

Effectiveness of ICTs in Dissemination of Agricultural Information among Farmers in Cauvery Delta, Thanjavur.

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Abstract - The role of ICT in Agriculture plays a new modern paradigm that facilitates and improves the agricultural sector. The ICT had rendered service to farmers for market access, announcement of weather condition, awareness of crop diseases etc. There are several types of the ICT tools used in agriculture sector such as Radio, Television, Mobile phones, Internet, Electronic money transfer etc. The ICT helps the farmers to understand the gap between productivity and market demand. The ICT, particularly the mobile technology has helped the farm producers in knowing internal commodity prices like agriculture produce. Thus ICT has been a big platform to the farm producer for their empowerment and enhancement. The ICTs assist the farmers to provide and manage the efficient supply chain of the agricultural products. This study attempted to know the impact various ICTs on productivity. The research also determines the factors influencing to refer the ICTs in agriculture. The study focused on to identify the problems faced by the farmers while access the ICTs. The research was conducted in Cauvery Delta Region, Thanjavur District. The data survey collected from 264 respondents by using simple random sampling technique. Regression, Descriptive Statistics and Factor analysis statistical tools were used to evaluate the data. The research findings have provided useful direction for the researcher and Practitioners for to develop future ICT based dissemination systems.

Keywords -Agriculture, Awareness, ICT, Farmers, Preference, Retention.

1. Introduction:

Agriculture required the technology combination to improve the production and the food is available to the human being. Access the modern sources of information tools were decisive necessity for the growth and substantial development in the agricultural sector. In the global most of the agrarian countries shows the interest to spend amount for adopting the new modern technology. The countries were

wisely adopting the appropriate technology for relevant situation for their sustainable growth. Similarly majority of the African countries has implemented the ICTs to the agriculture sector for their growth. [2] Information Communication Technology has immense potential to empowering the farming and farmers. The ICT was highly used by the agricultural extension and agricultural researcher. [8] described that the ICTs provides some market information such as input price, quality, quantity of produce, product output price, where to buy market, where to sell market, upto date market demand etc. Consequently, farmers were highly benefited of Information communication Technologies. On the other hand, the low illiterate farmers and poor infrastructural rural village farmers were found some barriers to access the Information Communication Technologies. The farmers were often faced the problem of fragmentation of output due to diffused market. The output fragmentation were cause due to lack of market information. Thus lack of market information also indirectly influences the transaction cost [12]-[13]. In the same way, there are some more challenges were causes to poor access of ICTs among farmers.

2. Literature Review:

2.1 Factors Influence on ICTs:

[16] stated that the farmers of the study area can improve and enhance their income and support with the use of well practice of ICTs. [7] evaluated the market performance and welfare with Digital Information Technology among South Indian Fishers sector at Kerala. The study exposed that the fishermen were benefited highly through mobile phone technology. The study showed that the fishermen get price reduction dispersion and elimination of waste through the mobile technology.

[1] illustrated that the education of adult and non-formal distance learning at Africa. The study revealed that the 50% of the Zambian farmers agreed that the consequence

information from radio programs had increased the crops yields at the study area.

[9] analyzed the usage of ICT opportunity and challenges at Africa. The study investigated among the cocoa farmers in Ghana. The researcher found that the local company Esoko on promoted the link to provide information to the farmers regards farming. The link transmit the information by their local language through voice and SMS messages The ICT tool gave the information about the farming practice, post harvest, pest management, farm safety etc.

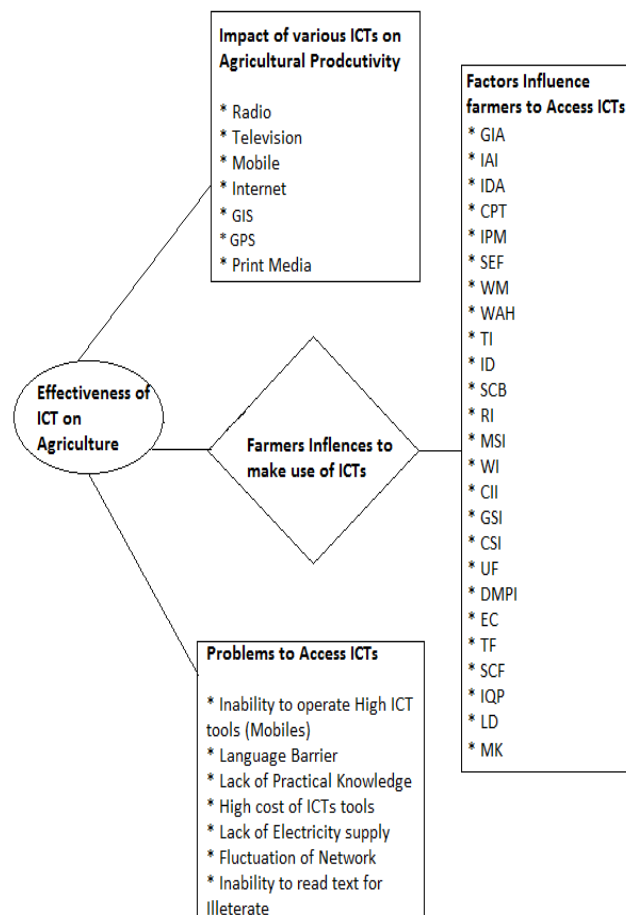
2.2 Problem Confrontation to Access ICTs:

[3] analyzed the use of ICT and awareness among Nigeria farmers. The research explored the major constrains of farmers found while use of ICTs was unaffordable cost and poor in services. [15] examined the market information services on farm by ICT for productivity. The research output explored that the 60% of the farmers were facing the poor technical knowledge while using ICTs.

[11] studied the use of ICTs in agriculture and influencing social factor at Africa. The researcher revealed that the disseminating of agriculture information and sharing knowledge through ICTs radio, television, mobile phones, Internet and web based information were gradually increase more. But, the usage of ICT was low due to inadequate ICTs infrastructure. The most of the rural village found the problem of inadequate infrastructure of ICTs.

[10] examined the access and assessment of ICT at Nigeria. The study revealed that some main problems like unaffordable cost to access internet, too expensive of ICT equipments, insufficient of electricity supply were the general problems for to use ICTs by both groups.

2.3 Proposed Framework:



3. Research Methodology:

3.1 Research Design:

The research is a descriptive design contains both qualitative and quantitative method. The study was conducted in Thanjavur District, Cauvery delta region. The sample population was 840. The sample size of the study was calculated by using online Rao software with 5% margin error and 95% of confidence level. The secondary data was collected from the journals, articles, websites, thesis, e-books, books etc. The simple random sampling technique was used to gather data with structured questionnaire. The questions were framed in 5 point Likert scale method. (1 - Strongly Agree, 2 - Agree, 3 - Neutral, 4 - Disagree, 5 - Strongly Disagree).

3.2 Objectives of the study:

- To measure the impact of various ICTs on Agricultural productivity
- To analysis the factors influence on farmers to refer ICTs.

- To identify the problems encountered by the farmers while using of ICTs

3.3 Statistical Tools

The research objectives were framed with perfect statistical tools to evaluate the prompt results.

S.No	Description of Objectives	Statistical Tools for analysis
1	Impact of various ICTs on Agricultural Productivity	Multiple Regression
2	Influence the farmers to refer ICTs in Agriculture	Factor Analysis
3	Problems encountered by farmers while using ICTs	Descriptive Analysis

The statistical tools were analyzed by the IBM - SPSS20 Packages

4. Data Analysis And Interpretations:

4.1 The impact of various ICTs on Agricultural Productivity

Table 1: Regression Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.793 ^a	0.629	0.623	0.865
a. Predictors: (Constant), Internet, Mobile, Radio, GIS, Print Media, GPS, TV				

The table 1 shows the model summary of regression analysis in which adjusted R² explain how much the agriculture productivity improves the usage of various ICTs. The adjusted R² value (0.629) showed that 79.3% improves in agriculture productivity.

Table 2: Model Fitness

ANOVA ^a						
Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	160.480	7	22.926	30.647	.000 ^b
	Residual	191.505	256	.748		
	Total	351.985	263			
a. Dependent Variable: Improves Agriculture Productivity						
b. Predictors: (Constant), Internet, Mobile, Radio, GIS, Print Media, GPS, TV						

The ANOVA table 2 explains with the significance (<0.05) F = 30.647 that the predictors independent variables has strong prediction over the dependent variable.

Table 3: Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.526	0.458		1.150	0.251
	GIS	0.059	0.065	0.044	0.911	0.363
	GPS	0.120	0.069	0.088	1.730	0.085
	Radio	0.232	0.063	0.181	3.687	0.000
	TV	0.213	0.063	0.179	3.387	0.001
	Print Media	0.671	0.066	0.514	10.186	0.000
	Mobile	0.173	0.057	0.150	3.045	0.003
	Internet	0.112	0.072	0.081	1.553	0.122
a. Dependent Variable: Improves Agriculture Productivity						

The table 3 illustrated that un-standardized co-efficient indicates that how much dependent variables varies with independent variable. The value of print media (B=0.671) show that this factor causes 67.1% change in dependent variable improvement in agricultural productivity while all other factor remains constant. The coefficient of radio is (B = 0.232) it means that if other variable remains constant, then change in radio leads to increase 23.2% in improvement in agriculture productivity. The dimension of radio, TV, print media, mobile have (p<.05) significance values. The print media has the highest value (t=10.186) which shows the positive effect on improvement in agricultural productivity. Radio, TV, mobile values also has

high values i.e. ($t = 3.387$), ($t = 3.387$), ($t = 3.045$) respectively.

4.2 The factor influence on farmers to make refer ICTs

Factors Influence on farmers to refer (ICTs)

1. Global information about agriculture (GIA)
2. Information about Agricultural Inputs (IAI)
3. In-depth information about Agriculture (IDA)
4. Information about Crop Production Technology (CPT)
5. Integrated Pest Management Information (IPM)
6. Socially and Economically feasible (SEF)
7. Working towards Modernization (WM)
8. Without anybody help farmers can use (WAH)
9. Timely Information (TI)
10. Possibility of Interactive discussion (ID)
11. Socio-Cultural Barriers (SCB)
12. Retrievable Information (RI)
13. Marketing and Storage Information (MSI)
14. Weather Information (WI)
15. Crops Insurance Information (CII)
16. Government scheme and system Information (GSI)
17. Credit Scheme Information (CSI)
18. User Friendly (UF)
19. Different market centre price of Agricultural Products (DMPI)
20. Environment Conservation (EC)
21. Learning Technical Farming (TF)
22. Gets solution to challengeable in farming (SCF)
23. Improve quality production (IQP)
24. Land Disputes Information(LD)
25. Minimum Knowledge (MK)

4.2.1 Exploratory Factor Analysis:

Towards categorize factors affecting marketing management, and to determine the variance explained by each factor, an exploratory factor analysis approach was followed. Exploratory factor analysis extraction used principal components and rotation used Promax with Kaiser Normalization [4]-[6] for the analysis.

Table 4: KMO and Bartlett Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.838
Bartlett's Test of Sphericity	Approx. Chi-Square	2794.22
	Df	300
	Sig.	.000

The Data from the table 4 revealed that internal coherence of the data was appropriate (KMO = 0.838), while and the Bartlett's statistic was significant at the 0.000 level (2794.22). The results value of the communalities extraction values of all the 25 items were more than 0.4. [6] suggested that loadings factor of criterion levels show to be only meaningful when the values are more than 0.40.

After loading the pattern matrix examination and communalities lower than 0.4 and variables not loaded to their corresponding factors were removed [5]. The items exactly loaded to the corresponding scale must be retained for the further study.

Table 5: Percent of explained variance by factors influencing to use ICTs

Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	
	1	7.499	29.997	29.997	7.499	29.997	
2	2.365	9.462	39.459	2.365	9.462	39.459	3.887
3	1.681	6.723	46.182	1.681	6.723	46.182	4.298
4	1.310	5.240	51.422	1.310	5.240	51.422	4.618
5	1.248	4.994	56.416	1.248	4.994	56.416	1.745
6	1.147	4.588	61.004	1.147	4.588	61.004	1.987

The table 5 revealed that the total variance of the factors. Based on the results of factor analysis the factors were classified into six main components, which have been named supportive factor, technical factor, environment factor, attitude factor, financial factor and behavioral factor, the obtained results from the factor analysis revealed that the

six mentioned factors explained 61.004% of the variation of influence to use ICTs. The first group which is labeled supportive factor had the most eigenvalue (7.499). Also, this factor explained 29.99% of the total variances of the variables. The second group, labeled technical factor, is comprised of four items. This factor with Eigen value 2.365 explained 9.462% of the total variances of the variables. The third group, labeled environment factor, is comprised of four items. This factor with Eigen value 1.681 explained 6.723 % of the total variances of the variables. . The fourth group, labeled as attitude factor, is comprised of four items. This factor with Eigen value 1.310 explained 5.240 % of the total variances of the variables. The fifth group, labeled financial factor, is comprised of two items. This factor with Eigen value 1.248 explained 4.994 % of the total variances of the variables. The sixth group, labeled behavioral factor, is comprised of two items. This factor with Eigen value 1.147 explained 4.588 % of the total variances of the variables.

Table 6: Pattern Matrix for the influences factors to use ICTs.

Factors	Components	Factor Loadings for Components
Supportive Factor	WI	0.896
	MSI	0.857
	RI	0.763
	TI	0.673
	IAI	0.628
	GI	0.586
	IDA	0.536
	GSI	0.491
Technical Factor	TF	0.788
	IQP	0.784
	CPT	0.734
	IPM	0.445
Environmental Factor	SCB	0.877
	CD	0.667
	SEF	0.637
	EC	0.593
Attitude Factor	WM	0.829
	MK	0.69
	SCF	0.682
	ID	0.591
Economical Factor	DMPI	0.692
	CSI	0.659
Behavioral Factor	UF	0.904
	WAH	0.511

The table 6 showed that the exploratory factor analysis for influencing factors to use ICTs. As all the factors loading values were more than 0.4 and loaded to their relevant scales except 1 item that is CII (Crop Insurance Information). Other than the 24 items for influence to use ICTs were retained for the further developments.

4.3 The problems encountered by the farmers while using of ICTs

Table 7: Descriptive statistics on constrains on accessing ICTs by the farmers respondent's

Constrains	N	Mean	±Std.Deviation
Inability to operate high ICTs	264	4.06	0.879
Language Barrier	264	4.29	0.740
Lack of Practical Knowledge	264	3.96	0.867
High cost of ICTs tools	264	4.45	0.821
Lack of Electricity Supply	264	3.73	1.003
Fluctuation of Network	264	4.04	0.880
Inability to read text for illiterate	264	3.92	0.902

The table 7 illustrated the constraints faced by the farmers too accessing agricultural information in Thanjavur District. The farmers' respondents positively rated the following measures: high cost of ICTs tool leads to major problem for poor access of ICTs (4.45 ± 0.821). Language barrier problem among farmers (4.29 ± 0.740), Inability to operate modern ICTs (4.06 ± 0.879), fluctuation of network signals (4.04 ± 0.880), Lack of practical knowledge (3.96 ± 0.867), Inability to read text for illiterate farmers (3.92 ± 0.902) and Lack of Electricity supply ($3.73 \pm 0.1.003$) were follow respectively.

5. Conclusion:

The study undertaken by the researcher shows that the effectiveness of ICTs among farmers in the study area. The research showed that most of the farmers were aware of ICTs tools. The ICTs facilitates smart supply chain management of agricultural products. Further, the ICTs had impacts on the agriculture production. [14] found in the empirical study that the ICTs has an important role for improving and enhancing the production of Boro and Broadcast of two types of rice variety, along with contributing the significant in agricultural growth. In this study show that the impact of various ICTs on agricultural production. The regression result revealed that the print media has the highest impact among other variables. Thus the farmers were in the study area were using the ICTs tools

and get benefit in their production. The research also indicates the factors influence to use refer the ICTs. The researcher found 25 influencing factor to refer ICTs. The influencing factors were evaluated using factor analysis and the factors were grouped into 6 components with of 24 variables for the future evaluation towards the research. The study also encountered the problem faced by the farmers to access ICT. The descriptive result revealed that the high cost of ICTs tool was the main constrains for the farmers in the study area.

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