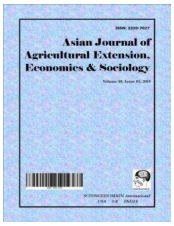

Asian Journal of Agricultural Extension, Economics & Sociology
16(3): 1-6, 2017; Article no.AJAEES.31598
ISSN: 2320-7027

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Adoption Level of Masumbi (*Citrus sinensis*) Growers and Its Relationship with Their Personality Traits in Haryana, India

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Authors' contributions

This work was carried out in collaboration between all authors. Author PK designed and performed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author PSS guided the authors PK and MK during whole study period. Author MK managed the analyses of the study. Author MK managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2017/31598
Editor(s):
(1) Zhao Chen, Department of Biological Sciences, College of Agriculture, Forestry and Life Sciences, Clemson University, USA.
Reviewers:
(1) Basil Mugonola, Gulu University, Uganda.
(2) Teresa B. Lirag, Central Bicol State University of Agriculture, Philippines.
Complete Peer review History: http://www.sciencedomain.org/review-history/18546

Original Research Article

Received 16th January 2017
Accepted 20th March 2017
Published 7th April 2017

ABSTRACT

Fruits have great importance in human dietary system and it is generally stated that the living standard of people can be judged by the production as well as consumption of fruits. Now a day's citrus becomes a major commercial fruit crop in the Haryana state and keeping this in view the present study was conducted in Bhiwani district of the state as it have vast area under citrus cultivation. Further 3 blocks viz. Dadri, Badhra and Loharu were selected purposively and from each block 40 farmers were selected randomly, making a total of 120 respondents. The major thrust of study was the determination of citrus growers existing level of adoption towards recommended farm practices and association of their personality traits with adoption level. About

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71 per cent of the farmers had medium to high level of adoption category. Time of planting, recommended cultivators, fruit drop were highly adopted agronomic practices, whereas least adopted agronomic practices were packaging, disease and their control and insect pest and their control. Personality traits like education (r = 0.563), extension contact (r = 0.233), mass media exposure (r = 0.339), risk orientation (r = 0.497), scienticism (r = 0.395) and economic motivation (r = 0.428) with adoption level had positive and significant correlation. To improve the adoption level, extension agencies should give more emphasis on the practices which require specialized skills like post-harvest technology and packaging.

Keywords: Adoption level; correlation; citrus; fruits; personality traits.

1. INTRODUCTION

Diversification is the spread of investment over a variety of enterprises or the production of a variety of different articles, services etc., often as a safeguard against the effect of fall in demand for a particular product. Diversification concept at the macro level is to move away from agriculture to industries. Nevertheless, diversification with agriculture is in the nature of shift from one crop to another crop or from one enterprise e.g. crop raising, to another enterprise e.g. livestock [1]. For the rural economy in general and small and marginal farmers in particular, the crop diversification has been largely considered as a ray of hope for their economic upliftment. Diversification is an important strategy to stabilize farm income by reducing the risk and uncertainty.

Today fruits and vegetable farming as a diversified farming is important to generate employment round the year, supplement farm economy and to earn foreign exchange also by enhancing the export. Fruits play an important role in human nutrition, offer diversity, ecological sustainability and fight against hunger. They are sources of essential minerals, vitamins, dietary fibre, supply complex carbohydrates and proteins. They are good sources of calcium, phosphorus, iron, magnesium and contribute over 90 per cent of vitamin C. It is generally stated that the living standard of people can be judged by the production as well as consumption of fruits. In the initial planning era, the Indian agriculture was cereal food oriented and it was only in the fourth five year plan that horticultural crops started getting attention and investment support at the national.

India is the second largest producer of fruits after China, with a production of 88977 thousand million tonnes of fruits from an area of 7216 thousand hectares. The Haryana state has a very conductive situation for vegetable and fruit farming as a diversification. According to 2014 statistics, the citrus is grown on an area of 19.4 thousand ha with production 235.4 thousand MT in Haryana [2]. It is extensively grown in the district Bhiwani, Sirsa, Hisar, Mahendergarh and Ambala. In Bhiwani district there is vast area under *Citrus sinensis,* called 'Mausambi' in Hindi. This crop is becoming popular in terms of area under cultivation and production. Therefore keeping in view the importance of *Citrus sinensis* in Bhiwani district of Haryana state, the study was proposed to assess the adoption level of masumbi (*Citrus sinensis*) growers and its relationship with their personality traits.

2. MATERIALS AND METHODS

The study was conducted in Haryana state from which district Bhiwani was selected purposively for sensitization of farmers and also have maximum area under drip irrigation system which is suitable for horticultural crops. Further 3 blocks viz. Dadri, Badhra and Loharu were selected purposively as shown in Fig. 1. From each block 40 farmers were selected randomly, making a total of 120 respondents. The data were selected with the help of well-structured and pre-tested interview schedule. The responses were obtained on three-point continuum scale in case of adoption (low, medium and high). Keeping in view the requirement of the study, frequency, mean, percentage, adoption index, rank, correlation coefficient and multiple regressions were calculated for the purpose of analysis and interpretation of data.

3. RESULTS AND DISCUSSION

Adoption refers to a decision for full-scale continued use of an innovation over a period. An individual passes from first hearing about an innovation to its final adoption through a mental process.

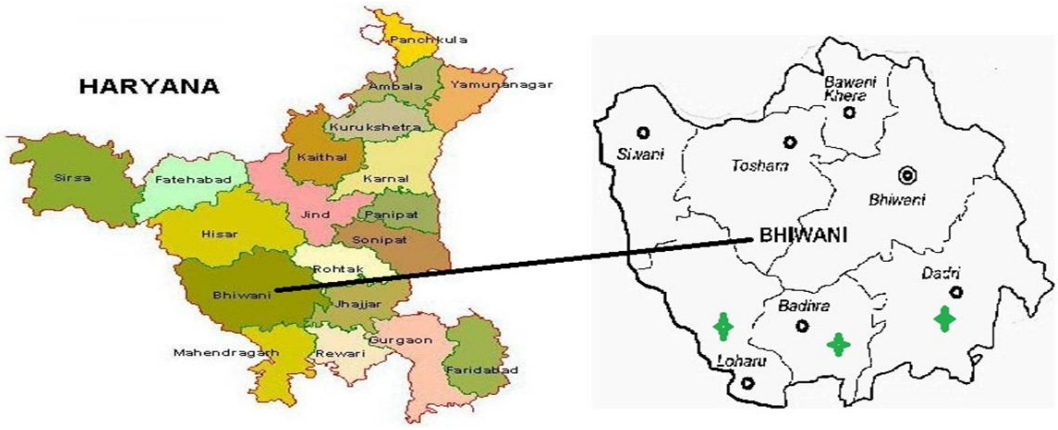

Fig. 1. Map of selected locale of study

3.1 Farmers' Adoption Level for the Recommended Cultivation Practices of *Citrus sinensis*

The distribution of citrus growers on the basis of adoption level is presented in Table 1. The adoption level was categorized in three categories low, medium and high, on the basis of package of practices adopted by Citrus growers which were recommended by CCSHAU, Hisar. The data revealed that majority of citrus growers (78.33 per cent) had high level of adoption while only 7.50 per cent had low level of adoption regarding time of planting and 14.17 per cent of the respondents was found to have medium level of adoption of it. The data revealed that maximum number of growers (70.00 per cent) possessed high level of adoption whereas, only 0.83 per cent had low level of adoption and 29.17 per cent had medium level of adoption about recommended cultivars. Regarding fruit drop, it was observed that majority of respondent (61.67 per cent) had high, 32.50 per cent had medium and 5.83 per cent had low level of adoption.

The major scientific practices of citrus cultivation were accorded ranks based on adoption index score in descending order. It is evident from table that the adoption index for time of planting was highest (85.41 per cent) and accorded rank first. It implies that the adoption for time of planting by respondents was highest. It was followed by recommended cultivars (84.58 per cent), fruit drop (77.91 per cent), inter cultural operation (72.50 per cent) and irrigation and post harvest technology (68.33 per cent), which were ranked 2nd, 3rd, 4th and 5th respectively. The adoption index of inter cropping (66.67 per cent), manure and fertilizer (64.16 per cent) and method of propagation and packaging (60.83 per cent) were ranked 6th, 7th and 8th respectively. Diseases and their control (53.33 per cent) and Insect-pest and their control (49.16 per cent) were least adoption practices by the respondents.

3.2 Overall Adoption Level of Citrus Cultivation Practices

The overall adoption level is presented in Table 2 and it indicates that 29.16 per cent of the respondents belonged to low adopter category while 40.00 per cent of them were observed to be in the medium adopter category, followed by 30.84 per cent in high adopter category. It shows that about 69.16 per cent of the farmers had low to medium level of adoption for citrus cultivation practices**.** The results of study are also supported by previous findings of [3- 9,10].

3.3 Relationship of Citrus growers' Personality Traits with Their Adoption Level

In the present study, an attempt was made to determine the relationship between citrus grower's personality traits as independent variables and level of their adoption as dependent variable. The zero order correlation coefficient was computed to know the relationship between personality traits, viz., age education, family education, socio-economic status, extension contact, mass media exposure, risk orientation and economic motivation etc. with the adoption level of respondents. The results are presented in Table 3 and it revealed that personality traits like education (0.563), extension contact (0.233), mass media exposure

Table 1. Farmer's adoption level about recommended cultivation practices of citrus (N=120)

Sr. No.	Practices	Adoption level	Score range	No. of growers	Percentage	Mean score	Adoption index	Rank order
1	Time of planting	Low	0	9	7.50	1.70	85.41	I
		Medium	1	17	14.17			
		High	2	94	78.33			
2	Recommended Cultivars	Low	<2	1	0.83	1.69	84.58	II
		Medium	2-3	35	29.17			
		High	>3	84	70.00			
3	Fruit drop	Low	0	7	5.83	1.55	77.91	III
		Medium	1	39	32.50			
		High	2	74	61.67			
4	Intercultural operation	Low	<2	12	10.00	1.45	72.50	IV
		Medium	2-3	42	35.00			
		High	>3	66	55.00			
5	Irrigation	Low	<2	23	19.17	1.36	68.33	V
		Medium	2-3	30	25.00			
		High	>3	67	55.84			
6	Post harvest technology	Low	<3	22	18.33	1.36	68.33	V
		Medium	3-5	32	26.67			
		High	>5	66	55.00			
7	Inter-cropping	Low	0	13	10.83	1.33	66.67	VI
		Medium	1	54	45.00			
		High	2	53	44.17			
8	Manure & Fertilizer	Low	<2	10	8.33	1.27	64.16	VII
		Medium	2-3	67	55.84			
		High	>3	43	35.83			
9	Method of propagation	Low	<3	16	13.33		60.83	VIII
		Medium	3-5	62	51.67			
		High	>5	42	35.00	1.21		
10	Packaging	Low	<2	10	8.30	1.21	60.83	VIII
		Medium	2-3	74	61.67			
		High	>3	36	30.00			
11	Disease & their control	Low	0	27	22.50	1.06	53.33	IX
		Medium	1	58	48.33			
		High	2	35	29.17			
12	Insect pest & their control	Low	0	36	30.00	0.98	49.16	X
		Medium	1	50	41.67			
		High	2	34	28.33			

Table 2. Overall adoption level of farmers about the recommended cultivation practices of citrus

Sr. No.	Category	Adoption level score	No. of Grower	Percentage
1	Low	18-30	35	29.16
2	Medium	31-35	48	40.00
3	High	36-43	37	30.84
Total			**120**	**100.00**

(0.339), risk orientation (0.497), scienticism (0.395) and economic motivation (0.428) with adoption level had positive and significant correlation (at 0.05% level of probability). This means that citrus growers having higher education, extension contact, mass media exposure, risk orientation, scienticism and economic motivation possessed higher level of adoption status of recommended citrus cultivation.

Table 3. Correlation between personality traits of the respondent and their adoption level

Sr. No.	Variables	Correlation coefficient	Regression coefficient	't' value
1	Age	0.129^{NS}	0.019	0.938^{*}
2	Education	0.563^{*}	1.146	4.928^{*}
3	Family education	0.148^{NS}	0.052	0.892^{*}
4	Land holding	-0.083	-0.229	-1.154
5	Socio-economic status	0.007^{NS}	0.100	2.064^{*}
6	Extension contact	0.233^{*}	0.126	1.927^{*}
7	Mass media exposure	0.339^{*}	0.149	1.113^{*}
8	Risk orientation	0.497^{*}	0.493	6.506^{*}
9	Scienticism	0.395^{*}	0.309	5.994^{*}
10	Economic motivation	0.428^{*}	0.509	5.911^{*}

The selected personality traits of citrus growers were fitted in the multiple regression equation for determining the type and magnitude of variation caused by these traits and results are also given in Table 3. Step-wise regression analysis was also used for selection of only those traits, which influenced the adoption level of citrus growers. The results clearly showed that all the independent variables except landholding were significant at 0.05 level of probability and jointly contributed to 68.00 per cent (R^2 = 0.68) variation in the adoption level. This means that only 68.00 per cent of variation in the dependent variable was due to these independent variables and the remaining 32.00 per cent is due to unexplained variables. In other words, one unit change in age, education, family education, land holding, socio-economic status, extension contact, mass media exposure, risk orientation, scienticism and economic motivation, will result in a corresponding change of 0.938, 4.928, 0.892, -1.154, 2.064, 1.927, 1.113, 6.506, 5.994 and 5.911 unit in adoption level of citrus growers on recommended cultivation practices, respectively. The results are supported with the findings of [11,12,3,13,10].

4. CONCLUSION

Since knowledge is pre-requisite to adoption, it is believed that higher level of knowledge must lead to higher adoption. Among the farmers who were having knowledge of citrus growing practices, only the farmers who were educated and having more extension contact and higher mass media exposure, higher risk orientation, scienticism and economic motivation were found to be having higher adoption level. To improve the adoption level extension agencies should give more emphasis on the practices which require specialized skills like post-harvest technology & packaging. Maximum efforts should be given on educating fruit growers about recommended practices. Project based proposals under National Horticulture Mission (NHM) like disease forecasting unit, post-harvest management basic information and implementation, rural primary markets/apni mandies etc. should be implemented to provide holistic growth of the horticulture sector through an area based regionally differentiated strategies and to create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth. Horticulture Development Officer (HDO) and some other factors like mass media exposure were mainly responsible for the dissemination of innovations and the farmers of the Haryana state generally seek their help and guidance. HDOs interest, aptitude, knowledge of the subject matter etc. play important role in influencing the farmers to adopt recommended practices.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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