



## Assessment of Post-harvest Management Information Needs of Yam Farmers in Kogi State, Nigeria

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### Abstract

#### Keywords:

Post-harvest management, Information needs, Yam farmers

The study assessed the post-harvest management information needs of yam farmers in Kogi State. Interview schedules were used to collect data from 189 yam farmers who were randomly selected from the four agricultural zones of the State (Zone A, B, C and D) by using multistage random sampling techniques. The data collected were subjected to descriptive statistics and binary logit regression. Result shows that majority of the yam farmers highly sought for information on storage (52.91%) and markets/market prices (50.79%). Logit regression analysis shows that educational level and extension contacts at 1% and income and age at 5% were found to have had significant effect on the farmers' access to improved post-harvest management information on yam. It is recommended that improving the educational background of yam farmers through adult educational system, ensuring access of yam farmers to needed information on improved post-harvest management technologies, and the preservation and propagation of some effective indigenous post-harvest management of yam would go a long way to boost their participation in post-harvest activities for better value addition to harvested yam.

### 1. Introduction

Yam (*Discorea spp*) is an economically important food crop grown throughout the tropical and subtropical regions of the world. Nigeria is known for the cultivation of some common staple crops like yam, cassava, millet, sorghum, cowpea, bambaranut, maize, pigeon-pea, among which yam stand out to be one of the most common especially in south and north central regions of the country. West Africa accounts for 90-95% of world yam production with Nigeria being the largest single producer (Osunde, 2008). Current production is about 8 Million tonnes (Ajala, 2012). Meanwhile, yam production in Kogi State was estimated to be 1286.96 MT in 2008 and rose minimally to 1290.73 MT in 2010 whereas, the area under cultivation 2008 was 104.56 Ha and in 2010 an area of 111.20 ha was cultivated (KSADP, 2011).

Although yams provide an important source of income and staple food, the rapid perishability of tubers and poor marketing systems limit its

production and market expansion. High levels of post-harvest tuber losses are caused by fungal and bacterial rots, rodent attacks, and premature sprouting. Poor marketing systems including inadequate transport, storage facilities, and storage management, result in an unsteady supply of yams causing erratic price fluctuations in the urban markets. Awuah and Akraasi (2007) affirmed that the major constraint to yam production worldwide is postharvest rot. Storage losses in yam of the order of 10-15% after the first three months and approaching 50% after six months storage have been reported (FAO, 2000 and Osunde, 2008)

According to Onyenobi *et al* (2009), postharvest management enhances the time, place, form and possession utilities created by the marketing system as the product moves from the farmer to the consumer. Appropriate post-harvest management enables wider access to new and existing markets and reduces post-harvest wastage and by-product contamination of air and water (FAO, 2001). In

meeting the challenges and opportunities of the globalization of agri-industries and food security, farmers, processors and traders need reliable access to appropriate techniques and technologies that will add value and enhance competitiveness for fresh and processed produce and their by-products (Opara, 2003).

Information as an enterprise is important for the production process especially for agricultural production and marketing of agricultural produce. Mudukuti and Miller (2002) suggested that in the information age, dissemination of information and applying this information in the process of agricultural production will play a significant role in development of farm settlements. According to Ofem *et al.* (2011), the areas of information needs of yam farmers border around post-harvest storage of yam tubers in barns, application of chemicals, sorting/grading, transportation and marketing and, information on the storage was the most sought for. Similarly, Golob (2011) in an interview with some set of yam farmers revealed that improved storage practices are the information mostly needed by yam farmers in promoting post-harvest management of yam to avoid wastage and selling their yams at a 'give away' prices in the period of bounty harvest. Similarly, Martey *et al.* (2012) identified transportation and yam marketing information as the most serious areas of information needs by famers in Ghana. This report is similar to that of a baseline survey carried out by Centre for Technology and Economic Development (CTED) in the Volta region of Ghana where the farmers are said to be in serious need of market information and prices as it was reported that farmers' knowledge on market prices in the study area is quite low. Also, Ofor and Ibeawuchi (2010) identified the area of information needs of yam farmers in the South-Eastern Nigeria to include, marketing, processing, and storage.

Quality and quantity of yams can be improved provided there is access to post-harvest information (David and Johnson, 2003). The need for post-harvest loss prevention of primary agricultural products has been of great concern to past and present governments in Nigeria. It is a problem that needs to be addressed at both on-farm and industry levels. The yam farmers are in the quest for answers to the questions that bordered around how, when and where to get right information for proper post-harvest handling of these crops. Hence, the research is anchored on assessing the information needs of these farmers.

Objectives of the study include:

1. Describe the socio-economic characteristics of the respondents;

2. Determine the level of post-harvest information needs of the yam farmers in the study area;

3. Ascertain the access of farmers to information on improved post-harvest management of yam in the study area;

4. Determine effect of yam farmers' socio-economic characteristics on their access to post-harvest management information in the study area;

## 2. Materials and methods

The research was carried out in Kogi State of Nigeria. Geographically, it is located between latitude  $6^{\circ}30'N$  and  $8^{\circ}48'N$  and Longitude  $5^{\circ}23'E$  and  $7^{\circ}48'E$ . Annual rainfall stands between 1016 mm and 1524 mm. It has a maximum temperature of  $33.2^{\circ}C$  and average temperature of  $22.8^{\circ}C$ , with an average relative humidity of 70%. Rain starts in March and is at its peak in September every year with average daily hours of sunshine at 6.2 hours. It has a land area of 283,135,359 Km<sup>2</sup>. It has a population of about 3,278,487 people out of which 1,691,737 are males and 1,586,750 are female with an average of 172,000 farm families (Ajala, 2012). About 1.2 million Farmers grow root and tubers crops including yam (Expanded Programme for Root and Tuber Crops, 2011).

The population for this study consisted of all the yam farmers in Kogi State. Due to the enormity of this population, a sample size of 155 respondents was selected using purposive, stratified and simple random sampling techniques. The first stage comprised the purposive selection of two (2) Local Government Areas from each of the stratified four agricultural zones (A, B, C and D) in the study area based on the concentration of yam farmers in these areas. These were sum up to eight (8) Local Government Areas. The yam farmers in these Local Government Areas with a population of 7,653 households were the sampling frame of this study. In the second stage, sample frames were developed for each of the Local Government Areas and using proportional allocation of 4.5% across board, a total sample size of 155. Primary data were collected through the use of interview schedule due to the fact that majority of the farmers were not literate and could not read or write. Data collected were subjected to Descriptive statistics (frequency, percentage and mean) and Binary Logit Regression. The logit model was used to analyze the effect of the socio-economic characteristics of yam farmers on their access to post-harvest information. The logit model is expressed as:

$$L_i = \ln \left( \frac{p}{1-p} \right) = \beta_0 + \beta_1 x_i + \dots + \beta_n x_n + u_i$$

$L_i$  = likelihood of having access to post-harvest information which is (access = 1 and no access = 0)

$P$  = probability of a farmer having access to post-harvest information

$1-P$  = probability of a farmer not having access to post-harvest information.

$\beta_0$  = intercept

$\beta_{1, \dots, n}$  = estimated parameters

$x_{1, \dots, n}$  = set of independent variables

For the logit model, the equation for the effect of socio-economic characteristics of yam farmers and the likelihood of having access to post-harvest information is specified as:

$$L_i = \ln (P/1-P) = \beta_0 + \beta_1 AGE + \beta_2 SEX + \beta_3 MST + \beta_4 EDU + \beta_5 HHS + \beta_6 EXP + \mu$$

Where:

$L_i$  = Likelihood of farmers having access to post-harvest information.

$AGE$  = Age of yam farmers measured in years.

$Gender$  = Gender of yam farmers measured as a dummy, male =1, female =2

$MST$  = Marital Status measured as 1 for single, 2 for married, 3 for divorced respondents.

$EDU$  = Educational level measured as the number of years spent in acquiring formal education by the respondents.

$HSS$  = Household size measured as the number of persons living in the house of the respondents at the time of the interview.

$EXP$  = Farming experience measured as the total number of years spent in farming particularly post-harvest operations

$INC$  = Income of farmers measured as the money in naira the farmer realizes from his enterprise at the end of the year

$\mu$  = Error which satisfies all the econometric conditions of Ordinary Least Square (OLS)

### 3. Results and discussion

#### 3.1 Socio-economic Characteristics of Yam Farmers

The result of the socio-economic characteristics of the respondents shows that majority (58.45%) of the yam farmers in the study area were in their active ages (31- 50 years old) with the mean age of about 45 years. With respect to gender of the respondents, result shows that they were male dominated and most of them were married and have attended one form of formal education or the other. This implies that most of the respondents were educated and this can make them seek and receive information easily which could be utilized to improve post-harvest management of yam. This result agrees with that of Okedo-Okojie and Onemolease (2009) who said majority of the yam farmers in Edo State, Nigeria were in their productive and active ages and have had one form of formal education or the other.

#### 3.2 Level of Post-harvest Management Information Needs of yam Farmers

The analysis about the level of information needs of yam as it is reflected in Table 2 shows that 14.29%, 29.87%, 51.95% and 3.90% of yam farmers said they needed low, medium, high information and no response on storage of yam tubers respectively, especially in the area of access to warehouses in order to improve the shelf life of tubers and also, to protect them from theft. This result is in consonance with that of Ofem *et al.* (2011) who reported that information on storage was highly sought for by yam farmers.

In terms of markets/market prices, 15.58%, 17.53%, 25.97% and 40.91 of the respondents said they needed low, medium, high information and no response on it respectively. The proportion of respondents who did not respond to this area of information need may be due to fact that market integration among farmers is high in terms of getting information readily from neighbours/friends and fellow farmers and as such may not consider the response to this information necessary. This result does not agree with those of Martey *et al.* (2012) and CTED, 2013 who in their various respective studies identified yam marketing information to be highly sought for by yam farmers in Ghana. In terms of information on credits, 16.23%, 32.47%, 31.17% and 20.13% claimed they needed low, medium, high information and no response on the availability of credits in order to boost their post-harvest activities. With respect to pesticides/insecticides, 17.53%, 23.38%, 25.33% and 33.77% of the respondents claimed the needed low, medium, high information, and no response respectively; on where and how to procure/apply them on yam.

#### 3.3 Sources of Information on Improved Post-harvest Management Technologies to Yam Farmers

The sources of information on improved post-harvest management technologies available to yam farmers are indicated in Table 3. The result shows that 78.87% of the respondents claimed they sourced their post-harvest information from their friends/neighbours (including fellow farmers). This result is different from that of Ibrahim *et al.* (2009) who reported that 46.00% of the farmers claimed they sourced their post-harvest management information from their friends/neighbours.

The result shows that 42.25% of the respondents received their post-harvest information from community-based organizations in the study area. Examples of these organizations are the youth, women and men organizations that operate under

various names and umbrellas, age grade or peer groups and credits and thrift societies.

The result shows that 3%1.28 of the respondents obtained their source of post-harvest management information on yam from religious organizations like the Catholic Men Organization (CMO), Catholic Women Organization (CWO), and ANSAR'DIN of the Moslem Faith which create forum for both men and women farmers to meet and interact.

The result also reveals that 54.55% of the respondents sourced their post-harvest management information on yam from Kogi State Agricultural Development Project (KSADP). The KSADP through the extension agents (village extension workers) relay post-harvest information to their contact farmers who also diffuse the information to the non contact farmers in the study area.

Table 1. Distribution of Socio-Economic Characteristics of Yam Farmers in Kogi State (n= 154)

Variables	Frequency	Percentages	Mean
Age			
≤ 20	3	1.95	
21 - 30	17	11.04	
31 - 40	37	24.03	
41 – 50	53	34.42	44.96
51 - 60	28	18.18	
> 60	16	10.39	
Gender			
Male	116	75.33	
Female	38	24.68	
Marital status			
Single	15	9.74	
Married	133	86.36	
Divorced	1	0.65	
Widowed	5	3.25	
Educational level			
No formal education	35	22.73	
Primary education	48	31.17	
Secondary education	31	20.13	
OND/NCE	30	19.48	
HND/Degree	10	6.49	
Household size			
≤ 5	47	30.52	
6 - 10	74	48.05	
11 - 15	29	18.83	7.51
> 15	4	2.60	
Farming Experience (years)			
≤ 10	36	23.38	
11 - 20	60	38.96	
21 - 30	34	22.08	20.12
31 - 40	18	11.69	
> 40	6	3.90	
Annual income (₦)			
≤ 50,000	36	27.51	
51,000 – 100,000	40	34.39	
101,000 – 150,000	18	11.64	
151,000 – 200,000	22	10.58	
201,000 – 250,000	18	8.47	145.59
> 250,000	20	7.41	
Extension contacts			
≤ 5	134	87.01	
6 - 10	9	5.84	
11 - 15	2	1.30	2.63
16 - 20	6	3.90	
> 20	3	2.00	

Table 2. Distribution of Respondents according to their Level of Post-harvest Management Information Needs on Yam, n = 154

Areas of Information Needs	Low (1)	Medium(2)	High(3)	No Response
Storage	22(14.29)	46(29.87)	80(51.95)	6(3.90)
Processing	46(29.87)	26(16.88)	39(25.33)	43(27.92)
Transportation	33(21.43)	47(30.52)	39(25.33)	35(22.73)
Markets/market prices	24(15.58)	27(17.53)	40(25.97)	63(40.91)
Weather	42(27.27)	23(14.94)	18(11.69)	71(46.10)
Pesticides/insecticides	27(17.53)	36(23.38)	39(25.33)	52(33.77)
Credit availability	25(16.23)	50(32.47)	48(31.17)	31(20.13)
Drying	51(33.12)	8(5.20)	8(5.20)	87(56.49)

Note: Multiple responses, The figures in parenthesis are in percentages (%)

Table 3. Distribution of Respondents according to the Sources of Post-Harvest Information on Yam available to them, n = 154

Source of Information	Frequency	Percentage (%)
Research Institutes	3	1.95
Universities	4	2.60
ADP	84	54.55
NGOs	26	16.90
Colleges of Education	2	1.30
Friends/neighbours	123	78.87
Religious organizations	49	31.82
Community meetings	65	42.21

Note: Multiple responses

### 3.4 Access of Yam Farmers to Information on Improved Post-harvest Management Technologies

Table 4 shows the result of the access of yam farmers to information on improved post-harvest management technologies. It reveals that majority of the respondents (77.27%) claimed that they had access to information on improved transportation system (motorcycles, pick-up vans, Lorries and other trucks). The result also shows that 38.31% of the respondents had access to information on pesticides/insecticides application; 44.16% of them said they had access to improved information on processing the yam tubers into yam slabs or chips, flour and pounded yam; 14.28% of the respondents had access to information on storage of yam in a warehouse found in and around the markets as earlier discussed in the case of maize. This means that majority of the yam farmers in Kogi State had little or no access to information on improved post-harvest management technologies.

This result agrees with those of Okoedo-Okojie and Onemolease (2009), Martey *et al.* (2012) and Nnadi and Akwivu (2007) that yam farmers had little or no access to information on improved post-harvest management technologies. The findings of FAO (2000) and Osunde (2008) on implication of inadequate access to information on improved post-

harvest management technologies, especially in area of storage leading to losses of the order of 10 - 15% after the first three months and approaching 50% after six months of storage is applicable here.

The implication for this is that, yam farmers in Kogi State have suffered losses and were normally compelled to sell their yams at give-away prices.

### 3.5 Effect of Socio-economic Characteristics of Respondents on their Access to Improved Post-harvest Information on Yam

Logit regression analysis was used to determine the effect of socio-economic characteristics of the respondents on their access to improved post-harvest management information and the result is contained in Table 5. Age has significant negative effect on access to information on improved post-harvest management technologies of yam at  $P < 0.05$ . This means, the higher the age of the respondents, the lower their chances of having access to information on improved post-harvest management technologies.

This implies that as those farmers in their active and productive ages advance, they may be ageing and drawn away from active participation in accessing information on improved post-harvest management technologies of yam.



Table 4. Distribution of Respondents according to their Access to Information on Improved Post-Harvest Management Technologies of Yam n= 154

Improved Post-harvest Management Technologies	Access	No Access	Total (%)
Transportation	119 (77.27)	35 (22.72)	100
Processing into yam flour	68 (44.16)	86 (55.84)	100
Pesticides/Insecticides application	59 (38.31)	95 (61.69)	100
Storage of yam in warehouses	22 (14.28)	132 (85.71)	100

Note: multiple responses, Figures in parentheses are in Percentages (%)

This result is in conformity with Martey *et al.* (2012) that age of the yam farmers significantly reduced their access to information on improved post-harvest management technologies.

Annual income of yam farmers has positive significant effect on access to information on improved post-harvest management technologies of yam at  $P < 0.05$ . In other words, the higher the annual income of the respondents, the higher the respondents' chances of having access to information on improved post-harvest management technologies of yam. This might be tied to the fact that higher annual income often translates to the capacity of a farmer to seek and access needed post-harvest management information.

The number of times extension agent had contact with the respondents significantly ( $P < 0.01$ ) affect access to information on improved post-harvest technologies on yam. This means that the higher the number of visits by extension agents to the farmers, the higher their chances of accessing the post-harvest management information available to them. This may be due to the fact that extension agents have the desired agricultural information which is made available to the farmers through the contact farmers.

Educational level has positive significant effect on access to information on improved post-harvest management technologies at  $P < 0.05$ . This

means that the higher the educational level of the respondents, the higher their likelihood of having access to information on improved post-harvest management technologies of yam. This implies that high level of education attained by the yam farmers have made them easily access both print and electronic media for information on improved post-harvest management technologies of yam. This result is similar to that of Martey *et al.* (2012) that educational level of the yam farmers had a significant effect on their access to market information.

Chi-square (37.397) was statistically significant ( $P < 0.01$ ). Thus, the null hypothesis was rejected and alternative hypothesis accepted, implying that socio-economic characteristics of yam farmers in Kogi State had significant effect on their access to information on improved post-harvest management of yam. From the result, Nagelkerke  $R^2$  is 0.907 meaning that the variables accounted for 90.70% of the factors responsible for the variations in the probability of access to information on improved post-harvest management technologies. This means that there were other factors apart from those captured in the regression model that could have affected the respondents' probability to have access to information on improved post-harvest management technologies of yam.

Table 5. Logit Regression Showing the Effect of the Socio-Economic Characteristics of Yam Farmers on their Access to Information on Improved Post-Harvest Management Technologies

Variables	B	S.E	Wald	P-Value
Age	-0.141	0.070	4.093	0.043*
Gender	1.188	1.131	1.103	0.294
Marital Status	-2.020	1.953	1.071	0.301
Household size	-0.070	0.180	0.151	0.697
Annual income	0.013	0.006	4.522	0.033*
Extension contact	1.967	0.592	11.030	0.001**
Educational level	0.601	0.179	11.238	0.001**
Farming Experience	0.051	0.058	0.773	0.379
constant	-5.213	3.838	1.845	0.174
Log likelihood ratio = 37.397 <sup>a</sup> , Nagelkerke $R^2$ = 0.907				
Chi-square statistic = 173.083, Sig = 0.001				

\* Statistically significant at 5% and \*\* at 1% level of probability

#### 4. Conclusion and recommendations

Majority of the yam farmers were within their active and economic ages. Male respondents dominated yam post-harvest management in terms of number of persons involved but not by role or level of participation. The study revealed that age, educational level, annual income and extension contact were found to have significant effect on access of yam farmers to information on improved post-harvest management technologies. The common sources of post-harvest management information for majority of yam farmers were informal (friends/neighbor, community based organizations). This may be due to the fact that these sources were closer to them and that there existed interpersonal communication between these sources and the farmers.

The study also identified areas of post-harvest information needs of yam farmers to include storage, processing, transportation, markets/market prices, pesticides/insecticides application and credit availability of which the most sought for is that of storage of yam farmers. The study recorded little or no access to information on improved post-harvest management technologies by yam farmers. This is tied to the fact that these technologies were not available, and where they were, the farmers might not have the awareness of their existence due to inadequate information on them. Based on the research findings the following recommendations are made:

1. Efforts by both private and public extension should be geared towards improving the educational level of the yam farmers through the promotion of adult education especially in the rural areas as this will enable them easily access and utilize information on improved post-harvest management of yam. .

2. Extension organizations, especially ADPs should ensure regular contact with the yam farmers to keep them abreast of innovations on post-harvest management technologies that are available.

3. Access to information sources/channels is imperative as this will increase the farmers' access to both technical and economic information on how best to handle the harvested yam. Therefore, both private and public development agencies should ensure rural farmers access to needed information through establishment of ICT centers and GSM facilities in rural areas. The Federal Ministry of Agriculture and Rural Development transformation programme (popularly known as "e-wallet" ) for the distribution of improved seeds and fertilizer

4. Improvement in the transportation system should be given priority attention as this is necessary to facilitate conveying of farm produce

from farm gates to markets or homes and from home to markets. This can be achieved through the rehabilitation of feeder roads in the rural areas.

5. Where farmers have little or no access to improved post-harvest management technologies, efforts by private and public extension should be geared at the preservation and propagation of some effective indigenous post-harvest management practices of yam.

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## ارزیابی نیاز اطلاعاتی مدیریت پس از برداشت سیب‌زمینی کاران ایالت کوگی، نیجریه

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این مطالعه به ارزیابی نیاز اطلاعاتی مدیریت پس از برداشت سیب‌زمینی کاران در ایالت کوگی در کشور نیجریه می‌پردازد. سیب‌زمین کاران به تعداد ۱۸۹ نفر به روش نمونه‌گیری تصادفی چند مرحله‌ای از ۴ منطقه از ایالت مذکور انتخاب شدند. از آمار توصیفی و رگرسیون لجوجیت برای توصیف و تحلیل داده‌ها استفاده شد. بر اساس نتایج حاصل اکثر سیب‌زمینی کاران در حد بالایی در جستجوی اطلاعات در زمینه نحوه انبارداری (۵۲/۹۱٪) و قیمت بازار (۵۰/۷۹٪) بودند. تحلیل رگرسیون لجوجیت نشان داد که سطح سواد و تعداد تماس‌های ترویجی در حد ۱٪ و درآمد و سن در سطح ۵٪ دارای نقش معنی‌داری بر دستیابی کشاورزان به اطلاعات مدیریت پس از برداشت سیب‌زمینی بودند. پیشنهاد می‌شود با بهبود سطح سواد کشاورزان از طریق دوره‌های آموزش بزرگسالان، تأمین دستیابی کشاورزان به اطلاعات مورد نیاز در زمینه فناوری‌های مدیریت پس از برداشت سیب‌زمینی و حفظ و اشاعه برخی از فنون مؤثر بومی در زمینه مدیریت پس از برداشت سیب‌زمینی یک مسیر مداومی برای افزایش مشارکت کشاورزان در فعالیتهای مدیریتی پس از برداشت برای افزایش ارزش افزوده محصول سیب‌زمینی فراهم نمود.

چکیده

کلمات کلیدی:

مدیریت پس از  
برداشت، نیاز  
اطلاعاتی،  
سیب‌زمینی کاران