



E-ISSN: 2788-9297
P-ISSN: 2788-9289
www.agrijournal.org
SAJAS 2021; 1(2): 146-150
Received: 19-05-2021
Accepted: 11-07-2021

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Transforming apple farming in Himachal Pradesh through information and communication technology

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Abstract

Himachal Pradesh has long been regarded as a horticultural state due to magnificent achievements in the production of fruits, mainly apple, which constitutes about 49 per cent of the total area under fruit crops and about 85 per cent of the total fruit production. The present study is an attempt to find the socio-economic status of apple growers and perception of apple growers regarding the use of ICT in the study area. The study was carried out in Shimla and Kullu districts of Himachal Pradesh. In all, the study targeted 100 apple growers aged 21 and above who use ICTs for apple farming purposes. The non probability method was used with random-cum-purposive sampling technique. The data was collected through focused group discussion, interview and questionnaire. The collected primary data was tabulated; computerized simple statistical tools such as percentages and chi-square were used. At the same time, a substantial part of this research paper is based on table analysis.

Keywords: Apple Growers, ICTs, Perception of Apple Growers.

Introduction

Agriculture is the main occupation of the people of Himachal Pradesh and has an important place in the economy of the state. Himachal Pradesh is the only state in the country whose 89.96 per cent population (Census, 2011) lives in rural areas. Therefore, dependency on agriculture/ horticulture is eminent as it provides direct employment to about 70 per cent of total workers of the state. Agriculture happens to be the premier source of state income (SGDP). About 13.62 per cent of the total SGDP comes from agriculture and its allied sectors. Out of the total geographical area of state 55.67 lakh hectares, the area of operational holdings is about 9.44 lakh hectares and is operated by 9.97 lakh farmers. The average holding size is about 1.00 hectare (Economics and Statistics Department, Government of Himachal Pradesh, 2020-21) ^[1]. Apple is one of the most important fruit crops of Himachal Pradesh, which constitutes about 49 per cent of the total area under fruit crops and about 85 per cent of the total fruit production. The rich diversity of agro-climatic conditions, topographical variations and attitudinal differences coupled with fertile deep and well drained soil favours the cultivation of temperate to sub-tropical fruit in the Himachal, the region is also suitable for cultivation of ancillary horticultural produce like flowers, mushroom, honey and hops. This particular suitability of Himachal has resulted in shifting of land use pattern from agriculture to fruit crops in the past few decades. It is the biggest producer of quality fruits like Apple. The area under apple has increased from 400 hectares in 1950-51 to 3025 hectares in 1960-61 and 114144 hectares in 2019-20. The total apple production in 2002-03 was 3.48 lakh tonnes, while during 2019-20 this has been reported as 7.15 lakh tonnes. Approximately 90 percent of the total apple produce is exported to the distant markets of the country. An estimated Rs. 5,000 crore apple economy has strong backward and forward linkages generating employment to lakhs of people Such as transporters, carton manufacturers, controlled atmosphere store/cold chain owners, wholesale fruit dealers, fruit processing unit owners, etc. from other states. It comes to an economy of almost Rs 28,000 crore annually if one includes the ancillary add-ons of 'apple production and trade' (Deccan 2021) ^[2]. The state has emerged as a leading producer of apple but production level of the crop in Himachal Pradesh is far below the international standards. Therefore, ICT use is very important for apple farming to compete in this competitive world and it helps to seek information on apple farm activities and to enhance the knowledge of apple growers. ICT is of great significance both for the individual and economic development. Information is one of the fundamental tools for horticultural growth and development because today apple farming is not only an occupation, it has become a business. So ICT enhance the apple grower (s) production efficiency and minimizes their risk and burden in apple farm activities.

As rightly stated by Winrock (2003) [3] information and communication technology (ICT) have touched almost every field of human activity and horticulture is not an exception to that.

Despite the greater role of horticulture in the state economy, yet the state of Himachal Pradesh has not been able to realize its real apple production potential as it is much lower than the international standards. In addition, there is a huge gap between actual yield and possible potential yield of apple crops. Clearly indicating that the available technologies, if adopted by the farmers can increase agricultural production considerably (Waqas *et al.* 2017; Ahmad *et al.* 2016) [4, 5]. Therefore, there is a dire need to make use of information and communication technology in the field of apple farming. In this context, apple growers require sufficient information and exposure to the latest technologies. Research has shown that farmer’s information exposure is most likely to be a key factor influencing their adoption behaviour (Musingafi and Zebron, 2014) [6]. It assist farmers to plan market so as to obtain better price for produce and it also save from exploitations from the middlemen, who uses the prevailing information-gap (Anoop *et al.*, 2015) [7].

“Digital India” an initiative of Government of India launched in the year 2015, emphasizes on three factors *viz.* digital infrastructure, digital services and digital literacy. Agriculture is an important component which is directly going to impact agricultural extension and marketing services. It seeks to change rural India into a digitally-empowered knowledge economy, by providing universal phone connectivity and access to broadband in 250,000 villages, extend timely services to farmers through information technology and its tools and enhance efficiency in agricultural governance through digital literacy and electronic delivery of services. It is pertinent to mentioned that agricultural extension system is playing an important role since decades in disseminating horticulture technology to the apple growers. Information Technology (IT) may strengthen our extension system manifold by use of various IT tools in technology dissemination and empowering apple growers with the desired information. Their use with right perspective will transform information services to the farmers to be timely, logistic and effective (Pukhta, Sufi & Maqbool, 2012) [8]. The present study gives vital insights into the new technological age in the apple farming which follows the acceptance of modern ICT like internet, mobile, television and radio in the apple farm operations to increase their efficiencies and enhance their knowledge.

Keeping in view the importance of apple production and productivity level in Himachal Pradesh as compare to the international standards is far below, it is important to find out the transformation of apple farming in Himachal Pradesh through Information and Communication Technology (ICT) and the actors influencing the process of such transformation. The research paper is a modest attempt in this direction.

Objectives

- To examine the demographic profile of the apple growers as per age, gender, income and education level
- To identify usage of ICT as per the perception of apple growers
- To determine the usage of ICT as per demographic variables

Methodology

With a view to accomplish the objectives of the present study, primary data has been collected from the apple growers. The study was carried out in two districts of Himachal Pradesh (Shimla and Kullu). Primary data have been collected from the sample respondents and to collection of relevant first-hand data in the present study multistage random-cum-purposive sampling method was used. At the first stage, two districts were selected purposively. These districts were selected on the basis of highest production and highest area under apple farming. The two districts were Shimla and Kullu. At the second stage four development blocks, two from each district were selected (Narkanda and Rohru blocks from Shimla and Naggar and Anni from Kullu blocks). At the third stage, 5 villages, five from each panchayat, were selected randomly whereas the selection of villages was made on the basis of the highest apple production. At the fourth stage, 100 respondents (50 from each district) were selected. Data was collected through a self-administered questionnaire. To ensure high response rate, the questionnaire was administered personally by the researcher. The reference year of the study was 2020-21 and data collection was carried out during May-September 2021.

Results

Demographic characteristics of apple growers showed that highest number of representation was observed in 31-40 years (30%), followed by 25% respondents equally belonged to the age group of 21-30 and 41-50 years respectively. Only 20% respondents belonged to the age group of 50 years and above and majority of the apple growers are in their middle age as depicted in Table 1.

Table 1: Socio-economic Status of Apple Growers

Age (Years)	N	%	Education	N	%
21-30	25	25.0	Primary	10	10.0
31-40	30	30.0	High School	35	35.0
41-50	25	25.0	Higher Secondary	25	25.0
51 & above	20	20.0	Graduate & above	30	30.0
Total	100		Total	100	
Gender	N	%	Marital Status	N	%
Male	84	84.0	Single	24	24.0
Female	16	16.0	Married	76	76.0
Total	100		Total	100	
Category	N	%	Income (Yearly)	N	%
Schedule caste	22	22.0	200001-300000	19	19.0
General	78	78.0	300001-400000	30	30.0
Total	100		400001-500000	33	33.0
Type of family	N	%	500001 & above	18	18.0
Nuclear family	37	37.0	Total	100	
Joint family	42	42.0			
Extended family	21	21.0			
Total	100				

N = Number; % = Percentage.

Out of 100 respondents, from both the districts 84 per cent were males and only 16 per cent were females. In the sample males represent majority of the respondent which shows gender predilection among the farmers in both the districts as revealed in Table 1. Only 24 percent respondents were single and 76 percent were married as presented in Table 1. The respondents in both the districts are distributed into 4 categories based on educational qualification, primary education, high school, higher secondary and graduate and

above. 10 per cent have only primary education, 35 per cent have high school education, 25 per cent of the respondents have studied till higher secondary and 30 per cent are graduate and above. The respondents were adequately represented as per educational qualification as shown in Table 1. It is evident from the table 1 that (78%) respondents were from general category and (22%) respondents were from SC category. Table 1 revealed that while getting information about family structure of respondents, it was clear from the study that most of the respondents (42%) belong to joint family; followed by nuclear family (37%), and (21%) of respondents were from extended family respectively. Highest number of representation was observed in income class Rs 400001- Rs 500000 (33%), followed by Rs 300001-Rs 400000 (30%) whereas (19%) respondents income was Rs 200001-Rs 300000 and almost equal representation was seen in income class Rs 500001 and above (18%) as shown in Table 1.

Table 2 Row 1 clearly indicates that majority of the respondents (51.4%) agreed, (37.8%) strongly agreed that the internet could be a useful source of apple farming information. Only 5.40 per cent respondents were among those who disagree and 2.70 per cent respondents strongly disagree with the statement. Some 2.70 per cent respondents remained neutral that internet could be a useful source of apple farming information. Row 2 depicts that majority of the respondents (88.8%) agreed that the mobile could be a useful source for apple farming information. Mobile phone

technology has provided multi-dimensional benefits to the apple growers and it helps in interaction, accessibility, and quick/timely information exchange in terms of farm inputs, transportation, labour, market information, varieties of apple, weather updates, Pesticides/Insecticides etc. Despite all the associated benefits, almost (2.63%) respondents neither agreed nor disagreed on the effectiveness of mobile phones as the useful source of apple farming information. Only small a segment of respondents did not agree to the usefulness of mobile as the source of apple farming information. Row 3 reveals that majority of respondents (43.3%) disagree and (36.7%) strongly disagree about the statement that TV telecasted programs provide sufficient and useful apple farming information. According to apple grower’s view point, the programs telecasted on Television are not need based and location specific. Only (10%) respondents agreed to the statement and (6.67%) strongly agreed that the TV broadcasted programs provide sufficient and useful information. 3.33 per cent respondents neither agreed nor disagreed with the statement. Row 4 shows that majority of the respondents 55 per cent agree and 35 per cent respondents strongly agree that the radio broadcast programs provided useful and sufficient apple farming information. Only 5 per cent of the respondents were disagree and 5 per cent of the respondents were strongly disagree that the radio broadcast programs provided useful and sufficient apple farming information.

Table 2: Perception of Apple Growers about ICT Use

Statement	SD		D		N A nor D		A		S A	
	N	%	N	%	N	%	N	%	N	%
Internet can be a useful source of apple farming information	1	2.70	2	5.40	1	2.70	19	51.4	14	37.8
Mobile can be a useful source of apple farming information	1	1.31	4	5.26	2	2.63	42	55.3	27	35.5
TV telecast programs provide sufficient apple farming information	22	36.7	26	43.3	2	3.33	6	10	4	6.67
Radio broadcast programs provide sufficient apple farming information	1	5	1	5	-	-	11	55	7	35

SD=Strongly Disagree; D=Disagree; N A nor D=Neither Agree nor Disagree; A=Agree; SA=Strongly Agree; N=Number; %=Percentage.

In the Table 1.3 the relationship, like age and usage of internet as information source by the respondents has been presented in Table 3, which showed a highly significant relationship (Chi-square value 20.778, sig. 0.000) between the age of the respondents and the usage of internet as

utilization of apple farming information, majorly belonging the age group of 31-40 years. It has also been observed in various studies related to technology adoption that this age segment are majorly innovators and early adopters of technology.

Table 3: Usage of ICT and Age of the Respondent

Age Category	Usage of Internet			Usage of Mobile			Usage of Television			Usage of Radio		
	Not use	Use	Total	Not use	Use	Total	Not use	Use	Total	Not use	Use	Total
21 to 30 Years	15	10	25	7	18	25	7	18	25	25	00	25
31to 40 Years	10	20	30	8	22	30	18	12	30	29	01	30
41 to 50 years	20	5	25	1	24	25	7	18	25	22	03	25
51 and above	18	2	20	8	12	20	6	14	20	04	16	20
Total	63	37	100	24	76	100	40	60	100	80	20	100
Chi Square Value	20.778			8.626			8.828			54.086		
Significance	0.000			0.034			0.031			0.000		

The relationship, like age and usage of mobile as information source by the respondents has been presented in Table 3, which showed significant relationship (Chi-square value 8.626, sig. 0.034) between the age of the respondents and the usage of mobile for getting apple farm related information, the age group of 31-40, followed by 21-30 and 41-50. Penetration of mobile phone has been rising in the state across all age categories as they have become cheaper, easily available and call rate have drastically fallen. The

statistic was found significant (0.031) with a statistic chi-square value (8.828) in the case of Television. Respondents belonging to the age group of 21-30 and 41-50 are majorly using television for getting apple related information. Television programs focused on providing horticultural information has been running for last many years. So, older people belonging to age category 41-50 and 51 and above have been viewed by them for years and same trend has been noted in upcoming generation. The statistic was found

highly significant (0.000) with a statistic chi-square value (54.086) in the case of radio, respondents belonging to age category 21-30 are not using radio at all for apple farming purpose. Young people are using more modern ICT

techniques like Internet as they are interactive technologies available 24 hours a day and can be used at any point of time for getting information.

Table 4: Usage of ICT and Gender of the Respondent

Gender Category	Usage of Internet		Total	Usage of Mobile		Total	Usage of Television		Total	Usage of Radio		Total
	Not use	Use		Not use	Use		Not use	Use		Not use	Use	
Male	60	24	84	15	69	84	35	49	84	64	20	84
Female	03	13	16	09	07	16	5	11	16	16	00	16
Total	63	37	100	24	76	100	40	60	100	80	20	100
Chi Square Value	16.000			10.861			0.607			4.761		
Significance	0.000			0.000			0.435			0.029		

Table 4 illustrated a highly significant (chi-square value 16.00, sig. 0.000) relationship between the gender of the respondents and usage of internet as information source, male respondents are adopting internet for getting information related to apple farming. Males in rural market in India are more independent in their decision making and generally are innovators in terms of adoption decisions of various product categories. The statistic was found highly significant (chi-square value 10.861, sig. 0.000) in the case

of Mobile Phone, male respondents were using mobile phones to get apple farming related information. The statistic was found insignificant (chi-square value 0.607, non-sig. 0.435) in the case of Television, respondents of both genders had no association with adoption of Television for apple farming information. The statistic was found significant (chi-square value 4.761, sig. 0.029) significance level in the case of radio, only male respondents are using radio for getting apple farm related information.

Table 5: Usage of ICT and Income of the Respondent

Income Category	Usage of Internet		Total	Usage of Mobile		Total	Usage of Television		Total	Usage of Radio		Total
	Not use	Use		Not use	Use		Not use	Use		Not use	Use	
200001-300000	17	02	19	03	16	19	07	12	19	16	03	19
300001-400000	13	17	30	04	26	30	12	18	30	23	07	30
400001-500000	18	15	33	05	28	33	16	17	33	25	08	33
500000 and above	15	03	18	12	06	18	5	13	18	16	02	18
Total	63	37	100	24	76	100	40	60	100	80	20	100
Chi Square Value	14.895			21.955			2.189			1.679		
Significance	0.001			0.000			0.534			0.641		

Table 5 revealed that the statistic was found highly significant (chi-square value 14.895, sig. 0.001) in case of internet, respondents with income segment Rs. 300001-400000 were major users for getting apple farm related information. The statistic was found highly significant (chi-square value 21.955, sig. 0.000) in the case of mobile, respondents with income segment of Rs. 400001-500000 followed by Rs. 300001-400000 were major users of mobile

phones for getting apple farm related information. The statistic was found insignificant (chi-square value 2.189, sig. 0.534), respondents were using Television irrespective of which income level they belong to. The statistic was found insignificant (chi-square value 1.639, non-sig. 0.641) in the case of radio, respondents belonging to any income category are using radio for getting apple farming related information.

Table 6: Usage of ICT and Educational Qualifications of the Respondent

Educational Qualifications Category	Usage of Internet		Total	Usage of Mobile		Total	Usage of Television		Total	Usage of Radio		Total
	Not use	Use		Not use	Use		Not use	Use		Not use	Use	
Primary	07	03	10	06	04	10	02	08	10	10	00	10
High School	15	20	35	05	30	35	11	24	35	35	00	35
12th Pass	16	09	25	07	18	25	09	16	25	17	08	25
Graduate and Above	25	05	30	06	24	30	18	12	30	18	12	30
Total	63	37	100	24	76	100	40	60	100	80	20	100
Chi Square Value	11.634			9.398			7.904			21		
Significance	0.008			0.024			0.048			0.000		

Table 6 depicted that the statistic was found significant (chi-square value 11.634, sig. 0.008) in the case of internet, respondents who acquired high school qualifications were using internet for apple farm purpose followed by people who were XII pass. The statistic was found significant (chi-square value 9.398, sig. 0.024) in the case of mobile, respondents who were high school qualifications followed by higher educational qualification were using mobile phones for apple farming purpose in order to improve farm

efficiency. The statistic was found significant (chi-square value 7.904, sig. 0.048) in the case of Television, respondents who were less educated were majorly using television to become aware about the apple related information and development. The statistic was found highly significant (chi-square value 21.000, sig. 0.000) in the case of radio, respondents who had higher education qualifications were using radio for getting apple farm related information. It has been observed in many studies

conducted in context of technology adoption which reflect that educational qualification has been a critical influencer in its adoption. People who are more educated are more likely to adopt new technologies launched in the market faster in comparison to people who are less educated.

Conclusion and Suggestions

Himachal Pradesh has long been regarded as a horticultural state due to magnificent achievements in the production of fruits, mainly apple. After Independence, when Himachal Pradesh was formed in 1948, horticulture was started from scratch by the Department of Agriculture and it was soon realized that it could play a vital role in improving the economy of the state. A separate horticulture section in the Department of Agriculture was created in 1953 which played a commendable part in the proliferation of apple farming in the temperate region of the state. Horticulture was given top priority in the state plans and a separate Department of Horticulture came into existence in September, 1970. Since then, Horticulture has been gaining momentum very fast throughout the state. Information and Communication Technology have been found very effective in timely disseminating information needed for apple growers. The study finds that mobile phones and television are the most populous modes of communication for the apple growers. It has been found that the great majority of apple growers mainly males using these modes of communication fall in the income slab of Rs. 4 lakhs to five lakhs aging between 41 to 50 in a great majority and having educational qualification of high standard or graduate and above. The study found that most of the respondents agreed with the view that mobile and internet can be a useful source of apple related information whereas, 80% of the respondents disagreed that TV telecasted programs provided sufficient apple related information. Significant relation was found between age of the respondents and the application of information received through radio and TV. Similar relation was also noticed between education of the respondents and application of information received through radio and TV. Due to their high age factor, they were observed less leaned towards acquiring information from television and mostly depend on radio. Moreover, comprehensive knowledge dissemination about the recent ICT needs to be propagated and provided to the apple growers so that they access and get aware of such modes of communication and may successfully apply for their horticultural purposes thereby get benefits.

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