

Attitude of Farmers towards Information and Communication Technology (Ict) Tools

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Agriculture sector is one among the foremost important sector in India which might be benefited with the utility of ICTs. Therein regards, extensive use of information technologies got to be promoted to farm level for transfer of technologies. The main target of the study was on the attitude of farmers towards information and communication technology tools in Anantapur district of Andhra Pradesh. Interview schedule was used for data collection from the farmers and appropriate statistical tools were used to analyze the collected data. Proportionate random sampling was used in the selection of one hundred and twenty (120) farmers as the sample of the study. The outcomes confirmed that the majority (73.34%) of farmers had medium level of attitude towards ICT tools followed by high (15.00%) and remaining (11.66%) of the farmers had low level of attitude towards ICT tools. Findings of multiple linear regression shows that all the fourteen independent variables put together contributed 75.80 per cent of the total variation in the attitude towards ICT tools by the farmers. The regression coefficient results revealed that the profile characteristics namely age, farming experience, farming experience in ICT tools, training undergone, social participation, innovativeness, economic orientation and risk orientation were found to be positively significant. Remaining profile characteristics viz., education, land holding, possession of ICT tools, annual

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income, extension contact, scientific orientation and cosmopolitaness were non-significant with the attitude towards ICT tools.

Keywords: Attitude; e-agriculture; extension; farmers; ICT based farming.

1. INTRODUCTION

Over the years, Agriculture Extension has been at the fore front within the delivery of adequate data to the farming community not just for increasing productivity however additionally to reinforce their standard of living. Keeping in-sight of the demand for agricultural growth, evolutionary modifications had been made in transfer of technology to succeed in the farming community effectively. The Information and Communication Technology (ICT) is one among the required counterparts which made the agriculture extension more realistic and quite interesting.

Developing nations like India are though capable to get self-sufficiency in food production after green revolution however they're in risk to keep this self-sufficiency as they are possibly to face food shortage in near future due to rapid population growth. Thus, the demand of continuous increasing population is often fulfilled with the assistance of ICT as a tool of revamping extension network of the country. ICT is an emerging tool for development of farming communities.

Information and communication technologies have unique feature that provide opportunities to harness them in ways which are extraordinary from traditional media. ICT provides two-way communication between rural communities and development organizations. ICTs also improves the capacity to look for information and increase the number of information available, provide quality information, reduces uncertainty and enhance market participation.

Meera et al. [1] had stated that as a results of the emerging new paradigm of agricultural development, old ways of delivering vital services to citizens are being challenged; traditional societies are additionally being modified into knowledge societies all over the world. Positive attitude of farmers toward information and communication technology will magnify their agriculture productivity and also improve their socio economic conditions.

Information is a valuable input through which farmers adopt new technologies to make the

farming more profitable. The application of ICT offers wider possibilities, there by strengthening transfer of technology between research and extension system and further onward transmission to the end users. Due to the decreasing strength of field level functionaries at gross root level it becomes a challenging task to the concerned agencies to reach the farming community with latest technical knowhow. It is quite evident that the advent of ICT revolution which is well utilised by other sectors than agriculture sector. Hence, use of ICT for farm communication plays a vital role in bridging this gap at rural areas hence access to these ICT tools is a crucial requirement for sustainable development of the farming community. It is quite evident that many of the bottlenecks hinder the free flow of information through these tools. Hence it is time to seriously look into these issues to make future communication system more sustainable.

With this history this study has been formulated with the following objective. To study the attitude of farmers towards information and communication technology tools.

2. METHODOLOGY

The present study was conducted in Anantapur district of Andhra Pradesh for the duration of the year 2017-2018. An ex-post facto research design was used in the present investigation. Anantapur district was selected purposively based on largest district in Andhra Pradesh with an area of 19.13 lakh ha. Three divisions Kadiri, Anantapur and Kalyanadurg were selected randomly. From each division one mandal were selected by means of using random sampling technique. From each mandal four villages were selected by using random sampling procedure. 34 farmers from Gandlapenta mandal, 47 farmers from Bukkarayasamudram mandal and 39 farmers from Beluguppa mandal were selected from the villages by proportionate random sampling method. Thus a complete of 120 farmers were sampled for the study by proportionate random sampling method who are using ICT tools. Data was collected through a well-structured interview schedule which was developed keeping in view of the objective of the

study. For this objective, schedule consists of 21 statements. Out of 21 statements, 15 were positive and 6 were negative statements and rated on a five point continuum 'Strongly Agree', 'Agree', 'Undecided', 'Disagree', and 'Strongly Disagree' with scores of 5, 4, 3, 2 and 1 respectively for positive statements. For negative statements the score of 1, 2, 3, 4 and 5 were assigned for 'Strongly Agree', 'Agree', 'Undecided', 'Disagree', and 'Strongly Disagree', respectively. On the groundwork of attitude scores obtained, farmers were categorized into three categories as less favourable, medium favourable and highly favourable. The collected data were coded, classified and tabulated. The statistical tools like Frequency, Percentage, Mean and Standard Deviation were used. Coefficient of correlation was carried out to find out nature of relationship between profile characteristics and attitude of farmers. Multiple linear regression was also carried out to find out functional relationship between independent variables with attitude of farmers. Statistical Package for Social Sciences was used for data analysis.

2.1 Pearson’s Correlation Coefficient (r)

This test was used to study the relationship between the scores of selected profile characteristics and the attitude of farmers. It measures the degree of relationship between the two sets of variables.

2.2 Multiple Linear Regression (MLR)

Multiple linear regression analysis was used to study the effect of independent variables on dependent variables. The following multiple linear regression equation was fitted to the data having 14 parameters.

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_{14}X_{14}$$

Where

- Y = Dependent variable
- X1 to X14 = Independent variables
- a = Intercept or constant
- bi's = Partial regression coefficients.
- bi's = b1, b2,b14

3. RESULTS AND DISCUSSION

At a look from Table 1 inferred that majority (73.34%) of the farmers had medium level of

attitude towards ICT tools followed by high (15.00%) and rest (11.66%) of the farmers had low level of attitude towards ICT tools. The end results are in accordance with Madhubabu [2], Kabir [3] and Verma [4].

3.1 Content Analysis of Attitude Statements Regarding ICTs Tools

An appraisal of the content analysis of 21 statements as shown within the table 2 that just about all of the respondents had medium favourable attitude towards ICT tools. A half the respondents agreed (50.00%) followed by strongly agreed (37.50%), disagreed (5.00%), strongly disagreed (4.16%) and undecided (3.33%) with the statement ICT can provide reliable information. A bit greater than half the respondents had agreed (50.83%) followed by strongly agreed (37.50%), strongly disagreed (5.73%), disagreed (4.166%) and undecided (2.50%) with the statement ICT can provide practical oriented information. Less than half of the respondents disagreed (45.00%), followed by strongly disagreed (22.50%), agreed (21.66%), undecided (9.16%) and strongly agreed (1.66%) with the statement ICT can access at anywhere. A little greater than one third of the respondents agreed (32.50%) followed by disagreed (30.83%), strongly agreed (17.50%), undecided (17.50%) and strongly disagreed (1.66%) with the statement ICT tools can increase confidence level. Quite half the respondents strongly disagreed (55.00%) followed by disagreed (36.66%), agreed (3.33%) and undecided (3.33%) and agreed (1.66%) with the statement it is difficult to use ICT tools by rural people.

A little quite two third of the respondents strongly agreed (74.16%) followed by agreed (20.00%), undecided (3.33%), disagreed (1.66%) and strongly disagreed (0.83%) with the statement we have to pay money for getting information through ICT tools. A little less than half of the respondents disagreed (45.83%) followed by agreed (23.33%), strongly agreed (15.00%), strongly disagreed (10.83%) and undecided (5.00%) with the statement ICT tools can provide information very quickly. A bit over one third of the respondents agreed (36.66%) followed by undecided (33.33%), strongly agreed (15.83%), disagreed (12.50%) and strongly disagreed (1.66%) with the statement ICT tools are more interactive. A bit greater than half the respondents agreed (56.66%) followed by strongly agreed (24.16%), strongly disagreed (9.16%), disagree (5.83%) and undecided

(4.16%) with the statement can ICT tools help for information sharing. A little less than half of the respondents agreed (41.66%) followed by strongly agreed (25.00%), disagreed (23.33%), undecided (6.66%) and strongly disagreed (3.33%) with the statement ICT can access at any time.

A little less than half of the respondents disagreed (46.66%) followed by strongly disagreed (20.83%), agreed (19.16%), strongly agreed (7.50%) and undecided (5.83%) with the statement can ICT tools make complex ideas into simple ideas. Half of the respondents agreed (48.33%) followed by disagreed (23.33%), undecided (12.50%), strongly disagreed (10.00%) and strongly agreed (5.83%) with the statement I am wasting my precious time by browsing unnecessary sites. A bit quite one third of the respondents strongly disagreed (72.50%) followed by disagreed (19.16%), strongly agreed (4.16%), undecided (3.33%) and agreed (0.83%) with the statement initial cost of ICT tools is very high. Quite half of the respondents agreed (55.00%) followed by strongly agreed (29.16%), disagreed (5.83%), undecided (5.83%) and strongly disagreed (4.16%) with the statement information provided by the ICT tools is not suitable to tackle local problems. A little less than half the respondents agreed (47.50%) followed by disagreed (28.33%), strongly disagreed (11.66%), strongly agreed (9.16%) and undecided (3.33%) with the statement ICT can access by anybody.

More than half the respondents strongly disagreed (60.00%) followed by disagreed (31.66%), undecided (4.16%), agreed (3.33%) and strongly agreed (0.83%) with the statement ICT tools are not suitable to illiterate people. Less than half of the respondents agreed (42.50%) followed by strongly agreed (40.83%), disagreed (5.83%), strongly disagree (5.83%) and undecided (5.00%) with the statement information provided through ICT is not in local language. A little less than half of the

respondents agreed (43.33%) followed by strongly agreed (30.83%), disagreed (24.16%), strongly disagreed (0.83%) and undecided (0.83%) with the statement traditions inhibit the use of ICT tools by rural women. A little more than half of the respondents agreed (54.16%) followed by strongly agreed (21.66%), disagreed (19.16%), strongly disagreed (2.50%) and undecided (2.50%) with the statement ICT application has created employment opportunities. A little less than half of the respondents agreed (45.83%) followed by strongly agreed (28.33%), disagreed (20.83%), undecided (3.33%) and strongly disagreed (1.66%) with the statement ICT application in agriculture has improved the social status of the farmer. A little less than half of the respondents agreed (46.66%) followed by strongly agreed (25.00%), disagreed (20.83%), undecided (5.83%) and strongly disagreed (1.66%) with the statement ICT can increase the standard of living.

3.2 Coefficient of Correlation between Profile of Farmers and Attitude towards ICT tools

To study the nature of relationship between the profile characteristics of farmers and attitude of farmers towards ICT tools, coefficient of correlation were computed and the values are presented in Table 3. From Table 3 it is evident that amongst independent variables of farmers, twelve variables viz., education, land holding, experience in farming, experience in usage of ICT tools, possession of ICT tools, annual income, training undergone, social participation, extension contact, innovativeness, economic orientation, scientific orientation and cosmopolitaness had positive and significant relationship with attitude. Whereas, profile characteristics such as risk orientation had a negative and significant relationship with attitude of farmers and age had a negative and non-significant relationship with the attitude of farmers.

Table 1. Distribution of respondents according to their attitude towards ICT tools

S. No.	Category	Frequency	Percentage
1	Less Favourable	14	11.66
2	Moderately Favourable	88	73.34
3	Highly Favourable	18	15.00
	Total	120	100.00

Table 2. Content analysis of attitude statements regarding ICTs tools

S. No	Statements	SA		A		UD		DA		SDA	
		F	%	F	%	F	%	F	%	F	%
1.	ICT can provide a reliable information	45	37.50	60	50.00	4	3.34	6	5.00	5	4.16
2.	ICT can provide practical oriented information	44	36.66	61	50.85	3	2.50	5	4.16	7	5.83
3.	ICT can access at any where	2	1.66	26	21.67	11	9.17	54	45.00	27	22.50
4.	ICT tools can increase confidence level	21	17.5	39	32.50	21	17.50	37	30.84	2	1.66
5.	It is difficult to use ICT tools by rural people	4	3.33	2	1.66	4	3.33	44	36.68	66	55.00
6.	We have to pay money for getting information through ICT tools	89	74.18	24	20.00	4	3.33	2	1.66	1	0.83
7.	ICT tools can provide information very quickly	18	15.00	28	23.33	6	5.00	55	45.84	13	10.83
8.	ICT tools are more interactive	19	15.83	44	36.68	40	33.33	15	12.50	2	1.66
9.	Can ICT tools help for information sharing	29	24.17	68	56.68	5	4.16	7	5.83	11	9.16
10.	ICT can access at any time	30	25.00	50	41.68	8	6.66	28	23.33	4	3.33
11.	Can ICT tools make complex ideas into simple ideas	9	7.50	23	19.16	7	5.83	56	46.68	25	20.83
12.	I am wasting my precious time by browsing unnecessary sites	7	5.83	58	48.34	15	12.50	28	23.33	12	10.00
13.	Initial cost of ICT tools are very high	5	4.16	1	0.83	4	3.33	23	19.16	87	72.52
14.	Information provided by the ICT tools is not suitable to tackle local problems.	35	29.18	66	55.00	7	5.83	7	5.83	5	4.16
15.	ICT can access by anybody.	11	9.16	57	47.52	4	3.33	34	28.33	14	11.66
16.	ICT tools are not suitable to illiterate people.	1	0.83	4	3.33	5	4.16	38	31.68	72	60.00
17.	Information provided through ICT is not in local language	49	40.84	51	42.50	6	5.00	7	5.83	7	5.83
18.	Traditions inhibit the use of ICT tools by rural women	37	30.84	52	43.33	1	0.83	29	24.17	1	0.83
19.	ICT application in agriculture has created employment opportunities.	26	21.67	65	54.17	3	2.50	23	19.16	3	2.50
20.	ICT application in agriculture has improved the social status of the farmer	34	28.33	55	45.85	4	3.33	25	20.83	2	1.66
21.	ICT can increase the standard of living	30	25.00	56	46.68	7	5.83	25	20.83	2	1.66

3.2.1 Age Vs Attitude towards ICT tools

It was revealed from the Table 3 that there was negative and non-significant relationship between age and attitude of farmers towards ICT tools. From this, it is ready to be inferred that because the age increases the favourable attitude towards ICT tools was decreased but the relationship was non-significant. Age may have negatively influenced on utilization of ICT tools due to lack of skill in utilization of ICT tools. This findings as same as within the findings of Sravan [5], Samatha [6].

3.2.2 Education Vs Attitude towards ICT tools

It used to be evident from the Table 3 that there was a positive and significant relationship between education and attitude of farmers towards ICT tools. The very fact that humans collect their understanding from formal schooling system which makes an individual greater confident and self-reliant in any decision making process. This findings as same as within the findings of Chauhan [7], Kabir [3].

3.2.3 Land holding Vs Attitude towards ICT tools

From the Table 3 there was a positive and significant relationship between land holding and attitude of farmers towards ICT tools. This is often due to the very fact that size of landholding provides the financial base for farmers to practice new technologies disseminated through ICT tools for reaching high profit. Higher land holding often operates via economic condition which enables farmers get right of entry to ICT tools which results in favourable attitude towards ICT tools. This findings as same as within the findings of Shankaraiah and Swamy [8], Meagy et al [9].

3.2.4 A Experience in farming Vs Attitude towards ICT tools

From the Table 3 that there was a positive and significant relationship between experience in farming and attitude of farmers towards ICT tools. The rationale might be the experience in farming increased, higher are going to be their technology-wise knowledge and there'll be more favourable attitude towards ICTs. This findings as same as within the findings of Samatha [6].

3.2.5 b Experience in usage of ICT tools Vs Attitude towards ICT tools

From Table 3 shows that a positive and significant relationship between experience in

usage of ICT tools usage and attitude of farmers towards ICT tools. This reason is that farmers having the medium possession of ICT tools. Experience of ICT tools usage results in favourable attitude towards ICT tools. This findings as same as within the findings of Chauhan [7].

3.2.6 Possession of ICT tools Vs Attitude towards ICT tools

From the Table 3 that there was a positive and significant relationship between possession of ICT tools and attitude of farmers towards ICT tools. The very fact is that farmer having more ICTs tools are socially rich, progressive and superior farmer. They mainly use new ICT tools in farming. They are looking out for more information for his or her monetary improvement in agriculture. The farmers having larger possession of ICT tools have high favourable attitude towards ICT tools. This findings as same as within the findings of Devaraja [10].

3.2.7 Annual income Vs Attitude towards ICT tools

It used to be evident from the Table 3 that there was a positive and significant relationship between annual income and attitude of farmers towards ICT tools. The motive would possibly be that the annual income of the farmers directly affects the economic viability, stability and rational behaviour of an individual. Hence, increase in the income levels associated amplify access to ICT tools which leads to a favourable attitude towards the ICT tools. The current findings as same as within the findings of Kafura et al. [11].

3.2.8 Training undergone Vs Attitude towards ICT tools

From the Table 3 that there was a positive and significant relationship between training undergone and attitude of farmers towards ICT tools. It implies that number of trainings passed through will increases the attitude towards ICT tools also increases. This may be because of the very fact that the farmers exposed to medium to high trainings and infrequently contacted with agricultural department personnel and scientists that they can gather the expertise about ICT tools and utilization of new technologies.

3.2.9 Social participation Vs Attitude towards ICT tools

From Table 3 that there was a positive and significant relationship between social participation and attitude of farmers towards ICT tools. Reason is that farmers had been having membership in social organisations. The farmers who actively participated in social matters to do of society has resulted in expanded attention of ICT tools and which lead to a favourable attitude towards the ICT tools. The contemporary findings as same as within the findings of Shankaraiah and Swamy [8].

3.2.10 Extension contact Vs Attitude towards ICT tools

From the Table 3 indicates that positive and significant relationship between extension contact and attitude of farmers towards ICT tools. Extension participation exposes farmers to new areas of farming strategies with a knowledge and achievement. Also provides the chances for gaining knowledge about agricultural innovations. Most of the extension programmes may moreover additionally alternate their way of wondering degree via a range of educational ability which results in a way of favourable attitude towards ICT tools. This findings as same as within the findings of Meagy et al. [9].

3.2.11 Innovativeness Vs Attitude towards ICT tools

From the Table 3 that there was a positive and significant relationship between innovativeness and attitude of farmer towards ICT tools. Innovativeness is that the individuals who are pruned to innovation, usually it'll have greater orientation towards technology and usage, these factors do naturally have an impact on the attitude towards ICT tools. The current findings as same as within the findings of Kafura et al. [11].

3.2.12 Economic orientation Vs Attitude towards ICT tools

It used to be evident from the Table 3 that there was a positive and significant relationship between economic orientation and attitude of farmers towards ICT tools. This is able to possibly be because of that training will help them to reinforce in terms of their know-how,

attitude and skills in the way of their income generating things to do which results in excessive financial gains. The existing findings as same as within the findings of Devaraja [10].

3.2.13 Risk orientation Vs Attitude towards ICT tools

It was evident from the Table 3 that there was a negative and significant relationship between risk orientation and attitude of farmers towards ICT tools. The fact that farmers having greater risk with the ICT tools they didn't use ICT tools results in less favourable attitude.

3.2.14 Scientific orientation Vs Attitude towards ICT tools

It was evident from the Table 3 that there was a positive and significant relationship between scientific orientation and attitude of farmers towards ICT tools. It was the logical thinking and which helps the individual to apprehend the object thoroughly and formulate more favourable attitude towards scientific method of usage of ICT tools. This findings as same as within the findings of Palaiah et al. [12].

3.2.15 Cosmopolitaness Vs Attitude towards ICT tools

From the Table 3 that there was a positive and significant relationship between cosmopolitaness and attitude of farmers towards ICT tools. Cosmopolitaness is that the degree to which an individual is oriented outside the social organization because the individual's cosmopolite nature increases the favourable attitude towards ICT tools increases. This findings as same as within the findings of Islam and Rashid [13].

3.3 Combined Impact of all Independent Variables on Attitude of Farmers towards ICT Tools

To determine the combined impact of all the independent variables in explaining the attitude of farmers towards ICT tools, multiple linear regression analysis was taken out. The computed co-efficient of determination (R^2) value and partial regression co-efficient (b) values with their corresponding t-values were presented in Table 4.

Table 3. Relationship between profile characteristics of farmers with attitude

S. No.	Independent variables	'r' value
1	Age	-0.144 NS
2	Education	0.193*
3	Land holding	0.275**
4	Experience in farming	0.202*
	Experience in usage of ICT tools	0.205*
5	Possession of ICT tools	0.245**
6	Annual Income	0.186*
7	Training undergone	0.199*
8	Social Participation	0.510**
9	Extension Contact	0.188*
10	Innovativeness	0.209*
11	Economic Orientation	0.376**
12	Risk Orientation	-0.221*
13	Scientific Orientation	0.327**
14	Cosmopolitaness	0.293**

** 0.01% level of Significant. * 0.05% level of Significant. NS-Non Significant

Table 4. Multiple linear regression analysis of selected independent variables with Attitude towards ICT tools

S. No.	Independent variables	Regression coefficient	Standard error	't' value
1.	Age	-0.389	0.045	-4.360*
2.	Education	0.129	0.239	1.900 ^{NS}
3.	Land holding	0.040	0.346	0.692 ^{NS}
4.	Experience in farming	0.576	0.042	7.317*
	Experience in usage of ICT tools	0.135	0.066	2.336**
5.	Possession of ICT tools	0.116	0.222	1.508 ^{NS}
6.	Annual Income	0.016	0.205	0.313 ^{NS}
7.	Training undergone	-0.160	0.447	-2.843*
8.	Social Participation	0.622	0.063	11.894*
9.	Extension Contact	0.083	0.064	1.448 ^{NS}
10.	Innovativeness	0.168	0.116	3.090*
11.	Economic Orientation	0.263	0.092	4.761*
12.	Risk Orientation	-0.182	0.259	-3.556*
13.	Scientific Orientation	0.060	0.077	1.097 ^{NS}
14.	Cosmopolitaness	-0.015	0.071	-0.205 ^{NS}

$R^2=0.758$ ** 0.01% level of significant * 0.05% level of significant NS- Non Significant

Results from the Table 4 found that the 15 independent variables with the attitude towards ICT tools by the farmers taken on Multiple Linear Regression analysis gave the Co-efficient of Multiple Determination (R^2) value of 0.758. Hence, it is able to be inferred that all the independent variables put together contributed 75.80 per cent of the total variation in the attitude towards ICT tools by the farmers and

remaining 24.20 per cent was due to extraneous factors.

The regression coefficient given in the Table 4 similarly revealed that the profile characteristics namely age, farming experience, farming experience in ICT tools, training undergone, social participation, innovativeness, economic orientation and risk orientation were found to be

positively significant. Remaining profile characteristics viz., education, land holding, possession of ICT tools, annual income, extension contact, scientific orientation and cosmopolitaness were non-significant with the attitude towards ICT tools.

The following multiple linear regression equation was fitted to the data having 14 parameters.

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_{14}X_{14}$$

4. CONCLUSION

The findings indicated that farmers had medium level of attitude towards ICT tools due to more dependence on informal sources for getting information associated to agriculture, and that they had been not getting right information at right time from the prevailing extension system. Hence, that they had been showing positive attitude towards ICT tools, which give information around the year with none barriers. So there's a pressing want to rearrange high quality training programmes and demonstrations for farmers at village level on ICT tools. Additionally there to the government of Andhra Pradesh need to provide subsidies on ICT tools for the farmers, in order that they ought to effortlessly get right of entry to the current day information on agriculture and allied sectors.

RECOMMENDATIONS

In order to be more holistic, the study of ICTs may also encompass linkage mechanism of farmers with university scientists and farmer organizations through ICTs may be studied.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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