

Personal, Socio-Economic and Psychological Characteristics of Horticulture Crop Growers and their Association with Cognitive, Perception and Adoption Level

Sai Tejashree G.^{1*}, Y. N. Shivalingaiah², Siddayya³, K. P. Raghuprasad⁴ and Sagar S. Pujar⁵

¹Senior Research Fellow, ICAR, Krishi Vigyan Kendra Bengaluru Rural UAS, GKVK, Bengaluru (Karnataka), India

²Professor and Head, Department of Agricultural Extension, College of Agriculture, UAS, GKVK, Bengaluru (Karnataka), India.

³Professor, Department of Agricultural Marketing, Co-operation and Business Management, College of Agriculture, UAS, GKVK, Bengaluru (Karnataka), India.

⁴Manager and Professor, Agricultural Technology Information Centre, UAS, GKVK, Bengaluru (Karnataka), India.

⁵Scientist, ICAR, Krishi Vigyan Kendra-Bengaluru Rural, UAS, GKVK, Bengaluru (Karnataka), India.

(Corresponding author: Sai Tejashree G.*)

(Received: 26 April 2023; Revised: 08 May 2023; Accepted: 28 May 2023; Published: 05 July 2023)

(Published by Research Trend)

ABSTRACT: India is one of the leading producers of fruits and vegetables and ranks second in fruits and vegetable production globally. It is gaining importance in recent decades and contributes 38 per cent to India's agricultural GDP from 16 per cent cropped area with a share of nearly 35 per cent of total exports of agricultural commodities of the country. The present study was conducted in Chikkaballapur and Kolar districts of eastern dry zone of Karnataka in the year 2021-2022 to study the personal, socio-economic and psychological characteristics of horticulture crop growers and their association with cognition level, perception and adoption level with a total sample size of 120 growers. Ex-post facto research design was adopted. Data was collected by using pre-tested personal interview method. Further, appropriate statistical tools were employed to analyse the collected data. The study revealed that, more than half (64.17 %) of the horticulture crop growers belonged to middle age. Nearly, one-third (30.00 %) of the horticulture crop growers had primary school education. More than two-third (68.33 %) of horticulture crop growers had medium family size. Nearly, two-fifth (38.33 %) of the horticulture crop growers were marginal farmers. 67.50 per cent of the growers belonged to high level of annual income (i.e., > 6,66,000). Whereas, majority of the horticulture crop growers had a medium level of experience in precision farming (42.50 %), area under precision farming (59.17 %), farm power possession (40.83 %), extension participation (40.00 %), social recognition (40.83 %), mass media exposure (37.50 %), extension contact (44.17 %), economic motivation (42.50 %), risk bearing ability (41.67 %), innovativeness (45.00 %). Further age, family size, landholding, annual income, area under precision farming, farm power possession, social recognition, risk bearing ability and innovativeness had non-significant association with cognitive level at 5 per cent level of significance.

Keywords: Personal, socio-economic, association, Cognitive, Perception and Adoption Level.

INTRODUCTION

Agriculture is the back bone of the Indian Economy. It provides employment to the 54.6 per cent of the total population of Indian Sub-continent. It contributes 18.8 per cent to total GDP of the country. Today, Indian agriculture is encountered with many problems like climate change, depletion of ground water, fragmentation of land, low production and productivity, small farm holding, limited surplus for value addition, poor transportation and storage, lesser mechanization, limited access to inputs and market so on and so forth. Thus, there is a need to come up with the sustainable technological interventions which not only increase the farm productivity and income but also maintain the sustainability in agricultural production. In this context, "Precision Farming" serves as a promising solution to

increase the productivity with reduced input application with the help of site-specific management strategies by considering within field variability into account; also reduce environmental degradation with reduced application of chemicals. "Precision farming" can also be defined as farm management system based on information and technology that identifies, assesses, and manages variability within fields for the best possible profitability, sustainability, and preservation of land resources (Mandal and Atanu 2013). Even though, number of precision farming technologies suitable for Indian condition are identified and recommended, the rate of adoption of these technologies vary from farmer to farmer as it is influenced by background and socio-economic characteristics of the farmers. Thus, it is essential to analyze the personal and socio-economic

characteristics of the farmers and their association with various behaviour aspects of an individual which would give a basic and clear picture about the background of the farmers and helps to design the strategies to be taken up for encouraging the precision farming. Hence, the present study is taken up with the specific objective: To study the personal, socio-economic and psychological characteristics of horticulture crop growers and their association with cognitive, perception and adoption level.

METHODOLOGY

The study was conducted in Chikkaballapur and Kolar districts of Eastern dry zone of Karnataka state in 2021-22. One potential taluk from each district based on area, production and productivity was selected. Further, from each taluk 20 tomato growers, 20 capsicum growers and 20 rose growers were selected. Thus, the total number of respondents for the study was 120 farmers. Ex-post facto research design was used. The data was collected by personal interview method using pre-tested interview schedule and suitable statistical tools were employed for data analysis.

RESULTS AND DISCUSSION

A. Personal, socio-economic and psychological characteristics of horticulture crop growers

Age: It is evident from the Table 1 that, more than three-fifth (64.17 %) of the horticulture crop growers belonged to middle age group followed by young (25.83 %) and old (10.00 %) age groups. The probable reason might be that middle aged growers were well educated and were very enthusiastic to know and adopt the innovative technologies like precision farming to increase their standard of living. The results are in line with Harisha (2017) and Barman *et al.*, (2021).

Education: It can be observed from the Table 1 that 30.00 per cent of the horticulture crop growers had high school education followed by PUC (25.00 %), illiterates (17.00 %), graduation and above education (14.17 %), middle school (10.83 %) and primary school education (02.50 %). It is clear from the above results that most of the horticulture crop growers were educated upto high school, the possible reasons for the above trend may be due to the fact that the presence of high schools in rural setting and distance constraint to procure higher education from nearby towns. The results are in conformity with Kudari (2014).

Family size: The keen observation of the Table 1 indicates that significant per cent (68.33 %) of horticultural crop growers belonged to medium family size. The possible reason may be because growers were middle aged and had basic formal education which has enabled them to be aware of various family planning campaigns and understand the importance of family

planning. The similar results were reported by Patil (2014) and Khan *et al.*, (2022).

Land holding: The Table 1 reveals that more than two-fifth (42.50 %) of the tomato growers were small farmers followed by big (32.50 %) and marginal (25.00 %) farmers. Among capsicum growers, two-fifth (40.00 %) of them belonged to small farmers category and equal (30.00 %) per cent of them belonged to marginal and big farmer's category. While, 60.00 per cent of the rose growers were marginal farmers, one-fourth (25.00 %) of them were small farmers and 15.00 per cent of them were big farmers. The above results show that most of the horticulture crop growers were marginal and small farmers. The possible reason for above trends may be due to the fragmentation of ancestral property/land into smaller fragments among the family members. The findings are in line with findings of Kamaraddi (2011).

Annual Income: The glance at Table 1 reveals that, more than three-fifth (67.50 %) of the horticulture crop growers belonged to high level of annual income followed by medium (17.50 %) and low (15.00 %). The might be due to the fact that the growers get more income by adopting precision farming technologies particularly in cultivation of high value crops like vegetables and flower crops. Further, carrying out subsidiary enterprises like dairy farming and poultry might have added to their income enabling the growers to get medium to higher level of annual income. The findings are in accordance with Kudari (2014).

Experience in precision farming: It is apparent from Table 1 that, more than half (55.00 %) of the tomato growers had medium level of experience in precision farming followed by low and high farming experience. In case of capsicum growers, two-fifth (40.00 %) of the growers had medium level of experience followed by low (35.00 %) and high (25.00 %) level of experience in precision farming. Among rose growers, 32.50 per cent of growers had medium experience, 52.00 per cent had low and 15.00 of them had high experience in precision farming. It is clear from the results that most of the growers had medium experience in precision farming. This is might be due to the availability of the mulching sheets, drippers, shade nets and other implements at subsidized rates under various schemes over past few years and majority of the growers were middle aged and were marginal farmers. The similar results were also reported by Padma (2013).

Area under precision farming: It can be inferred from Table 1 that, nearly three-fourth (59.17 %) of the horticulture crop growers had medium area under precision farming followed by high (27.50 %) and low (13.33 %) area under precision farming respectively. This could be due to that majority of them belonged to small and marginal farmer's category and had medium experience in precision farming. The results are in line with Padma (2013).

Table 1: Personal, socio-economic and psychological characteristics of horticulture crop growers. (n=120)

Sr. No.	Characteristics	Categories	Tomato growers n ₁ =40		Capsicum growers n ₂ =40		Rose growers n ₃ =40		Total n=120	
			No.	%	No.	%	No.	%	No.	%
1.	Age	Young (<35years)	12	30.00	10	25.00	09	22.50	31	25.83
		Middle (36 to 50years)	23	57.50	28	70.00	26	65.00	77	64.17
		Old (>50years)	05	12.50	02	05.00	05	12.50	12	10.00
2.	Education	Illiterate	06	15.00	08	20.00	07	17.50	21	17.50
		Primary school	02	05.00	00	00.00	01	02.50	03	2.50
		Middle school	03	07.50	05	12.50	05	12.50	13	10.83
		High school	13	32.50	11	27.50	12	30.00	36	30.00
		PUC	11	27.50	09	22.50	10	25.00	30	25.00
		Graduation and above	05	12.50	07	17.50	05	12.50	17	14.17
3.	Family size	Small (1-3 members)	01	02.50	05	12.50	05	12.50	11	09.17
		Medium (4-6 members)	30	75.00	22	55.00	30	75.00	82	68.33
		Large (>7 members)	09	22.50	13	32.50	05	12.50	27	22.50
4.	Land holding	Marginal farmers (<2.50 acres)	10	25.00	12	30.00	24	60.00	46	38.33
		Small farmers (2.50-5.0 acres)	17	42.50	16	40.00	10	25.00	43	35.83
		Big farmers (>5.0 acres)	13	32.50	12	30.00	06	15.00	31	25.84
5.	Annual Income Mean=4,88,000 SD=3,56,000	Low (<3,10,000)	06	15.00	07	15.50	05	12.50	18	15.00
		Medium (3,10,000-6,66,000)	08	20.00	09	22.50	04	10.00	21	17.50
		High (>6,66,000)	26	65.00	24	60.00	31	77.50	81	67.50
6.	Experience in precision farming Mean=4.30 SD=2.01	Low (<3.29)	13	32.50	14	35.00	21	52.50	48	40.00
		Medium (3.29-5.30)	22	55.00	16	40.00	13	32.50	51	42.50
		High (>5.30)	05	12.50	10	25.00	06	15.00	21	17.50
7.	Area under precision farming Mean=1.87 SD=1.69	Low (<1.02)	08	20.00	04	10.00	04	10.00	16	13.33
		Medium (1.02-2.72)	18	45.00	23	57.50	30	75.00	71	59.17
		High (>2.72)	14	35.00	13	32.50	06	15.00	33	27.50
8.	Farm power possession Mean=2.50 SD=1.46	Low (<1.77)	14	35.00	08	20.00	14	35.00	36	30.00
		Medium (1.77-3.24)	15	37.50	19	47.50	15	37.50	49	40.83
		High (>3.24)	11	27.50	13	32.50	11	27.50	35	29.17
9.	Extension Participation Mean=4.74 SD=2.05	Low (<3.71)	09	22.50	12	30.00	13	32.50	34	28.33
		Medium (3.71-5.76)	18	45.00	15	37.50	15	37.50	48	40.00
		High (>5.76)	13	32.50	13	32.50	12	30.00	38	31.67
10.	Social Recognition Mean=1.54 SD=1.48	Low (<0.80)	11	27.50	10	25.00	13	32.50	34	28.33
		Medium (0.80-2.28)	15	37.50	18	45.00	16	40.00	49	40.83
		High (>2.28)	14	35.00	12	30.00	11	27.50	37	30.83
11.	Mass media exposure Mean=10.88 SD=4.25	Low (<8.75)	14	35.00	12	30.00	10	25.00	36	30.00
		Medium (8.75-13.01)	15	37.50	14	35.00	16	40.00	45	37.50
		High (>13.01)	11	27.50	14	35.00	14	35.00	39	32.50
12.	Extension contact Mean=9.42 SD=2.80	Low (<8.02)	10	25.00	10	25.00	13	32.50	33	27.50
		Medium (8.02-10.82)	17	42.50	21	52.50	15	37.50	53	44.17
		High (>10.82)	13	32.50	09	22.50	12	30.00	34	28.33
13.	Economic Motivation Mean=22.58 SD=2.43	Low (<21.36)	11	27.50	10	25.00	09	22.50	30	25.00
		Medium (21.36-23.80)	16	40.00	16	40.00	19	47.50	51	42.50
		High (>23.80)	13	32.50	14	35.00	12	30.00	39	32.50
14.	Risk Taking Ability Mean=14.23 SD=1.41	Low (<13.52)	12	30.00	11	27.50	15	37.50	38	31.67
		Medium (13.52-14.93)	15	37.50	17	42.50	18	45.00	50	41.67
		High (>14.93)	13	32.50	12	30.00	07	17.50	32	26.67
15.	Innovativeness Mean=14.18 SD=1.35	Low (<13.50)	15	37.50	04	10.00	10	25.00	29	24.17
		Medium (13.50-14.86)	17	42.50	19	47.50	18	45.00	54	45.00
		High (>14.86)	08	20.00	17	42.50	12	30.00	37	30.83

Farm power possession: An insight into Table 1 indicates that, 37.50 per cent of the tomato growers had medium farm power possession followed by low (35.00 %) and high (27.50 %) farm power possession. Among capsicum growers, nearly half (47.50 %) of the growers had medium farm power possession followed by high (32.50 %) and low (20.00 %) farm power possession. With respect to rose growers 37.50 per cent of them had medium farm power possession followed by low (35.00 %) and high (27.50 %) farm power possession. It is evident from the data that majority of the horticulture crop growers had medium to low farm power possession, the probable reason might be that majority of the growers possessed electric motor, tractor, power tiller etc., and medium to small land holdings. The results are in conformity with Sangeetha (2009).

Extension participation: A bird eye view of the Table 1 indicates that, two-fifth (40.00 %) of the horticulture crop growers had medium level of extension participation followed by high (31.67 %) and low (28.33 %) level of extension participation. This could be due to the awareness of the growers regarding various extension activities carried out by line departments and active participation in the various training programmes. The findings of the present study were in conformity with the results reported by Sudha (2008).

Social Recognition: It can be clearly noted from Table 1 that 40.83 per cent of the horticulture crop growers had medium level of social recognition followed by high (30.83 %) and low (28.33 %) level of social recognition. The above trend may be due the fact that recognition of the growers in their locality by other farmers, friends, relatives and neighbors as progressive farmers due to adoption of precision farming technologies as well as their improved standard of living.

Mass media exposure: The findings from the Table 1 indicates that, two-fifth (40.00 %) of rose growers and 37.50 per cent of tomato growers belonged to medium mass media exposure category, whereas equal (30.00 %) per cent of capsicum growers belonged to high and medium category of mass media exposure. This might be due to the increased mobidensity and connectivity to the rural areas. Further the majority of the growers were middle aged and had basic education which paved them an ease to use and access the various mass media and social media platforms to gain knowledge on various aspects of precision farming.

Extension Contact: The data presented in Table 1 indicates that majority of the growers belongs to medium to high level of extension contact. This might be due to the fact that establishment of KVK's in the area as well as RSK's at hobli level led the growers to have close contact with the officials and also the presence of College of agriculture/horticulture in the study area helped the farmers to maintain a close contact with the scientists through Rural Agriculture Work Experience programme and other extension activities conducted by the SAU's. The results are in accordance with findings of Sindhu (2021).

Economic motivation: It is observed from Table 1 that, more than two-fifth (42.50 %) of the horticulture

crop growers had medium level of economic motivation followed by high (32.50 %) and low (25.00%) level of economic motivation. The medium to high economic motivation of the growers may be due the fact that higher returns and profit are the ultimate goal. Further, growers are market oriented and attempt to achieve resource use efficiency through adoption of various precision farming technologies to earn more profits and improve their standard of living by cultivating high value crops or commercial crops because of their innovativeness characteristics. The results are in conformity with the findings of Hanjabam (2014); Nayak and Banerjee (2022).

Risk Taking Ability: It is evident from Table 1 that, two-fifth (41.67 %) of the horticulture crop growers belonged to medium level of risk bearing ability followed by low (31.67 %) and high (26.67 %) level of risk bearing ability. In case of tomato growers, 37.50 per cent of them possessed medium risk bearing ability, whereas 32.50 per cent of them possessed high and 30.00 per cent of them possessed low risk bearing ability. Among capsicum growers, 42.50 per cent of the growers had medium risk bearing ability followed by high (30.00 %) and low (27.50 %) risk bearing ability. With respect to rose growers, 45.00 per cent of them belonged to medium risk bearing ability category followed by low (37.50 %) and high (17.50 %) risk taking ability categories. The growers belong to medium to high risk bearing ability; this might be due to the fact that growers always take moderate risk to adopt the innovative precision farming technologies as they require high initial investment to get more profit and as these approaches are new to them. The results are in accordance with Harisha (2017).

Innovativeness: A glimpse of Table 1 shows that, 45.00 per cent of the horticulture crop growers belonged to medium level of innovativeness followed by high (30.83 %) and low (24.17%) level of innovativeness. The probable reason for the above trend may be due to the medium to high risk bearing ability of the growers and cosmopolite nature of the growers. The results are in line with Kudari (2014).

B. Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their cognitive level

Table 2 presents the data with respect to association between personal, socio-economic and psychological characteristics of horticulture crop growers with their cognitive level.

With respect to overall horticulture crop growers, characteristics like extension participation and economic motivation had positive and significant association with cognitive level of understanding at one percent level. Whereas, characteristics like education, experience in precision farming, mass media exposure and extension contact had positive and significant association with cognitive level of understanding at five per cent level of significance. However, age, family size, landholding, annual income, area under precision farming, farm power possession, social recognition, risk bearing ability and innovativeness had non-significant association with cognitive level.

Education was found to be significantly associated with cognitive level of the horticulture crop growers. The probable reason might be that higher education level of the growers might have created interest in the growers to gain significant knowledge about precision farming technologies and motivated them to adopt the precision farming technologies to improve their standard of living.

Experience paves the strong basis for knowledge. Experience in precision farming was found to be significantly associated with cognitive level of the horticulture crop growers. The probable reason might be that, it is obvious that those who involve more in precision farming activities, they will gain more knowledge, get more yield and income, have good status and recognition in the society. They will also be well versed regarding the various aspects of production, market intelligence, risk bearing ability and manage their farm efficiently with the knowledge they have gained through the experience.

Extension participation of horticulture crop growers was positively and significantly associated with cognitive level. Extension participation helps the growers to get a significant exposure to wide range of information about precision farming technologies from various sources. It also provides an opportunity to the growers to interact, discuss and learn various aspects of precision farming from extension agents and also their fellow mates.

Mass media have a significant importance in creating awareness and increasing knowledge about innovative

technologies among the mass of people. The mass media exposure has significant association with the cognitive level of the horticulture crop growers. The probable reason might be that in current scenario mass media and social media platforms plays a crucial role in providing information on wide range of aspects of farming without any time constraints which help the growers to plan and decide need based farm operations to enhance their productivity.

Extension contact had a significant association with the cognitive level of the horticulture crop growers. The probable reason might be that growers had significant participation in various extension activities regarding precision farming carried out by department of horticulture, KVK, RSK and the college of horticulture, Kolar & college of sericulture, Chintamani which have resulted in maintaining a cordial relationship with the officials and scientists. This lead to frequent contact with extension agents to gain information and discuss about various aspects of precision farming and gain significant knowledge motivating them to adopt various precision farming technologies.

Economic motivation had a significant association with the cognitive level of the horticulture crop growers. The probable reason might be that higher economic motivation creates desire and urge to gather or know more about precision farming technologies for efficient utilization of resources to increase their productivity and earn more profits.

Table 2: Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their cognitive level.

(n=120).

Sr. No.	Independent variables	Chi-square			
		Tomato growers n ₁ =40	Capsicum growers n ₂ =40	Rose growers n ₃ =40	Overall horticulture growers n=120
1.	Age	1.606 ^{NS}	1.538 ^{NS}	2.296 ^{NS}	1.595 ^{NS}
2.	Education	15.336*	17.009**	19.452**	15.638*
3.	Family size	3.636 ^{NS}	5.180 ^{NS}	6.178 ^{NS}	4.198 ^{NS}
4.	Landholding	1.524 ^{NS}	2.485 ^{NS}	2.016 ^{NS}	2.199 ^{NS}
5.	Annual income	3.398 ^{NS}	3.011 ^{NS}	3.012 ^{NS}	6.142 ^{NS}
6.	Experience in precision farming	15.544**	10.271*	9.382*	14.071*
7.	Area under precision farming	4.198 ^{NS}	1.195 ^{NS}	2.297 ^{NS}	5.334 ^{NS}
8.	Farm power possession	6.684 ^{NS}	9.075 ^{NS}	5.413 ^{NS}	5.484 ^{NS}
9.	Extension participation	10.332**	14.964**	13.115**	13.039**
10.	Social recognition	1.051 ^{NS}	1.344 ^{NS}	6.546 ^{NS}	2.302 ^{NS}
11.	Mass media exposure	9.892*	11.424*	14.963*	10.427*
12.	Extension contact	13.327**	10.327**	10.974*	10.911*
13.	Economic motivation	15.057**	12.634**	19.174**	15.216**
14.	Risk bearing ability	7.598 ^{NS}	8.949 ^{NS}	3.870 ^{NS}	6.256 ^{NS}
15.	Innovativeness	3.145 ^{NS}	3.547 ^{NS}	3.869 ^{NS}	3.538 ^{NS}

* Significant at 5% level; **Significant at 1% level; NS-Non-significant

C. Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their perception level

With regards to overall horticulture crop growers, characteristics like education, annual income, extension participation, mass media exposure, extension contact and risk bearing ability had positive and significant association with perception level at one percent level. Whereas, experience in precision farming had positive and significant association with perception level at five per cent level of significance. However, age, family size, land holding, area under precision farming, farm power possession, social recognition, economic motivation and innovativeness had non-significant association with perception level.

Education had positive and significant association with the perception level of growers towards precision farming technologies. The probable reason might be that education level of an individual about a technology or practices influence his thought process and way of perceiving the things around him. Growers with the higher education level will possess the better ability to understand the pros and cons of the technology and take decision accordingly to adopt those technologies in their farm.

Annual income of the horticulture crop growers had positive and significant association with their perception towards precision farming technologies. The probable reason might be that annual income plays a crucial role in obtaining education and motivate them to earn more profit by gaining more knowledge towards a particular technology which in turn influences the perception of an individual.

Mass media exposure of the horticulture crop growers has positive and significant association with their perception level. The possible reason might be that, mass media provides ample information on various aspects of precision farming; greater mass media exposure enhances the growers to obtain more information about precision farming technologies and their usage. Also, increased mass media exposure widens the mental horizon of the growers to accept and adopt various precision farming technologies which in turn increase the resource use efficiency and income of the growers. The risk bearing ability of the horticulture crop growers has positive and significant association with their perception level. The probable reason for the above trend might be that growers with higher risk bearing ability tend to gather more information regarding precision farming technologies from various sources. So, the growers with greater risk bearing ability would take up the risk of adopting the innovative technologies by developing favourable perception towards precision farming in order to increase the farming efficiency.

Extension participation had positive and significant association with the perception level of the growers towards precision farming technologies. Participation of the horticulture crop growers in various extension activities like training programmes, demonstration, field days and group discussion provides an opportunity to the growers to enhance their knowledge which thereby encourages them to build appropriate perspective in relation to precision farming technologies. So the growers who participate more on extension activities no doubt have better perception level.

Table 3: Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their perception level. (n=120)

Sr. No.	Independent variables	Chi-square			
		Tomato growers n ₁ =40	Capsicum growers n ₂ =40	Rose growers n ₃ =40	Overall horticulture growers n=120
1.	Age	0.187 ^{NS}	3.454 ^{NS}	4.119 ^{NS}	2.219 ^{NS}
2.	Education	13.404 ^{**}	28.903 ^{**}	15.058 ^{**}	20.006 ^{**}
3.	Family size	0.802 ^{NS}	3.966 ^{NS}	1.006 ^{NS}	2.886 ^{NS}
4.	Landholding	7.664 ^{NS}	2.531 ^{NS}	3.599 ^{NS}	5.457 ^{NS}
5.	Annual income	11.787 ^{**}	11.182 ^{**}	11.379 ^{**}	14.337 ^{**}
6.	Experience in precision farming	11.520 [*]	12.877 ^{**}	10.810 [*]	10.949 [*]
7.	Area under precision farming	1.352 ^{NS}	2.032 ^{NS}	3.016 ^{NS}	3.480 ^{NS}
8.	Farm power possession	6.973 ^{NS}	1.202 ^{NS}	6.263 ^{NS}	4.190 ^{NS}
9.	Extension participation	11.797 ^{**}	18.594 ^{**}	13.426 ^{**}	13.023 ^{**}
10.	Social recognition	4.648 ^{NS}	8.092 ^{NS}	1.841 ^{NS}	2.329 ^{NS}
11.	Mass media exposure	19.339 ^{**}	12.840 ^{**}	14.132 ^{**}	19.324 ^{**}
12.	Extension contact	14.973 ^{**}	12.456 ^{**}	13.079 ^{**}	12.504 ^{**}
13.	Economic motivation	6.296 ^{NS}	6.630 ^{NS}	4.520 ^{NS}	5.674 ^{NS}
14.	Risk bearing ability	11.397 [*]	10.235 [*]	15.074 ^{**}	14.013 ^{**}
15.	Innovativeness	2.915 ^{NS}	6.829 ^{NS}	5.362 ^{NS}	6.766 ^{NS}

* Significant at 5% level; **Significant at 1% level; NS-Non-significant

Extension contact has positive and significant association with the perception level of the growers. The growers having regular contact with extension agents would benefit them by having awareness and information on various precision technologies earlier than others in their locality and influence their perception and interpretation about the precision technologies.

Experience of growers in precision farming has positive and significant association with their level. Experience of an individual acts as the basis for the individual's knowledge regarding the technology which in turn influence the way individual perceives the technology and influence their adoption behavior. So, it is obvious that growers with the more experience in precision farming have higher perception level.

D. Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their adoption level

With respect to overall horticulture crop growers, characteristics like land holding, annual income, area

under precision farming, farm power possession, extension contact, economic motivation and risk bearing ability had positive and significant association with adoption level at one percent level. Whereas, characteristics like experience in precision farming, and innovativeness had positive and significant association with adoption level at five per cent level of significance. However, age, education, family size, extension participation, social recognition and mass media exposure had non-significant association with adoption level. The findings are in line with Pujar *et al.*, 2021.

The study revealed that there was a positive and significant association between landholding and adoption level. The probable reason might be that growers with larger landholding will have a relative advantage of cost of economies, resource mobilization and more opportunities to try and adopt precision farming technologies to get higher yield and to earn more profit.

Table 4: Association between personal, socio-economic and psychological characteristics of horticulture crop growers with their adoption level. (n=120)

Sr. No.	Independent variables	Chi-square			
		Tomato growers n ₁ =40	Capsicum growers n ₂ =40	Rose growers n ₃ =40	Overall horticulture growers n=120
1.	Age	0.209 ^{NS}	4.289 ^{NS}	2.828 ^{NS}	3.453 ^{NS}
2.	Education	10.487 ^{NS}	5.034 ^{NS}	4.792 ^{NS}	9.714 ^{NS}
3.	Family size	6.145 ^{NS}	1.795 ^{NS}	4.454 ^{NS}	3.691 ^{NS}
4.	Landholding	19.790 ^{**}	19.892 [*]	18.822 ^{**}	19.568 ^{**}
5.	Annual income	12.099 ^{**}	10.415 [*]	10.567 [*]	11.866 ^{**}
6.	Experience in precision farming	11.341 [*]	8.006 [*]	29.310 ^{**}	15.456 [*]
7.	Area under precision farming	13.853 ^{**}	19.177 ^{**}	13.306 ^{**}	12.826 ^{**}
8.	Farm power possession	14.233 ^{**}	19.611 ^{**}	9.500 ^{**}	11.112 ^{**}
9.	Extension participation	1.344 ^{NS}	5.700 ^{NS}	6.320 ^{NS}	2.845 ^{NS}
10.	Social recognition	6.518 ^{NS}	9.990 [*]	7.739 ^{NS}	9.485 ^{NS}
11.	Mass media exposure	4.749 ^{NS}	1.572 ^{NS}	2.333 ^{NS}	5.674 ^{NS}
12.	Extension contact	12.719 ^{**}	16.713 ^{**}	12.993 ^{**}	17.987 ^{**}
13.	Economic motivation	13.191 ^{**}	10.123 [*]	14.158 ^{**}	12.765 ^{**}
14.	Risk bearing ability	12.324 ^{**}	14.074 ^{**}	10.864 [*]	14.000 ^{**}
15.	Innovativeness	10.175 [*]	12.576 [*]	11.114 [*]	9.397 [*]

* Significant at 5% level; **Significant at 1% level; NS-Non-significant

Annual income had a positive and significant association with the adoption level of the horticulture crop growers. This might be due to the fact that higher annual income creates greater avenues to the growers to modernize their farming with innovative technologies like precision farming technologies leading to the higher adoption level.

Economic motivation of the horticulture crop growers had a positive and significant association with their adoption level. This might be due to the fact that higher economic motivation of the growers would have led them to acquire more knowledge about precision farming technologies and this would have resulted in the higher adoption level. Further, the higher economic motivation would have motivated them to increase the productivity and earn more profit by adopting site

specific nutrient management technologies like precision farming technologies

Risk bearing ability of the horticulture crop growers had a positive and significant association with their adoption level. The probable reason might be due to the fact that growers with higher risk bearing ability are curious to know and adopt the innovative technologies, this would have led the horticulture crop growers to adopt the precision farming technologies to optimize their productivity and earn more profit.

The experience in precision farming technologies of horticulture crop growers had significant association with their adoption level because, the experienced growers can compare the outcomes of the precision farming technologies with the traditional farming technologies and the positive outcomes of the precision farming technologies obtained by their experience in

adoption these technologies would create a favourable attitude towards these technologies and motivate them to adopt the precision farming technologies.

The social recognition had positive and significant association with the adoption level of horticulture crop growers. This might be due to the fact that the fame and recognition in the society motivate the individual to achieve/ shine in the particular area. This would have led the growers to adopt the precision farming technologies in greater extent.

There was a significant association between adoption level and innovativeness of the horticulture crop growers. The probable reason might be that innovative nature of the grower motivates them to gather more information regarding innovative technologies and adopt them to earn more profit.

CONCLUSIONS

India being one of the leading agricultural producers globally has the largest arable lands worldwide, with over 155 million hectares. In the wake of climate change, depletion of natural resources and an imminent food crisis, India must move beyond aggressive farming i.e., should practice precision farming which can reverse the aftermaths of the Green Revolution and usher in an era of Evergreen Revolution. Rapid socio-economic changes in India, is creating ample of opportunities for the application of precision farming. Indian farmers based on their socio-economic situation should adopt technologies which are sustainable in practicing, intensifying productivity, and augment farm income. Precision farming can influence a paradigm shift in obsolete and aggressive farming practices to digitally transformed agricultural practices to feed an ever-growing global population.

FUTURE SCOPE

The study focuses on only eastern dry zone of Karnataka Thus; similar studies can be carried out in other agro climatic zones of the state and country in order to reach a more concrete conclusion.

Acknowledgements. The authors are thankful to the University of the Agricultural Sciences, GKVK, Bangalore-560065, Karnataka, India for the research facilities and farmers of Kolar and Chikkaballapur District for their valuable response.

Conflict of interest. None

REFERENCE

Barman, M., Das, P. K., Barman, I. and Deka, S. D. (2021). Characteristics of Farmer Producer Company Members and their Perceived Constraints with Reference to Commercial Potato Production and

Marketing. *Biological Forum- An International Journal*, 13(4), 98-103.

Hanjabam, S. (2014). Analysis of the Profile Characteristics and Attitude of the Farmers, Extent of Adoption and Constraints in Taking up Precision Farming in Kerala. *International Journal of Humanities and Social Sciences*, 1(2), 258-289.

Harisha, N. (2017). A study on vegetable production under protected cultivation in Kolar district of Karnataka, *M.Sc. Thesis* (Unpub.), University of Agricultural Sciences, Raichur.

Kamaraddi, P. (2011). Entrepreneurial behaviour of pomegranate growers in Koppal district of Karnataka, *M.Sc. Thesis* (Unpub.), Acharya N. G. Ranga Agricultural University, Hyderabad.

Khan, I., Bashir M., Ganiel, N. A., Rafiq, A., Bhat, I. A., Dar1, K.A., Qadri1, S.F.I., Ashraf1, S., Nagool, S. A. and Buhrool, Z. I. (2022). Study on Impact of the Socio Economic conditions of the Sericultural Farmers on Cocoon Production. *Biological Forum – An International Journal*, 14(4), 1153-1156.

Kudari, B.M. (2014). A study on perception of precision farming by the farmers. *M.Sc. Thesis* (Unpub.), University of Agricultural Sciences, Dharwad.

Nayak, B. and Banerjee, P. K. (2022). Entrepreneurial Behaviour of Vegetable Growers in Odisha. *Biological Forum- An International Journal*, 14(2a), 608-613.

Mandal, S. and Atanu, M. (2013). Precision farming for small agricultural farm: Indian scenario. *American Journal of Experimental Agriculture*, 14(8), 17-21.

Padma, S. R. (2013). Perspectives of stakeholders on precision farming by the farmers. *Ph. D. Thesis* (Unpub.), Tamil Nadu Agricultural University, Coimbatore.

Patil, P. P. (2014). Technological gap in turmeric production technology in Sangli district. *M.Sc. Thesis* (Unpub.), Mahatma Phule KrishiVidyapeeth, Rahuri.

Pujar, S. S., Kumar, K. A., Kavyashree, C., Suresha, S. V. and Shashikalabai, D. (2021). Profile characteristics association with the utilization pattern of ICT tools and the suggestions to overcome the constraints faced by the ICT tools user farmers. *The Pharma Innovation Journal*, 10(11), 2490-2492.

Sangeetha, S. (2009). Study on factors influencing precision farming technologies in Tomato cultivation. *M.Sc. Thesis* (Unpub.), Tamil Nadu Agricultural University, Coimbatore.

Sindhu, M. U. (2021). Farmer's knowledge and perception on importance of pollinators and pollination in crop production of Kolar and Chikkaballapur districts in Karnataka state. *M. Sc. Thesis* (Unpub.), University of Agricultural Sciences, Bangalore.

Sudha, T. (2008). Prospects of precision farming in Dharmapuri districts-a multidimensional analysis. *M.Sc. Thesis* (Unpub.), Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai.

How to cite this article: Sai Tejashree G., Y. N. Shivalingaiah, Siddayya, K. P. Raghuprasad and Sagar S. Pujar (2023). Personal, Socio-Economic and Psychological Characteristics of Horticulture Crop Growers and their Association with Cognitive, Perception and Adoption Level. *Biological Forum – An International Journal*, 15(7): 164-171.