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RESEARCH ARTICLE :

Association between knowledge level of recommended soybean cultivation practices by the farmers and their selected independent variables

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SUMMARY : The present investigation was conducted in Kota region of Rajasthan purposively because this region stands first in area 822329 hactare and production 1197758 tonnes of soybean cultivation among all ten agriculture regions of Rajasthan. Kota region comprises four districts *viz.*, Kota, Baran, Bundi and Jhalawar. Out of these two districts *viz.*, Kota and Jhalawar were selected purposively for this study because of highest area and production. Kota and Jhalawar districts comprise five and seven tehsils, respectively. Out of which two tehsil from Kota (Degod and Ramganj Mandi) and two tehsil from Jhalawar (Khanpur and Manohar Thana) (as per the data of 2014-15) district were selected randomly. Out of these 6 villages were selected from each selected tehsil on the basis of random sampling method. Thus, the total 24 villages, were selected. List of all the soybean cultivators was prepared from each of the selected village, with the help of patwari and agriculture supervisor, eight to twelve farmers were selected by using proportionate random sampling technique as per availability so as to make the sample size 220. The age, education, size of land holding and extension participation were found to be positively and significantly associated with the knowledge level of farmers about recommended soybean cultivation practices. While, the variables like, caste, family type and family size were found to be non-significantly associated with the knowledge level of farmers about recommended soybean cultivation practices.

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BACKGROUND AND OBJECTIVES

Soybean [*Glycine max* (L.) Marril] belongs to family leguminoceae, sub family papilionaideae and genus glycine. It is mainly grown in *Kharif* season. Soybean is reported to have originated in eastern Asia or China and has been to man over 5000 years. It was introduced in USA in the year 1804 and has since revolutionized the agriculture of that country. In India efforts have been made since 1969 to popularize its cultivation and consumption. Soybean has been known by various names in India such as Bhat,

Bhatman, Ramkuithi etc. It is called the miracle crop of the twentieth century and is popularly known as "queen of pulses," wonder crop, farmer's friend and agriculture's Cinderella.

It is the cheapest source of high quality protein. It contains 20 per cent oil and 40 per cent high quality protein. Its oil is used for manufacturing vanaspati ghee and several other industrial products. Soybean is widely used in the antibiotic industry for making penicillin and allied drugs. A large number of Indian and western dishes, fast food beverages, milk etc. are prepared by soybean.

RESOURCES AND METHODS

The independent variables included in the study were selected on the basis of extensive review of literature, personal discussion with research scientists, extension personnel and experts of recommended soybean cultivation practices. Only those independent variables which have relevance with the study were finally selected for this study. Seven variables namely age, caste, education level, size of land holding, family type, size of family and extension participation were identified as the important variables which might affect the knowledge and attitude towards recommended soybean cultivation practices by the farmers.

Age:

The number of years completed by the farmers at the time of interview was considered as his age in the present investigation. The farmers' age were classified into three categories on the basis of mean and standard deviation. These categories are as below :

– Young : Below 37 years
– Middle : From 37 to 55 years
– Older : Above 55 years.

Caste:

Respondents were classified into four categories as per their caste. The scale developed by Trivedi (1963) was used and the scoring was done as per the scale. Respondents were grouped into four categories as per their caste.

– Schedule cast (S.C.)
– Schedule tribe (S.T.)
– Other backward caste(O.B.C.)
– General caste (GEN.)

Education level:

Education level was operationalized as the number of years of formal schooling successfully completed by a respondent. The scale developed by Trivedi (1963) was used and the scoring was done as per the scale. Respondents were grouped into three categories as per their education.

– Illiterate (cannot read and write)
– Literate (can read, write and upto primary to middle level)
– Educated (middle and above level).

Size of land holding:

The respondents were grouped into three categories on the basis of their land holding category (The procedure followed by revenue department, Government of Rajasthan).

– Marginal : (below 1ha)
– Small : (1-2 ha)
– Large : (above 2 ha).

Family type:

Respondents were classified into following two groups on the basis of family types possessed by them. The scale developed by Trivedi (1963) was used and the scoring was done as per the scale. Respondents were grouped into three categories as per their family type.

– Nuclear
– Joint.

Size of family:

Respondents were classified into following two groups on the basis of family size as under. The scale developed by Trivedi (1963) was used and the scoring was done as per the scale. Respondents were grouped into three categories as per their family size.

– Small family : Upto five members
– Big family : Above five members.

Extension participation:

Extension participation refers to the participation of respondents in various extension activities conducted by the village extension workers or by other agency in relation to acquire knowledge about the technology.

OBSERVATIONS AND ANALYSIS

The association between knowledge level of farmers

about recommended soybean cultivation practices and their selected 7 independent variables *viz*., age, caste, education level, size of land holding, family type, family size and extension participation was tested with the help of correlation co-efficient and the results have been presented in Table 1.

Table 1: Association between farmers' level of knowledge about recommended soybean cultivation practices and their selected independent variables (n=220)

Sr. No.	Independent variables	Correlation co-efficient
1.	Age	0.525**
2.	Caste	0.102NS
3.	Educational level	0.377**
4.	Size of land holding	0.327**
5.	Family type	0.062NS
6.	Size of family	0.099NS
7.	Extension participation	0.258*

* and ** indicate significance of values at P=0.05 and 0.01, respectively
NS = Non-significant

Knowledge and age:

It is evident from the data given in Table 1 that age was found positively and significantly associated with the knowledge level of farmers about recommended soybean cultivation practices at 1 per cent level of significance.

The Null hypothesis ($H_{0.1}$) *i.e.* 'there is no association between the knowledge level of farmers about recommended soybean cultivation practices and their age was, therefore, rejected. It could be inferred that when age increases the knowledge level also increases simultaneously and *vice versa*. This might be due to fact that aged farmers have more practical experience and more contact with extension personnel which creates interest them to know more about recommended soybean cultivation practices.

The findings of the study are in conformity to that of Kumawat (2015). Found that it could be inferred that when age increases the knowledge level also increases simultaneously and *vice versa*. This might be due to fact that aged farmers have more practical experience and more contact with extension personnel and creates interest to know about recommended production technology of rapeseed and mustard crop.

Knowledge and caste:

It is apparent from data given in Table 1 which indicate that the caste found was non-significantly associated with knowledge level of farmers about recommended soybean cultivation practices.

The Null hypothesis ($H_{0.2}$) *i.e.* 'there is no association between the knowledge level of farmers about recommended soybean cultivation practices and their caste' was, therefore, accepted. It means the caste did not affect knowledge level of farmers about recommended soybean cultivation practices because all the soybean growers might have paid the attention on acquiring the knowledge about recommended soybean cultivation practices.

The findings of this study support the findings of Kumawat (2015) reported that It means the caste did not affect knowledge level of farmers about recommended production technology of rapeseed and mustard crop because all the rapeseed and mustard growers might have paid the attention on acquiring the knowledge about recommended production technology of rapeseed and mustard crop.

Knowledge and education:

It is evident from the data given in Table 1 that the education was found positively and significantly associated with knowledge level of farmers about recommended soybean cultivation practices at 1 per cent level of significance.

The Null hypothesis ($H_{0.3}$) *i.e.* 'there is no association between the knowledge level of farmers about recommended soybean cultivation practices and their education was, therefore, rejected. It means that the education makes significant impact on increasing knowledge level of farmers about recommended soybean cultivation practices. This might be due to the facts that educated/literate farmers might have more exposure about the innovation through literature and through other communication media which may increase their knowledge level.

The findings of this study also draw support them the findings of Kumar (2013). There is no association between the knowledge level of farmers about recommended coriander production technology and their education level was, therefore, rejected. It means that the education level make the significant role in increasing knowledge level of farmers about recommended coriander production technology. This might be due to the fact that the coriander growers are more literate and educated. The coriander growers might have more learned and more understood the coriander production

technology due to their higher perception level of farmers

The findings of this study also draw support them the findings of Bairolia (2008); Geengar (2006); Bunkar *et al.* (2014) and Kumawat (2015).

The findings of this study also draw support them the findings of Bairolia (2008); Geengar (2006); Bunkar *et al.* (2014); Kumar (2013) and Kumawat (2015).

Knowledge and size of land holding:

It is apparent from the data given in Table 1 that the size of land holding was positively and significantly associated with knowledge level of farmers about recommended soybean cultivation practices at 1 per cent level of significance.

The Null hypothesis ($H_{0.4}$) *i.e.* 'there is no association between the knowledge level of farmers about recommended soybean cultivation practices and their size of land holding was, therefore, rejected. It means that the size of land holding make significant impact on increasing knowledge level of farmers about recommended soybean cultivation practices. Farmers of the study area were having big size of land holding with irrigation facility, because of this reason respondent wants to get more information from the relevant sources to increase the production and also to minimize the constraints about recommended soybean cultivation practices. The findings of this study support the findings of Singh (2004); Kumar (2013) and Kumawat (2015).

Knowledge and size of family:

The data given in Table 1 indicate that the size of family was non-significantly associated with knowledge level of farmers about recommended soybean cultivation practices.

The Null hypothesis ($H_{0.5}$) *i.e.* 'there is no association between the knowledge level of farmers about recommended soybean cultivation practices and their size of family' wa, therefore, accepted. It means the size of family did not make significant impact on knowledge level of farmers about recommended soybean cultivation practices. The results so appeared might be due to the reasons that all the members of the family are part or partially involved in farming. The findings of this study support the findings of Tarachand (2001); Naruka and Singh (2005); Kumar (2013) and Kumawat (2015).

Knowledge and family type:

It was revealed the data in from Table 1 that the family type was found non-significantly associated with knowledge level of farmers about recommended soybean cultivation practicesat 0.01 per cent level of probability.

The stated Null hypothesis ($H_{0.6}$) *i.e.* "There is no association between the knowledge level of farmers about recommended soybean cultivation practices and their family type" was accepted. It means that the family type did not make the significant impact for increasing knowledge level of farmers about recommended soybean cultivation practices. It means that the family type does not exert its influence on extent of knowledge. The findings of the study are in conformity with the findings of Naruka and Singh (2005); Dhayal (2006); Bairolia (2008); Jakhar (2009) and Kumar (2013).

Extension participation:

The data presented in Table 1 revealed that the extension participation was associated significantly with the knowledge level of farmers about recommended soybean cultivation practices at 1 per cent level of significance.

The stated Null hypothesis ($H_{0.7}$) *i.e.* There is no association between knowledge level of farmers about recommended soybean cultivation practices and their extension participation" was, therefore, rejected in case of soybean growers.

Therefore, it may be stated that extension participation had influenced the knowledge level of farmers. This might be due to the fact that farmers had participated in different types of KVK activities and the scientists provided them more information and facilities which might have helped the farmers to increase their knowledge level about recommended soybean cultivation practices.

These findings are supported by the findings of Choudhary (2011) reported that this might be due to the fact that beneficiary farmers had participated in different type of KVK activities and the scientists provided them more information and facilities which might have helped the farmers to increase their knowledge level about improved mungbean production technology. Whereas, extension participation had no influence in the acquisition of knowledge level of non-beneficiary farmers about improved mungbean production technology. This might be due to that fact that non-beneficiary farmers had not benefitted by KVK activities due to the non involvement of themselves extension activities organized by KVK. These findings are supported by the findings of Tarachand

(2001).

Multiple regression analysis:

An association between knowledge level of farmers about recommended soybean cultivation practices and their seven independent variables was ascertained by computing correlation co-efficient ('r' values). The 'r' value only gives the strength and direction of association but does not focus on the predictive ability of independent variables over knowledge. Hence, the multiple regression was worked out to know predictive abilities of independent variables on the knowledge level about recommended soybean cultivation practices. The independent variables indicate significant contribution in zero order correlation for soybean growers, which were analyzed by multiple regression technique to determine their relative contribution to predict. The predicting power of each multiple regression equation was estimated with the help of co-efficient of multiple determinations (R^2). The significance of multiple regression co-efficients was worked out by finding out 't' values. Accordingly, the multiple regression analysis was done and the results are presented as follows:

Multiple regression analysis of knowledge level of farmers about recommended soybean cultivation practices and their selected independent variables

Out of seven independent variables, only four independent variable had shown significant association with knowledge level of farmers about recommended soybean cultivation practices in 'zero order' correlation analysis. These variables were entered in multiple regression models and computerized.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7$$

where,

Y = Estimated value of knowledge level of farmers about recommended soybean cultivation practices

a = The intercept

b_1 = Co-efficient of partial regression of Y on x_1 (age)

b_2 = Co-efficient of partial regression of Y on x_2 (caste)

b_3 = Co-efficient of partial regression of Y on x_3 (education level)

b_4 = Co-efficient of partial regression of Y on x_4 (size of land holding)

b_5 = Co-efficient of partial regression of Y on x_5 (family type)

b_6 = Co-efficient of partial regression of Y on x_6 (family size)

b_7 = Co-efficient of partial regression of Y on x_7 (Extension participation).

The R^2 value (0.738) in Table 2 indicates that seven independent variables jointly contributed about 73.80 per cent of the variation in the knowledge level of farmers about recommended soybean cultivation practices.

The data in Table 2 also revealed that the calculated 't' values for the multiple regression co-efficients were significant at 0.01 per cent level of probability. Hence, it could be inferred that these variables were important in predicting the knowledge level of farmers about recommended soybean cultivation practices.

Conclusion:

The age, education, size of land holding and extension participation were found to be positively and significantly associated with the knowledge level of farmers aboutrecommended soybean cultivation practices. While, the variables like, caste, family type and family size were found to be non-significantly associated with the knowledge level of farmers about recommended soybean

Table 2: Multiple regression analysis of knowledge level of farmers about recommended soybean cultivation practices and their selected independent variables (n = 220)

Sr. No.	Independent variables	Standardized co-efficients beta	Standard error	't' value
1.	Age	0.420	0.018	7.506**
2.	Caste	0.095	0.141	1.124NS
3.	Educational level	0.264	0.095	4.352**
4.	Size of land holding	0.074	0.215	-1.051**
5.	Family type	0.223	0.357	1.108NS
6.	Size of family	-0.047	0.339	-0.787NS
7	Extension participation	0.133	0.211	2.253**

** indicate significance of value at P=0.01 NS= Non-significant

Co-efficient of multiple determination (R^2) = 0.738** Multiple correlation co-efficient (R) = 0.817

cultivation practices.

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