mixed cropping	66.23	IV
13.	Herbicides application	76.20	II
14.	Major insect/pests and their control measures followed	19.34	XIV
15.	Major diseases and their control measures followed	46.23	XI

12.30 qt/ha respectively whereas the average yield were recorded as 11.34 and 11.83 qt/ha and increase in yield over farmers variety were recorded as 8.72 and 13.42 percent during the same period. The details of yield with yield attributing characteristics and economic performance are given in Table-3 and Table-4 respectively. Following the method developed by Samual *et al.,* 2000, technology gap, extension gap and technology index were calculated as 1.40 qt/ha, 4.33 qt/ha and 9.69 percent respectively (Singh *et al.,* 2008).

Table-3 clearly shows that the average yield of local varieties is also 39.06 percent more than the average district productivity. It clearly indicates that technological knowledge gap among farmer is very high. As the farmers come in contact with extension personnel, without changing variety, their own varieties started performing well. Table-4 shows that the income

of participating farmers increased by changing the high yielding variety. R. Suflam mustard variety is suitable for late sowing and it may be the most suited variety for Koshi region of Bihar.

In the same duration, KVK, Madhepura also assessed several high yielding varieties of other crops through FLDs. Comparative performance of these crops is shown in Table-5. This table clearly indicates that benefit-cost ratio of mustard cultivation is lowest among other crops being cultivated in the district. Benefit cost ratio of maize is the highest among all evaluated crops and should be promoted for increasing farmer's income. Mustard cultivation could become profitable and compatible by proper use of technologies like line sowing, use of sprinkler irrigation, use of Hybrid seeds, integrated nutrient management, integrated pest management, effective, weed management, strengthening of market channels.

2. Feed back of farmers about the variety : Field days were organized for quick dissemination of variety and collection of feed back from directly and indirectly participating farmers. Total five field days were organized during these two years. Feed back was collected in pre-structured format. Total 86 farmers shared their views. Education level and age group of respondents is given in Table-6. About 40 percent farmers were of more than 50 years. Education level of 40 percent respondents was up to matric pass.

There were fifteen recommended practices of mustard cultivation about which scores were obtained from the cultivators relating their adoption level, knowledge and attitude towards improved rapeseed mustard production practices. The technology adoption gap among the respondents along with mean technology adoption gap, rank and overall gap etc are explained in table-7.

Table-7 shows that five most assessed knowledge gap were line sowing (86.42%), herbicide application (76.2%), seed treatment (75.32%), mixed cropping (66.23%) and inter-cultural operations (66.0%). Similar observations were also reported by Jaiswal and Rathore 1985.

CONCLUSIONS

Mustard productivity in Madhepura district is very low as compared to state average which may be increased by strengthening the extension activities and providing accessibility of farmers to latest technology. Popularization of suitable variety coupled with line sowing herbicide application, seed treatment, mixed cropping and inter-cultural operations may increase the productivity in the district and fill the gap. The R. Suflam is better mustard variety in late condition in the Madhepura district.

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