

EFFECTS AND CONSTRAINTS ASSOCIATED WITH ICT USE BY YAM FARMERS IN BENUE STATE, NIGERIA

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ABSTRACT

The study examined the effects and constraints associated with the use of ICT facilities by yam farmers in Benue State, Nigeria. The objectives of the study were to describe the demographic characteristics of the farmers, identify the determinants of ICT use and analyze the effects of ICT on the output of yam farmers. Data were analysed using descriptive and inferential statistics. The results showed that majority (68.3%) of the farmers were within the active and innovative age. Majority (71.25%) were married and have one form of education or the other. Most of the farmers (67.5%) used mobile phones for communication. The respondents perceived all the constraints identified as severe with the exceptions of lack of confidence and lack of interest. Quantity of yam sett, labour and access to ICT facilities were significant determinants of yam output (there is no where in the body of the the work where "Decision to use ICT" stand as the dependent variable. Rather, it is "Yam Output"). Yam farmers however, have room to increase their output by increasing their fertilizer and quantity of staking materials (these recommendations are not from your findings. Include recommendations from the findings). Yam yield after the use of ICT was significantly higher than before ICT use with z-value of 3.33, as such it can be concluded that there is a significant relationship between ICT use and yam farmers productivity. Include some z scores, r squared. End with a major recommendation.

Key words Capital letters: Effects, constraints, ICT use, yam farmers

INTRODUCTION

Yam is a fundamental cash and food crop grown in many parts of the country and around the world. Nigeria accounted for about 70% of the total production of yam, while West Africa accounts for about 95% of yam production globally. It is in the class of roots and tubers, a staple of the West African diet, which provides some 200 calories of energy per capital daily. Ayanwuyi *et al.* (2011) stated that yam (*Dioscorea spp.*) is among the oldest recorded food crops, and ranks second to cassava in the study of carbohydrate in West Africa. It is a principal source of food in other tropical regions including East Asia, Africa, South America, South East Asia (including China). Six species are considered the chief edible yams of the tropics, namely white yam, watey yam, yellow yam, (name the six and possibly put their botanical names) Yam tubers are edible in boiled, fried, roasted or pounded forms

and could be chipped, dried and mashed into yam flour. It also has potential for livestock feed and industrial starch manufacture (Ref).

Information and communication technology is now been used (in all matters involving information dissemination, processing, storage, and retrieval) by virtually every sector (Meera *et al.*, 2004; Okwu and Iorkae, 2011). Processing, storage, transfer, and retrieval of information has now been made easy with the use of ICT facilities which access information at a relatively high speed and more accurately. ICT has high capacity for use in agricultural extension and are increasingly being used in many ways and in the various sectors of agriculture for purposes like sourcing for inputs, record keeping (i.e. using computers as database for day to day happenings on the farm), sourcing for viable market, and linking farmers with useful information. ICT can also be used during workshops as well to aid farmers' assimilation of the improved techniques being taught (Onumadu, 2011).

Nowadays, information dissemination depends on computers and internet network to reach a wider but targeted audience, and thereby create awareness of production information among farmers and enhance widespread dissemination of improved techniques and practises in farming. ICT facilities also make it easy to help farmers create a network among themselves, as they share both ideas and challenges to improve their farming efficiency. In Nigeria, the information technology approach is gradually spreading and obviously will take time to be fully integrated into the agricultural system (Adesope *et al.*, 2007).

Information and technology is fast becoming an increasingly powerful tool for improving the delivery of basic services and enhance local development opportunities (Gurstein, 2003). Recently almost all aspects of rural life have increased in their use of ICT. Ozor (2005) pointed out that rural communities require information, among others, on the supply of agricultural inputs, improved technology, and agricultural credit, market price and competitors. Ani (2007) summarized the role of ICT in extension as follows: faster access to expert knowledge and information, faster and more efficient delivery of information, more relevant and adopted content and dissemination of information to people hitherto unreached and a deeper geographic penetration, especially to rural areas. ICT use in agriculture plays a vital role in agricultural extension (Adedoyin, 2005), therefore, constraints associated with its use will greatly affect the information flow in the agricultural hierarchy and prevent the economic potentials in the various agricultural information sources from being fully harnessed (Ozor, 2005; Agwu and Alu, 2005)

Several constraints affect the use of ICT more specifically as most of the current ICT facilities are sophisticated, highly computerised and difficult to operate. Studies have however, shown that farmers have a rather passive attitude toward the use of ICT facilities because of these constraints (Adegbidi, 2012).

Furthermore, recent research work like that of Iorkae (2011) have shown the role of ICT in the adoption of new technologies and the slow implementation of ICT in agriculture as a result of some constraints faced by the farmers. The problems of adoption of research findings will be adequately addressed if farmers can, at least, first have access to this knowledge. ICT use in agriculture will help to minimise the constraints associated with adoption, because it will serve as a bridge between the knowledge bases and the beneficiaries (Adesope *et al.*, 2007 and Adedoyin, 2005).

Objectives of the study The objectives of this study were, to: :

1. describe the socio-economic characteristics of the yam farmers,;
2. identify the ICT facilities yam farmers mostly relied on in the study area,;
3. determine the effects of ICT use on yam farmers in terms of their output;
4. t determine the factors affecting yam farmers yield; and
5. examine the constraints affecting ICT use by yam farmers.

METHODOLOGY

Benue State is one of the States in North Central Nigeria. It is located approximately between latitude 61' 2°N to 81' 2°N and longitude 71' 2°E. Agriculture accounts for over 75% of the State's economic activities. It has a tropical climate with distinct seasons: the rainy season and dry season (Agwu and Alu 2005). The major occupation of the people is agriculture. The major agricultural produce includes: cassava, yam, fruits.. Major animals reared include cattle goat, sheep.

Multi-stage sampling technique was adopted for this study; two Local Government Areas (Oturpko and Gboko) were purposively selected, because the people are predominantly yam farmers. Four communities were also purposively selected from the two Local Governments Areas owing to their large scale production of yam. Twenty yam farmers were randomly selected from each of the four communities, to give a total of 80 sampled yam farmers.

Data collection and analysis

A well-structured questionnaire/interview schedule was administered through trained enumerators, for eliciting relevant information from the respondents. The analytical tools used include descriptive statistics (such as mean, frequency count and percentages) Likert-type scale was used to ascertain the major constraints to ICT use as perceived by yam farmers, a list of possible constraints to ICT use was compiled and respondents were asked to indicate the perceived constraints on a four point Likert-type scale of very severe, severe, undecided and not severe, scaled 4 to 1. Ordinary least square (OLS) regression and Z-test were also used as inferential statistics.

The implicit form of the linear function used is expressed as
 $Y = (X_1, X_2, X_3, X_4, X_5)$. The error term should not be part of the implicit function.

Where $Y =$ Output (kg)

$X_1 =$ yam sett (N)

$X_2 =$ labour (N)

$X_3 =$ fertilizer (N)

$X_4 =$ staking materials (N)

$X_5 =$ ICT use (N)

$e_i =$ Random Error Terms

Where $y, x_1 \dots x_5$ is as defined above

$b_0 =$ constant term

$b_1 \dots b_5 =$ coefficients

$e_i =$ Random error term

The linear function was the lead equation for this study and its explicit form is given by:

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e_i$$

Where $y, x_1 \dots x_5$ is as defined above

$b_0 =$ constant term

$b_1 \dots b_5 =$ coefficients

$e_i =$ Random error term

Also, t-test:

$$T = \frac{X_1 - X_2}{SEX}$$

Where, $SEX =$ Standard error

$X_1 =$ mean of first sample

$X_2 =$ mean of second sample

RESULTS AND DISCUSSION

Describe each Table first before inserting the Table

Table 1: Socio-economic and personal characteristics of respondents

Variables	Frequency	Percentages
Age		
30 years and less	17	21.25
31-40 years	20	25
41-50 years	18	22.5
51 and above	25	31.25
Access to ICT		
Had Access	79	98.75
No access	1	1.25
Access to extension service		
Had Access	21	26.25
No access	59	73.75
Farming experience		
1-10	8	10
11-20	11	13.75
31-40	56	70
Above 41 years	5	6.25
Length of exposure to ICT		
2-4 years	62	77.5
5-6 years	5	6.25
7-8 years	7	8.75
10 years & above	6	7.5

Source: Field survey, 2015

The findings in Table 1 show that majority (68.5%) of the respondents were less than 51 years, it is obvious that the yam farmers were still in their active age and consequently can positively affect their extent of ICT usage. Table 1 also reveal that majority (98.75%) of the respondents had access to ICT tools, while (1.75%) did not have access to ICT facilities. This implies that information and communication facilities were available in the study area, since majority claimed they had access to them. This will directly or indirectly affect their use as accessibility is directly associated with utilization. This finding is in agreement with that of Onumadu, (2011) who pointed out that accessibility of ICT facilities to a large extent affects their utilization. Majority (73.75%) of the respondents claimed that they did not have access to extension services while (21.25%) claimed that they had contact with extension agents. This will negatively affect the ability of the respondents in using ICT facilities, since extension is the major means through which the farmers learn new technologies, because extension agents can teach farmers the use of some categories of ICTs such as e mails, record keeping through the use of computers. This result is in line with the findings of Okwu and Iorkaa (2011) who affirmed that farmers use of new information was directly linked to their access to extension education. The entries in Table 1 also revealed that 70% of the yam farmers had work experience of between 31- 40 years, implying that majority of the yam farmers had relatively high working experience; this could directly or indirectly affect their extent of ITC usage.

Table 1 also shows that a majority (77.5%) have being exposed to ICT for between 2-4 years, indicating low exposure of Yam farmers to ICT. According Adebayo and Adesope (2007), ICT made a significant entry into Nigeria around year 2000, which probably accounted for their finding of low exposure to ICT. The same reason cannot however, be responsible for the present findings, the present situation could be as a result of the numerous constraints faced by yam farmers today.

Table 2: Distribution of the respondents by ICT facility mostly relied upon

ICT Tools	Frequency	Percentages	Rank
Computer	1	1.25	3 rd
Radio	24	30	2 nd
Television	1	1.25	3 rd
Video Player	-	-	5 th
Mobile phone	54	67.5	1 st
Internet	-	-	5 th

Source: Field survey, 2015

The entries in Table 2 indicate that the yam farmers relied mainly on mobile phones and radio which ranked 1st and 2nd respectively; this result reflects the low level of computer knowledge of the yam farmers as majority only relied on the common ICT facilities. This implies that a lot still needed to be done for farmers to have more access to other ICT facilities. This finding is in line with that of Adebayo and Adesope (2007) who pointed out that there was grossly under-utilization of ICT facilities by farmers, and that there is still a lot to be done if the Nigerian agricultural sector must meet up with the global challenges of ICT.

Table 3: Perception of the constraints faced by yam farmers in utilizing ICT

Perception of constraints		
Constraints	Mean	Remark
Financial constraint	3.81	SC
Lack of awareness	3.16	SC
Lack of confidence	2.1	NSC
Dynamic nature of ICT	3.43	SC
Inadequate power supply	3.56	SC
Complexity of ICT facilities	3.45	SC
Language barrier	3.16	SC
Skill on how to apply ICT in yam farming	3.66	SC
How to retrieve information	3.61	SC
Lack of interest	2.4	NSC

SC – Severe Constrain; NSC – Not a Severe Constrain ;

Source: Field surveys, 2014

Entries in Table 3 reveal that the respondents were faced with several severe constrains like: financial constraint, lack of awareness, dynamic nature of ICT facilities, inadequate power supply, complexity of ICT facilities, language barrier, lack of skill on the application of ICT to agriculture, and lack of skill on how to retrieve information via ICT facilities. On the other hand, lack of confidence and lack of interest were not perceived as severe limitations to the use of ICT by yam farmers. This shows that majority of the constraints under consideration were major limitations to use of ICT.

The result in Table 4 indicates that the linear functional form which is the lead equation has R^2 value of 0.850 which implies that about 85.0% of the variable in yield of yam production is explained by variable X_1 - X_5 (yam sett, labour, fertilizer, staking materials and rate of ICT use) included in the model therefore, the remaining 15.0% is as a result of non-inclusion of some very important explanatory variables as well as errors in estimation. The result reveals that there is a positive and significant relationship between the variables (yam sett, labour, fertilizers, staking materials and ICT use) and the output of yam farmers. Also it implied that if these sets of inputs increase the output will increase correspondingly, other conditions being equal.

Table 4: Regression estimates of factors affecting yield of yam

Variables	Coefficient	T-value
Constant	-9735.579	-1.523 ^{Ns}
Yam sett	2.964	5.496***
Labour	2.118	2.736***
Fertilizer	0.773	0.920 ^{Ns}
Staking materials	-1.329	-0.605 ^{Ns}
Rate of ICT use	10756.840	1.995*
$R^2 = 0.850$		

*** = significant at 1% level of probability

* = significant at 10% level of probability

Ns = Not significant

Source: Field survey, 2015

Table 5: Z-test of the Yam farmers' output before and after ICT use

N=80	Mean	Z- value	Sig. level
Before Adoption	64202.5	3.33	000***
After Adoption	83718.75		

Source: Field survey, 2015

Data in Table 5 show the result of Z-test that there was a significant mean difference in yield before and after the use of ICT, which implied a positive and significant difference in the respondents' output at 1% level of significance. This meant that the respondents realized a higher output when they utilized ICT compared with when they did not use ICT.

CONCLUSION

The study has showed that ICT use by yam farmers was profitable in terms of the yam output of farmers. output. The Z-test result revealed that there was a significant difference in the output of the respondents before and after the used ICT at 1% level of probability. The study revealed that the respondents were computer non-literates as only (1.25%) relied on computers. From the result it can be concluded that the use of ICT had a significant effect on yam farmer's output and the constraints under consideration were major limiting factors to the respondents' use of ICT at different level except lack of confidence on the use of ICT facilities and lack of interest which the respondents claim were not severe constraints.

RECOMMENDATIONS

Based on the findings of this study the following recommendations were made:

1. Provision of infrastructural facilities for example, stable electricity is immensely needed to motivate farmers to use ICT tools.
2. Rural dwellers should be empowered financially to be able to use and have access to ICT facilities
3. Opportunity should be given to interested private persons and non-governmental organisations to invest in the area of communication in the study area to enhance economic viability of the area and advance the use of ICT by the rural dwellers, especially teyam farmers.

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