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# To Study of Gap in Technology Adoption in Rapeseed-Mustard Cultivation in Ambala

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**ABSTRACT**
*The present study titled 'a study of gap in technology of adoption in rapeseed-mustard cultivation' was aimed to measure and analyze the extent of adoption and locating the technology adoption gap in specific components of mustard cultivation in Ambala-II and Saha block, Ambala district (Haryana). The study was carried out by the Krishi Vigyan Kendra, Ambala (Haryana) in the district during the rabi season 2015-16 in 5 villages spreading over 2 blocks to disseminate the improved cultivation practices technology of rapeseed-mustard (RM) for boosting productivity and to assess the economic viability and technological feasibility of the latest RM production technologies over the existing one. The study reported that there was higher gap in i.e. 56.52 per cent, majority of the respondents i.e. 52.20 per cent were having medium level of mean technology adoption gap, and maximum technology adoption gap among the respondents was in amount of FYM given. It was concluded that the study demands for gearing of appropriate machineries to provide the technological requisites to the mustard growers, if possible at the concessional rates in order to minimize the technology adoption gap. It also improved the relationship between the farmers and scientist and built confidence between them.*
**Key words**: Attitude, Innovativeness, Knowledge, Risk orientation, Technology adoption gap.

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## INTRODUCTION

Among the seven edible oilseed cultivated in India, rapeseed-mustard (Brassica spp.) contributes 28.6 per cent in the total production of oilseeds. In India, it is the second most important edible oilseed after groundnut sharing 27.8 per cent in the India's oilseed economy. The share of oilseeds is 14.1 per cent out of the total cropped area in India, rapeseed-mustard accounts for 3 per cent of it (Ministry of Agriculture, GOI 2015). India contributes 28.3 per cent and 19.8 per cent in world acreage and production. India produces around 6.7 mt of rapeseed-mustard next to China (11-12 mt) and EU (10–13 mt) with significant contribution in world rapeseed-mustard industry [14].

The rapeseed-mustard group broadly includes Indian mustard, yellow sarson, brown sarson, raya, and toria crops. Indian mustard [*Brassica juncea* (L.) Czernj. &Cosson] is predominantly cultivated in Rajasthan, U.P., Haryana, Madhya Pradesh, and Gujarat. It is also grown under some non-traditional areas of South India including Karnataka, Tamil Nadu, and Andhra Pradesh. The crop can be raised well under both irrigated and rain fed conditions. Increase in the per capita consumption of edible oil and hence, the self sufficiency of edible oil revolves around 60 per cent. A mustard seedbed should be firm, moist, and uniform which allows good seed to soil contact, even planting depth and quick moisture absorption leading to a uniform germination. Adequate nutrient supply increases the seed and oil yields by improving the setting pattern of siliquae on branches, number of siliquae/plant, and other yield attributes [1]. Recommended dose of fertilizers (RDF) for different zones changes with climate, soil type, time, and type of cropping system followed.

Inspite of these achievements, there exists a gap between production potential and actual realization. The gap is to be bridged or narrowed down to feed the ever growing human and livestock population with minimal nutritional requirements, to meet the requirements of industries and to earn valuable foreign

exchange through export or seed meal, oil and value added products. Large scale adoption of innovation is essential feature of agricultural development. However, some farmers adopt all the recommended improved practices while some others don't. The personal, social and economic aspects of the farmers play a major role in their adoption process. It was felt that information about the adoption level and technology adoption gap in cultivation of mustard crop in relation to personal characteristics of the farmers and reasons for the same would form an important aspect today [7].

The purpose of the study was to measure the extent of adoption and locating the technology adoption gap in specific components of rapeseed-mustard cultivation. In a study by Meena *et al* (2012) found that by conducting front line demonstration of proven technologies, yield potential of rapeseed –mustard crop could be enhanced to a great extent with increase in the income level of the farming community. The objectives of the study were:To study the socio-economic characteristics of small farmers; To ascertain the extent of technological adoption gap in rapeseed-mustard production;To analyze the extent of influence of socioeconomic factors on the adoption of improved rapeseed mustard production practices.

## MATERIAL AND METHOD

The experiment was conducted at farmers' field in Ambala district of Haryana state in India during *Rabi* season of 2014 and 2015. Conventional rice-wheat rotation was being followed on the field from last 10 many years. The climate of the area is semi-arid, with an average annual rainfall of 1100 mm. The experimental soil (0-15 cm) was sandy loam in texture with bulk density 1.52 $Mgm^{-3}$, pH 8.2, EC (Saturation extract) 0.50 $dSm^{-1}$ and organic carbon 0.48%.

The sample size was 125 farmers who were selected purposively from villages of Ambala-II and Saha block, Ambala district (Haryana). Haryana is the third highest producer of rapeseed-mustard crop. The villages having maximum area under rapeseed-mustard cultivation were listed in descending order in consultation with the department of agriculture. From the list of two blocks (Ambala-II and Saha) were selected and five villages having maximum area under the crop were selected from the selected block. From each selected village, 25 farmers were selected by simple random sampling method. Thus, the sample for study constituted 125 respondents from the selected villages of the block.

The data on extent of adoption were collected using pre-tested structured schedule by personal interview method from 125 farmers under case study. The extent of adoption of 15 important cultivation practices i.e. Varieties for cultivation, sowing time, seed spacing, seed in sowing, seed rate, seed treatment, amount of FYM, fertilizer dose (Nitrogen, phosphorus, potash), duration of fertilizer applied, Irrigation, inter-cultural operation, mixed cropping, herbicide application, major insect/pests and their control measures followed, major diseases and their control measures followed were considered for the study. The relationship between seed yield and crop parameters for adoption of improved agro-technology were also studied with the simple correlation analysis. The data on output of Mustard and input used per hectare were collected from the Front Line Demonstrations (FLDs) and farmers practices (FP). Technology gap, extension gap and technology index were calculated by collected data using the formulae as suggested by Samuel *et al* [13].

1. Technology gap = Potential yield (PY) – Demonstration yield (DY)
2. Extension gap = Demonstration yield (DY) –Farmers' yield (FY)
3. Technology index = Potential Yield(PY) – Demonstration Yield(DY) / Potential Yield(PY) x 100

## RESULTS AND DISCUSSION

*Socio-economic status of mustard growers:* The datain Table 1 revealed that out of total growers, majority (56.00%) had 'medium' socio-economic status, whereas 24.8 per cent and 19.2 per cent had 'low 'and' high' socio-economic status respectively. Similar findings were reported by Rai, *et al* [12].

*Extent of knowledge of mustard growers:* There were fifteen recommended practices of rapeseed-mustard cultivation about which scores were obtained from the cultivators relating their adoption level, knowledge and attitude towards improved rapeseed mustard production practices, Table 2 explains about the technology adoption gap among the respondents along with mean technology adoption gap, rank and overall gap. The Table 2 shows that maximum technology adoption gap among the respondents was in amount of FYM given i.e. 70 per cent, followed by 50.25 per cent in irrigation, 48.25 per cent in herbicides application, 43.05 per cent in fertilizer dose, 42.21 per cent in inter-cultural operations, 40.21 per cent in control measures of insects/pests, 40.20 per cent in duration of fertilizer applied, 27.25 per cent in seed treatment, 25.20 per cent in control of diseases and 17.20 per cent in seed depth in sowing. Present result is in line with the findings of Dubolia and Jaiswal [2], Rai *et al* [12], Gupta and Srivastava [3] and Jaiswal and Rathore [6].

The Table 3 indicates that majority of the respondents i.e. 51.2 per cent were having medium level of mean technology adoption gap, 24.0 per cent were having low and 24.8 per cent were having high mean

technology adoption gap in improved mustard cultivation practices. Results of previous studies have also supported that the improved technologies of mustard crop have significant effect in higher productivity of mustard Singh *et al* [15]. The findings revealed that a gap exists between the actual farmer's yield and realizable yield potential of the variety.

The Table 4 shows that there was higher gap in fertilizer management i.e. 56.52 per cent, followed by 50.74 per cent in crop management technique, 46.25 per cent in irrigation management, 33.87 per cent in plant protection technique, 17.27 per cent in seed and seed treatment and only 14.25 per cent in varieties for planting. Results of previous studies have also supported that extent of technology adoption gap in important components of rapeseed-mustard cultivation have significant effect in higher productivity of mustard Rai *et al* [12] and Mazhar [7].

Given that the oilseeds production of 30 million tones in 2007-08, the country needs to almost double the oilseeds production in the next 12 years requiring an annual growth rate of about 6.00 per cent [4, 7] therefore it is necessary to study the effect of socioeconomic status on the adoption of technology in mustard farming. In was to find out the extent of influence of socio-economic factors on the adoption gap in improved rapeseed-mustard production practices. For this correlation analysis of dependent variables i.e. adoption gap with age, education, size of land holding, annual income, social participation, and utilization of information sources, knowledge, attitude, innovativeness and risk orientation were done. The correlation values (r) are presented in Table 5.

The co-efficient of correlation between age, size of land holding of the respondents and their technology adoption gap in relation to improved production practices was positive and highly significant. Hence, it was concluded that higher the age of the respondent and larger size of land holding, higher was the technology adoption gap in the improved rapeseed-mustard production practices.

The co-efficient of correlation of education, social participation, utilization of information sources, knowledge, attitude and risk orientation with technology adoption gap in improved mustard production practices was negative and highly significant. This indicates that with the increase in the level of education, social participation, utilization of information sources, knowledge, attitude and risk orientation there was corresponding decrease in the level of technology adoption gap in improved mustard production practices.

The co-efficient of correlation of annual income with the technology adoption gap in improved rapeseed-mustard production practices was positive but non-significant. This indicates that the annual income had number of significant influence on the technology adoption gap in improved mustard production practices [10, 11, 16].

**Table 1: Distribution of mustard growers according totheir socio- economic status (N=125)**

| Sr. No. | Categories | Number of respondents | Percentage |
|---|---|---|---|
| 1. | Low (up to 24) | 31 | 24.8 |
| 2. | Medium (25-109) | 70 | 56.0 |
| 3. | High (above to 109) | 24 | 19.2 |
| | Total | 125 | 100 |

**Table 2: Technology adoption gap among the respondents regarding rapeseed-mustard**

| Sr. No. | Recommended practices | Mean technology (%) | Rank |
|---|---|---|---|
| 1. | Varieties for cultivation | 14.25 | XIII |
| 2. | Sowing time | 16.12 | XI |
| 3. | Seed spacing | 14.66 | XII |
| 4. | Seed in sowing | 17.20 | X |
| 5. | Seed rate | 11.12 | XV |
| 6. | Seed treatment | 27.25 | VIII |
| 7. | Amount of FYM given | 70.00 | I |
| 8. | Fertilizer dose: Nitrogen, phosphorus, potash | 43.05 | IV |
| 9. | Duration of fertilizer applied | 40.20 | VII |
| 10. | Irrigation | 50.25 | II |
| 11. | Inter-cultural operation | 42.21 | V |
| 12. | Mixed cropping | 14.05 | XIV |
| 13. | Herbicides application | 48.25 | III |
| 14. | Major insect/pests and their control measures followed | 40.21 | VI |
| 15. | Major diseases and their control measures followed | 25.20 | IX |

**Table 3: Distribution of respondents on the basis of mean technology adoption gap(N=125)**

| Sr.No. | Categories | Number of respondents | Percentage |
|---|---|---|---|
| 1. | Low (Mean-SD) | 31 | 24.8 |
| 2. | Medium (Mean+ SD) | 64 | 51.2 |
| 3. | High (Mean+ SD) | 30 | 24.0 |
| | Total | 125 | 100 |

**Table 4: Extent of technology adoption gap in important components of rapeseed-mustard cultivation**

| S. No. | Practices | Technology adopted (%) | Technology adoption gap | Rank |
|---|---|---|---|---|
| 1. | Varieties for planting | 85.75 | 14.25 | VI |
| 2. | Seed and seed treatment | 82.73 | 17.27 | V |
| 3. | Fertilizer management | 43.48 | 56.52 | I |
| 4. | Crop management technique | 49.26 | 50.74 | II |
| 5. | Irrigation management | 53.75 | 46.25 | III |
| 6. | Plant protection technique | 66.13 | 33.87 | IV |
| | Mean | 63.52 | 36.48 | |

**Table 5: Correlation coefficient between adoption of mustard production technologies and personal socioeconomic profile of the growers**

| Sr. No. | Independent variables | Value of co-efficient correlation (r-value) |
|---|---|---|
| 1 | Age | 0.4474* |
| 2. | Education | -0.7476 |
| 3. | Size of land holding | 0.3613* |
| 4. | Annual income | 0.2082* |
| 5. | Social participation | -0.5837 |
| 6. | Utilization of information sources | -0.5551 |
| 7. | Knowledge | -0.9731 |
| 8. | Attitude | -0.2921 |
| 9. | Innovativeness | -0.4712 |
| 10. | Risk orientation | -0.64 |

* indicates significant of value at P= 0.01 level of probability

## CONCLUSION AND RECOMMENDATIONS

The major conclusions drawn from the present study were:

– In the case of rapeseed-mustard, the maximum technology adoption gap was found in the area of fertilizer management followed by seed and seed treatment, irrigation management, plant protection technique and crop management technique.

– The study demands for gearing of appropriate machineries to provide the technological requisites to the rapeseed-mustard growers, if possible at the concessional rates in order to minimize the technology adoption gap.

– The findings further display the role of set of various independent variables influencing technology adoption gap in terms of magnitude. It suggests, therefore, while preparing strategy for reducing this technology adoption gap, the influence of these variables are to be considered separately when we wish to minimize the gap in specific categories viz., age, education, size of land holding etc.

The study demands the effective extension efforts to be made to transfer the technology among the mustard growers. This will not only help the rapeseed-mustard growers to earn more profit by way of optimally utilizing the rapeseed-mustard production technology, but will also help in bringing more and more area under the rapeseed-mustard cultivation.

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