

## IMPACT OF ICT TRAINING ON FARMERS' INCOME AND EXPENDITURE WITH SPECIAL REFERENCE TO FARMERS IN THIRUVERMBUR TALUK

Arockiaraj<sup>1</sup> and D.Kumar<sup>2</sup>

### ABSTRACT

Information and Communication Technology (ICT) is used as an overarching term incorporating all modes of transmission like electronic devices, networks, mobiles, services and applications which help to disseminate information with the help of technology. The researcher mainly focused on problems of farmers to use the ICT in agriculture. This study was based on both primary and secondary data. The primary data was collected based on random sampling method, with a help of questionnaire and study have been taken in the year 2020. The researcher purposively had chosen the Thiruvermbur Taluk for the present study. In this Taluk 5 high potential villages are chosen by the researcher, from each village 25 samples were chosen for data collection. Totally 125 farmers were randomly selected for the study. This study concluded that, nearly half of the sample respondents were not having proper education and guidance to improve their farming through ICT. They were suffering the lack of knowledge and training to adopt the ICT in agriculture. The government could improve the proper training and guidance to the farmers to adopt the modern technology in agriculture in the study area. We have also identified that the income of farmers had significantly changed from four different quarters such as 10,35 and 38 percentage. The factor analysis revealed that not have and not subscribe to agricultural database (0.955), There was unstable electricity (0.950), and the cost of using a commercial cybercafé was high (0.950) in the study area. There was a high positive correlation between Family Monthly Income and Family Monthly Expenditure

(Key words : Information and Communication Technology (ICT), E-Agriculture, agricultural sector, and problems of ICT)

### INTRODUCTION

Agriculture in India is that the core sector for food security, nutritional security, and sustainable development & for poverty alleviation. It contributes approximately 16% of GDP. Milestones in agriculture development in India include: revolution, Evergreen revolution, Blue revolution, White revolution, yellow revolution, Biotechnology revolution and thus the foremost up-to-date one is information and communication technology revolution. Information and communication technologies play a vital role in spreading information to farmers enabling them to form a choice on the pattern of cropping, use of high-yielding seeds, fertilizer application, pest management, marketing, etc. Thote *et al.* (2012) reported that measurement of agricultural growth is complex phenomena, which is dependent on various factors. These factors are correlated with each other.

Traditionally, Indian farmers are following indigenous production methods and depend upon friends, relatives, fellow farmers and input dealers to urge agriculture information. With the progression of agricultural science

and technology, numerous options to access contemporary technologies have become accessible. It is obvious from the replacement of indigenous varieties of seeds by high-yielding varieties and traditional equipment and practices by power tillers, tractors and other machines. Information and Communication Technology (ICT) is used as an overarching term incorporating all modes of transmission like electronic devices, networks, mobiles, services and applications which help to disseminate information with the help of technology. In the recent years, ICT has proved to be extremely beneficial for farmers including small land holders, marginalized and poor farmers, and helped them in marketing, precision farming and improved profits. Through ICT, farmers have been empowered to exchange their opinions, experiences and ideas. It has given farmers more exposure and allowed them to use science that looks at agriculture from an integrated perspective. Vasa *et al.* (2021) explained that the adoption of new of Information and Communication Technologies (ICTs) in farming activities becoming crucial for developing countries in order to meet the challenges of rapidly growing populations, urbanization and arable agricultural land declination. Because of it, each farmers' organization or farmer has to concern their

- 
1. Ph.D. Research Scholar in Economics P.T, Jamal Mohamed College (Autonomous), Affiliated to Bharathidasan University, Tiruchirappalli-620020
  2. Assoc. Professor ,Dept. of Economics, Jamal Mohamed College (Autonomous), Affiliated to Bharathidasan University, Tiruchirappalli-620020

agricultural products and services more towards modernized and ICT related routine. The efforts of the Government in the area of ICT have escalated the living standard of Indian farmers and made them ICT – friendly, which has resulted in increased penetration of useful information about crops, soils, climate, and cultivation process. Indian farmers to be more ICT – friendly, which include e-choupal, e-Krishi, e-aid, and mobile applications have also been launched by the government of India for the same including. The need for marketing agricultural produce at competitive prices will change the farmers’ attitude towards ICT and the new technologies will help and contribute more in sustaining Indian agriculture. The researcher mainly concentrated what are the problems to using the ICT in agricultural sector and income and expenditure in the study area.

### Statement of the problem

India is a developing country, with the majority of its population living in rural areas, and their primary occupation is agriculture. But these rural people live as they did 30 years ago. This is because agriculture is no longer a lucrative occupation in India. In this article, we are going to list the problems faced by farmers these days. The major problems faced by farmers in India are Lack of good quality seeds, lack of modern equipment, poor irrigation facilities, small and fragmented lands, lack of handling and storage facilities with local traders and intermediaries. ICT’s involvement in the agricultural sector faces many challenges. There is limited access to market information, the level of literacy among farmers is low, and there are many distribution channels that eat the pockets of both farmers and consumers. Government funding for farmers is still in its infancy, and most small farmers are still dependent on the local money lenders.

### Research questions

What are the problems faced by the farmers to using ICT in agriculture in Thrivembur Taluk?

What is the economic condition of agricultural farmers in the study area?

### Objectives of the study

To analyse the problems faced by the farmers to using ICT in agriculture in Thiruvermbur Taluk.

To analyse the economic condition of agricultural famers in the study area.

### Hypothesis of the study

There is no issues for farmers to use ICT in the agriculture in the study area.

There is an insignificant relationship between Annual Income of the sample respondents and Annual Expenditure of the sample respondents.

## MATERIALS AND METHODS

This study was based on both primary and secondary data. The primary data was collected based on random sampling method, with a help of questionnaire. The

researcher purposively chose the Thiruvermbur Taluk for the present study. In this Taluk 5 high potential villages are chosen by the researcher (Arasangudy, Koothappar, Krishnasamudram, Ellakkudy (CT), Natarajapuram). From each village 25 samples were chosen for data collection. Totally 125 farmers are randomly selected for the study. This study made during the period of January 2020 – December 2020.

In this study, Researcher used the following statistical tools such as Extraction Method: Principal Component Analysis to identify the relation on ICT usage and farmers’ income. Correlation (Karl Pearson correlation coefficients) was used to check the farmer’s income and expenditure.

## RESULTS AND DISCUSSION

Data in Table 1 shows the gender wise classification of the sample respondents in Thiruvermbur taluk. The researcher mainly focuses only Male and Female gender. Out of 125 sample respondents 61.6% (77) of the sample respondents were male agricultural farmers, and remaining 38.4% (48) of the sample respondents were female agricultural farmers in the study area. Therefore, majority of the sample respondents were Male in the study area, its shows the male is the deciding the authority in the study area.

Data in Table 2 explains the age wise classification of sample respondents in the study area. Age of the sample respondents were divided into four groups like age group between 18 – 37, 38 – 57, 58 – 77, and 77 and above. Out of 125 sampler respondents 46.4% (58) of the sample respondents came under the age group of 38 – 57, 38.4% (49) of the sample respondents came under the age group of 58 - 77, 09.6% (12) of the sample respondents came under the age group of 18 – 37 and 04.8% (06) of the sample respondents came under the age group of 77 and above. Therefore, majority of the sample respondents came under the age group of 38 - 57 in the study area.

Data in Table 3 shows the educational status of the sample respondents in the Thiruvermbur taluk. Educational status was divided into four categories, likely illiterate, Up to SSLC, Up to HSC, and UG Degree and above. Out of 125 sample respondents 31.2% (39) of the sample respondents were illiterate and remaining 68.8% (86) of the sample respondents were literate. Out of the 86 respondents 47 sample respondents were studied up to SSLC, 27 sample respondents were studied up to HSC, and 12 sample respondents were studied UG degree and above. Therefore, majority of the sample respondents were literate with a basic level of education.

Data in Table 4 explains the family monthly income of the sample respondents in the study area. Income was divided into four categories like, below Rs.10,000, Rs. 10,001 – 20,000, Rs.20,001 – 30,000, and Rs. 30,001 and above. Out of 125 sample respondents 39.20% (49) of the sample respondents were under the income group of Rs.20,001 –

Rs.30,000, 26.40% (33) of the sample respondents were under the income group of Rs. 10,001 – Rs.20,000, 22.40% (28) of the sample respondents were under the income group of below Rs. 10,000, and 12% (15) of the sample respondents were under the income group of Rs. 30,001 and above. Kamthania *et al.* (2013) reported that real economic value was added either because of savings resulting from the use of ICT or an increase in revenue or profitability. Therefore, majority of the sample respondent's family monthly income level was Rs. 20,001 – Rs.30,000.

Data in Table 5 shows the family monthly expenditure of the sample respondents in the study area. Expenditure pattern was divided into the four group like, below Rs.10,000, Rs. 10,001 – 20,000, Rs.20,001 – 30,000, and Rs. 30,001 and above. Out of 125 sample respondents 45.60% (57) of the sample respondents' family monthly expenditure level was Rs. 10,001 – 20,000, 26.40% (33) of the sample respondents monthly family expenditure level was below Rs. 10,000 and Rs. 20,001 – Rs. 30,000, and 01.60% (02) of the sample respondents family monthly expenditure was Rs. 30,001 and above. Therefore, majority of the sample respondent's monthly expenditure level was Rs. 10,001 – Rs. 20,000.

#### **Statistical inference – I: Problems faced by the sample respondents to use ICT in agriculture**

Prathap *et al.* (2021) explained that the sugarcane farmers of Tiruvannamalai and Nagapattinam districts had perceived the barriers to ICT usage as more severe, whereas in this section explains about the factor analysis of problems faced by the agricultural farmers to use ICT in agriculture. Out of these six factors, three factors were highly inter-correlated in the study area. The factor analysis revealed that not have and not subscribe to agricultural database (0.955), There was unstable electricity (0.950), and the cost of using a commercial cybercafé was high (0.950) in the study area.

#### **Hypothesis – I**

Ho: There is no issues for farmers to use ICT in the agriculture in the study area.

The Statistical Inference – It is revealed that, not had and not subscribed to agricultural database, there was unstable electricity, and the cost of using a commercial cybercafé was high. These three problems were majority of the sample respondents faced to use ICT in agriculture in the study area.

Therefore, the null hypothesis was rejected and alternative hypothesis framed.

H1: There is an issues for farmers to use ICT in agriculture in the study area.

#### **Statistical inference – II: Family monthly income and family monthly expenditure of sample respondents**

**R = 0.867; R<sup>2</sup> = 0.753; F = 373.983; T = 3.950**

There was a high positive correlation between family monthly income and family monthly expenditure. The F-Test and T-Test values indicated that the correlation was significant.

#### **Hypothesis – II**

Ho: There was a significant relationship between family monthly income and family monthly expenditure of the sample respondents in the study area

The statistical inference – II revealed that the there was a high positive correlation between family monthly income and family monthly expenditure of the sample respondents. Therefore, second hypothesis was accepted.

#### **Findings**

Out of 125 sample respondents 61.6% (77) of the sample respondents were male agricultural farmers. Therefore, majority of the sample respondents were male in the study area.

Out of 125 sampler respondents 46.4% (58) of the sample respondents were under the age group of 38 – 57, 38.4% (49) of the sample respondents were under the age group of 58 - 77. Therefore, majority of the sample respondents were under the age group of 38 - 57 in the study area.

Out of 125 sample respondents 31.2% (39) of the sample respondents were illiterate and remaining 68.8% (86) of the sample respondents were literate. Masangano *et al.* (2015) stated that for adoption to be sustainable, information about a technology should be judicious in order for farmers to form appropriate perceptions. Therefore, majority of the sample respondents were literate with a basic level of education.

Out of 125 sample respondents 39.20% (49) of the sample respondents were under the income group of Rs.20,001 – Rs.30,000. Cui-li stated that we must address the income gap between urban and rural situation, and expressed concern about its impact on the overall situation, it is necessary to take effective measures to increase the income of the farmers Therefore, majority of the sample respondent's family monthly income level was Rs. 20,001 – Rs. 30,000.

Out of 125 sample respondents 45.60% (57) of the sample respondents' family monthly expenditure level was Rs. 10,001 – 20,000. Therefore, majority of the sample respondent's monthly expenditure level was Rs. 10,001 – Rs. 20,000.

#### **The Statistical Inference I**

It is revealed that, not had and not subscribed to agricultural database, there was unstable electricity, and the cost of using a commercial cybercafé was high. These three problems were majority of the sample respondents faced to use ICT in agriculture in the study area. Suryawanshi *et al.* (2011) reported that mechanization was one of the answers to reduce cost of labour. The study of participation of sample farmers in farm mechanization revealed that the participation of farmers in farm implements was very poor. Therefore, the null hypothesis was rejected and alternative hypothesis framed.

#### **The statistical inference – II**

It is revealed that there was a high positive correlation between family monthly income and family

monthly expenditure of the sample respondents. Therefore, second hypothesis was accepted.

This study concluded that, nearly half of the sample respondents were not having proper education and guidance to improve their farming through ICT. They were suffering the lack of knowledge and training to adopt the ICT in agriculture. Jain *et al.* (2015) reported that it has been focused that the use of soft-computing techniques in

conjunction with communication networks, for inferring the decision regarding best practices for agricultural activities, is helpful in the development of these systems. The government could improve the proper training and guidance to the farmers to adopt the modern technology in agriculture in the study area. The government have to increase the subsidy and low interest loan to motivate the famers to adopt ICT in the study area.

**Table 1. Gender wise classification of sample respondents**

S. No.	Category	No. of Sample Respondents	Percentage
1	<b>Male</b>	77	61.60%
2	<b>Female</b>	48	38.40%
	<b>Total</b>	<b>125</b>	<b>100.00 %</b>

(Source: Computed from Primary Data)

**Table 2. Age wise of the sample respondents**

S. No.	Category	No. of Sample Respondents	Percentage
1	<b>18 - 37</b>	12	09.60%
2	<b>38 - 57</b>	58	46.40%
3	<b>58 - 77</b>	49	38.40%
4	<b>77 and Above</b>	06	04.80%
	<b>Total</b>	<b>125</b>	<b>100.00 %</b>

(Source: Computed from Primary Data)

**Table 3. Educational status of the sample respondents**

S. No.	Category	No. of Sample Respondents	Percentage
1	<b>Illiterate</b>	39	31.20%
2	<b>Up to SSLC/ITI</b>	47	37.60%
3	<b>Up to HSC/Diploma</b>	27	21.60%
4	<b>UG Degree and Above</b>	12	09.60%
	<b>Total</b>	<b>125</b>	<b>100.00 %</b>

(Source: Computed from Primary Data)

**Table 4. Family monthly income of the sample respondents**

S. No.	Category	No. of Sample Respondents	Percentage
1	<b>Below Rs. 10,000</b>	28	22.40%
2	<b>Rs. 10,001 – Rs. 20,000</b>	33	26.40%
3	<b>Rs. 20,001 – Rs. 30,000</b>	49	39.20%
4	<b>Rs. 30,001 and Above</b>	15	12.00%
	<b>Total</b>	<b>125</b>	<b>100.00 %</b>

(Source: Computed from Primary Data)

**Table 5. Family monthly expenditure of the sample respondents**

S. No.	Category	No. of Sample Respondents	Percentage
1	<b>Below Rs. 10,000</b>	33	26.40%
2	<b>Rs. 10,001 – Rs. 20,000</b>	57	45.60%
3	<b>Rs. 20,001 – Rs. 30,000</b>	33	26.40%
4	<b>Rs. 30,001 and Above</b>	02	01.60%
	<b>Total</b>	<b>125</b>	<b>100.00 %</b>

(Source: Computed from Primary Data)

**Table 6. Statistical inference – II: Family monthly income and family monthly expenditure of the sample respondents**

Model Summary <sup>b</sup>										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	<b>.867<sup>a</sup></b>	<b>.753</b>	.750	.386	.753	373.983	1	123	.000	.243

a. Predictors: (Constant), Monthly Income      b. Dependent Variable: Monthly Expenditure

ANOVA <sup>b</sup>						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	55.589	1	55.589	<b>373.983</b>	.000 <sup>a</sup>
	Residual	18.283	123	.149		
	Total	73.872	124			

a. Predictors: (Constant), Monthly Income      b. Dependent Variable: Monthly Expenditure

Coefficients <sup>a</sup>											
Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error				Lower Bound	Upper Bound	Zero-order	Patial	Part
1	(Constant)	.366	.093		<b>3.950</b>	.000	.183	.550			
	Monthly Income	.692	.036	.867	19.339	.000	.621	.762	.867	.867	.867

a. Dependent Variable: Monthly Expenditure

**Table 7. Statistical inference – I: Problems faced by the sample respondents to use ICT in agriculture**

<b>Communalities<sup>a</sup></b>	<b>Initial</b>	<b>Extraction</b>
You do not have access to ICT facilities	1.000	.800
Not able to access ICT lack of literate	1.000	.811
The cost of using a commercial cybercafé is high	1.000	.903
There will always be a bad internet connection	1.000	.776
There is unstable electricity	1.000	.903
You do not have, and do not subscribe to agricultural databases	1.000	.911

Extraction Method: Principal Component Analysis

a. Only cases for which Gender – F are used in the analysis phase

**Total Variance Explained<sup>a</sup>**

<b>Component</b>	<b>Initial Eigenvalues</b>			<b>Extraction Sums of Squared Loadings</b>		
	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>	<b>Total</b>	<b>% of Variance</b>	<b>Cumulative %</b>
1	5.104	85.063	85.063	5.104	85.063	85.063
2	.389	6.482	91.546			
3	.283	4.710	96.256			
4	.169	2.821	99.078			
5	.055	.922	100.000			
6	3.041E-16	5.068E-15	100.000			

Extraction Method: Principal Component Analysis

Only case for which Gender – F are used in the analysis phase

**Component Matrix<sup>ab</sup>**

	<b>Component</b>
	<b>1</b>
Not have access to ICT facilities	.894
Not able to access ICT lack of literate	.900
The cost of using a commercial cybercafé is high	.950
There will always be a bad internet connection	.881
There is unstable electricity	.950
Not have, and do not subscribe to agricultural databases	.955

Extraction Method: Principal Component Analysis.

a. 1 Components extracted. b. Only cases for which Gender – f are used in the analysis phase.

**Table 8. Report on ICT usage and income (2019 -2020)**

<b>ICT usage</b>		<b>QUARTER 1</b>	<b>QUARTER 2</b>	<b>QUARTER 3</b>	<b>QUARTER 4</b>
ICT used	Mean	75240.8545	82764.9400	1.1173E5	1.5419E5
	N	55	55	55	55
	Std. Deviation	1.01961E4	1.12157E4	1.51412E4	2.08948E4
	Kurtosis	-.940	-.940	-.940	-.940
ICT not used	Mean	76695.6429	99704.3357	1.3460E5	1.8575E5
	N	70	70	70	70
	Std. Deviation	1.12023E4	1.45630E4	1.96600E4	2.71308E4
	Kurtosis	-1.376	-1.376	-1.376	-1.376
Total	Mean	76055.5360	92251.0016	1.2454E5	1.7186E5
	N	125	125	125	125
	Std. Deviation	1.07531E4	1.56226E4	2.10905E4	2.91049E4
	Kurtosis	-1.219	-.850	-.850	-.850

**Table 9. Level of increase in income**

ICT Used		ICT not Used	
Mean	INCREASE %	Mean	INCREASE %
75240.85		76695.64	
82764.94	10.00	99704.33	30.00
111730.00	35.00	134600.00	35.00
154190.00	38.00	185750.00	38.00

## REFERENCES

- Jain, L., H. Kumar, and R. Singla, 2015. Assessing Mobile Technology Usage for Knowledge Dissemination among Farmers in Punjab. *Inf. Technol. Dev.* **21** (4) : 668-676.
- Kamthania, D. 2013. ICT in Agriculture. *CSI Communications.* **37**:7-9.
- Masangano, C. and C. Miles, 2004. Factors Influencing Farmers' Adoption of Kalima Bean (*Phaseolus vulgaris* L.) Variety in Malawi. *J. Sust. Agric.* **24** (2) : 117-129.
- Prathap, D., P. Murali and V. Venkatasubramanian, 2021. Barriers to ICT Usage: An Assessment Among the Sugarcane Farmers in Disadvantaged Districts of Tamil Nadu, India. *Sugar Tech.* **23** (2) : 286-295.
- Suryawanshi, D. and M. Khan, 2011. Assessment of farmers participation and benefits perceived from various agricultural technologies dissemination in Chhattisgarh. *J. Soils and Crops*, **21** (2) : 180-187.
- Thote, S., P. Deshmukh, U. Dangore and C. Vyawahare, 2012. Measurement of agricultural growth of Amravati district (M. S., India) - composite index approach. *J. Soils and Crops*, **22** (1) : 201-211.
- Vasa, L. and N. Trendov, 2021. Farmers' experience in adoption and usage of ICT solutions for agriculture in the Republic of Macedonia. *Appl. Studies in Agribusiness and Commerce*, **14** : 3-4 .

**Rec. on 07.07.2021 & Acc. on 16.07.2021**