

Analysis of Traditional Storage Techniques among Arable Crop Farmers in South- Western Nigeria

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I. Introduction

BACKGROUND OF THE STUDY

The role of Agriculture in Nigeria and the world economy cannot be over-emphasized. It was the backbone of Nigeria economy before the discovery of oil in commercial quantity. Storage of farm produce is of great importance in agricultural production and consumption (Anazodo, Ezeike and Odigbo, 1999). The storage of goods therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market (TNAU, 2008). But, post-harvest damage may go beyond financial losses to the producer. It can also cause illness or even death of the consumer (Umezuruke, 2011). This led many national governments to take more seriously the problems of storage of agricultural produce. Small scale farmers depend heavily on the agricultural sector but they experience disturbingly high levels of post-harvest loss due to over-ripening, decay and physical injuries caused during handling, packaging and transporting (Acedo and Wienberger 2006).

Post-harvest food crop losses are of the importance of food insecurity in Africa. According to AMCOST (2006), pre- and post-harvest food crop losses among African countries are estimated at about 10% which is higher than the global average. As climate conditions become more hot and humid, post-harvest problems are likely to increase and farmers will have to prepare for new pests and diseases.

If the product deteriorates in storage, its economic and nutritive value may be decreased. Factors which bring about deterioration, may be physical (mechanical injury, temperature and dryness); physiological (respiration); pathogenic (qualitative and quantitative biological deterioration) or pests (rodents, birds and insects). Farmers store food products either in specially designed structures or in any convenient place especially in jute bags and in baskets. The most common methods of storing root crops traditionally are pit storage, storage in the home and storage on raised platforms (Anazodo, Ezeike and Odigbo 1999). Yams are commonly stored underground in pits about 0.5m deep and with floors covered with yam vines or other straw material. After the yams are loaded in the pit, they are covered with a layer of straw material and soil. The post-harvest technology scenario in cereals, grain legumes, oil seeds, fruit, vegetables, tubers and roots etc. of Nigeria present a dismal picture are mostly comprised of traditional techniques and result in considerable deterioration (Oni and Obiakor, 2002).

STATEMENT OF THE PROBLEM

Although farmers have been known to practice indigenous storage of farm produce, these have been known to be less effective compared to modern storage method. Produce stored under the traditional method usually do not keep long and farmer suffer great losses (D.U. Okeodo, 2009). Thus, there is need for the extension service to actively pursue and communicate knowledge of improved storage methods to farmers since effective storage plays an important role in stabilizing food supply at the household level. There is also need to analyze the traditional storage techniques so as to improve them to reduce the defect or lapses in them.

Improved methods of storage have therefore been developed which attempt to minimize crop losses and reduce the causes of post harvest deterioration of yam tubers (Ezeike 1995; Fiagan 1995). Equally, attempts by farmers to come out of making use of traditional storage techniques have been scuttled as a result of poor economic status. However, the widespread and continued use of traditional storage techniques by small and subsistence farmers despite considerable losses usually associated with these methods warrant investigation (Okeodo, Okojie and Onomolease, 2009).

Based on the above statements, the following research questions were drawn:

1. What are the socio-economic characteristics of arable crop farmers?
2. What are the traditional storage techniques used by the arable crop farmers in south-western Nigeria?

3. What are the relationship between traditional storage techniques usage and arable crop farmers' productivity?
4. What is the level of awareness of improved storage techniques among arable crop farmers?

OBJECTIVES OF THE STUDY

The main objective of the study is to identify and analyze different types of traditional storage techniques been employed by arable crop farmers in the south western region of Nigeria.

The specific objectives are to:

1. examine the socio-economic characteristics of arable crop farmers.
2. determine the different types of traditional storage techniques used by arable crop farmers in Nigeria.
3. determine the relationship between traditional storage techniques usage and arable crop farmers' productivity.
4. determine the level of awareness of improved storage technique among arable crop farmers.

JUSTIFICATION OF THE STUDY

Nigeria produces a wide range of agricultural produce which are lost at one level or the other at post-harvest stage especially during storage leading to wastage of human effort, farm inputs and investments. Traditional storage techniques help to minimize arable crop losses in storage. This study is aimed at improving agricultural production by addressing the lapses and importance of traditional storage techniques among arable crop farmers in south-western Nigeria and also to improve the livelihood of the rural inhabitants.

II. Research Methodology

THE STUDY AREA

This research was carried out in the south western region of Nigeria. The south western region of Nigeria is made up of six states which are Ekiti, Osun, Ogun, Oyo, Ondo and Lagos state. The south western region of Nigeria has two distinct seasons. These are the raining season (April-October) and dry season (November-March). Temperature ranges from 21-28^o c with high humidity. The south westerly wind and north-east trade blow in the rainy and dry (harmattan) seasons respectively. Arable crop farmers in Osun and Ekiti state were sampled and interviewed. Osun state is an inland state in the south-western Nigeria and its capital is Osogbo. It was created in 1991 from the part of old Oyo state. The major sub-ethnic groups in Osun state are Ife, Ijesha, Oyo, Ibolu and Igbomina of the Yoruba people. People of Osun practice Islam, Christianity and Paganism called traditional faith. They are mainly traders, artisans and farmers. Ekiti state was declared a state on October 1, 1996, carved out of the territory of old Ondo state. They speak a common dialect of Yoruba language. Agriculture is the main occupation of the people of Ekiti.

THE POPULATION OF THE STUDY

The study involves farmers producing arable crops in south-western Nigeria.

THE RESEARCH DESIGN

The research adopted a cross selected sample. This involves a cross-section of farmers involved in arable crops production.

SAMPLING TECHNIQUE

The study was carried out in south-western Nigeria. Simple random sampling technique was used to select two states among the six states of south-western Nigeria. Five rural communities were selected from each state for the study. Eleven respondents were selected from each community making a total of one hundred and ten respondents for the study.

TYPES OF DATA AND INSTRUMENT USED FOR DATA COLLECTION

Data were collected using a simple well prepared and structured interview schedule for the study. It covered both the independent and dependent variables

TEST OF VALIDITY OF THE RESEARCH INSTRUMENT

To ascertain the appropriateness of the necessary instrument, the project supervisor critically supervised it and a pre data seminar was presented in the department before the data was collected.

METHOD OF DATA COLLECTION

Interview schedule was conducted on arable crop farmers. Some enumerators were employed, trained and used for the data collection.

ANALYSIS OF THE DATA

Descriptive analysis was carried out using simple frequency count and percentage and was presented using tables while chi-square and multiple linear regression were used to test the hypothesis. Likert scale was used to determine the level of improved storage techniques among arable crop farmers.

MODEL SPECIFICATION

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + e_i$$

Y= Dependent variable (traditional storage techniques usage)

B₀= Intercept coefficient (constant)

B₁= Age coefficient

X₁= Age

B₂= Sex coefficient

X₂= Sex

B₃= Household coefficient

X₃= Household

B₄= Farming experience coefficient

X₄= Farming experience

B₅= Arable crop produce coefficient

X₅= Arable crop produce

B₆= Annual income coefficient

X₆= Annual income

e_i= Error term

III. Results And Discussion

This study is concerned with the analysis of traditional storage techniques among arable crop farmers in south-western Nigeria. Data were collected from the respondents on their socio-economic characteristics, traditional storage technique and productivity, attitude of the arable crop farmers towards improved storage techniques, level of awareness and usage of improved storage techniques. One hundred and ten questionnaires were distributed, retrieved and analyzed descriptively using frequency counts, percentage, mean and standard deviation.

FREQUENCY DISTRIBUTION OF THE RESPONDENTS

AGE DISTRIBUTION OF RESPONDENTS

Age (Years)	Frequency	Percent
21-30	21	19.1
31-40	34	30.9
41-50	19	17.3
51-60	16	14.5
>60	20	18.2
Total	110	100.0

Source: Field Survey, 2013

Mean=45.2273

Standard deviation= 15.60208

This shows that 30% of the respondents are between age 31 and 40 and 19.1% are between age 21 and 30. From this, it can be deduced that majority of the respondents are in their early productive years.

GENDER DISTRIBUTION OF RESPONDENTS

Gender	Frequency	Percent
Male	99	90
Female	11	10
Total	110	100

Source: Field Survey, 2013

This indicates that 90% of the farmers are males which suggests that farming is still dominated by males which supports the findings of Aduloju (2007) that farming is still regarded as a male occupation because only 10% of the respondents are females.

HOUSEHOLD SIZE

Household Size	Frequency	Percent
1-5	66	60
6-10	37	33.7
>10	7	6.3
Total	110	100

Source: Field Survey, 2013

This shows that 50% of the respondents have a household size of less than 6 while 33.7% have a household size between 6 and 10 indicating a small farm family.

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FARMING EXPERIENCE

Farming Experience	Frequency	Percent
≤10	49	44.6
11-20	20	18.2
21-30	15	13.6
31-40	11	10
>40	15	13.6
Total	110	100

Source: Field Survey, 2013

Mean= 21.0818

Standard deviation= 17.04776

This indicates that 44.6% of the respondents have 1-10 years farming experience and it can be deduced that many of the farmers are in their early productive years.

ARABLE CROPS PRODUCED USING TRADITIONAL STORAGE TECHNIQUE

Arable Crop Produce (#)	Frequency	Percent
<100000	57	71.8
101000-200000	19	17.3
201000-300000	12	10.9
301000-400000	6	5.5
401000-500000	9	8.2
501000-600000	5	4.5
>600000	2	1.8
Total	110	100

Source: Field Survey, 2013

Mean= 1820999.72

Standard deviation= 226904.47735

ANNUAL INCOME

Annual Income	Frequency	Percent
≤100000	59	53.6
101000-200000	21	19.1
201000-300000	9	8.2
301000-400000	7	6.4
401000-500000	11	10
501000-600000	1	0.9
>600000	2	1.8
Total	110	100

Source: Field Survey, 2013

Mean= 170682.27

Standard deviation= 217081.85257

The frequency distribution of annual income of the respondents shows that 53.6% of the respondents generate annual income of ≤#100000. This indicates that many of them are into small scale production.

TRADITIONAL STORAGE TECHNIQUES

Traditional Storage Techniques Used	Frequency	Percent
None	34	30.9
Barn	16	14.6
Storehouse	4	3.6
Pit	11	10.0
Wooden techniques	12	10.9
Raised thatched platform	4	3.6
Platform covered with grasses	1	0.9
Stacking/Cool area storage	5	4.6
Barn/Basket	1	0.9
Barn/Pit	5	4.6
Barn/Storehouse	5	4.6
Barn/Wooden techniques	2	1.8
Storehouse/Pit	2	1.8
Storehouse/Platform covered with grasses	1	0.9
Pit/Palm fronds or Ashes	1	0.9
Pit/Wooden techniques	5	4.6
Barn/Pit/Wooden sheet	1	0.9

Total 110 100

Source: Field Survey, 2013

LEVEL OF AWARENESS OF IMPROVED STORAGE TECHNIQUES

Level of Awareness	Frequency	Percent
Low	15	13.6
Medium	92	83.7
High	3	2.7
Total	110	100

Source: Field Survey, 2013

Mean= 4.4000

Standard deviation= 4.30532

MULTIPLE LINEAR REGRESSION ANALYSIS

Model	Co-efficient	P-Value (Sig.)	Decision
Age	-0.005	0.605	NS
Sex	0.069	0.781	NS
Household Size	0.059	0.076*	S
Farming Experience	0.005	0.621	NS
Arable Crop Produce	-0.027	0.018**	S
Annual Income	0.046	0.000***	S

P<0.10

NS= Not Significant

S= Significant

*=Level of significance at 10%

**= Level of significance at 5%

***= Level of significance at 1%

R²= 0.315

Socio-economic characteristics in the model for 31.5% of the variance in the dependent variable while the remaining account for the other factors not included in the model.

There is an indication that there is a positive relationship between household size and traditional storage techniques used and household size is significant to traditional storage techniques usage.

Also, it is indicated that annual arable crop produce has a negative relationship with traditional storage techniques usage although, it is significant. Therefore, increase in arable crop produce will make the farmers to adopt improved storage techniques and use less of traditional storage techniques.

It is shown that a positive relationship exists between annual income and traditional storage techniques usage and it is significant. However, it can be deduced that annual income will enable arable crop farmers who do not store to use traditional storage techniques and enhance its level of usage among arable crop farmers.

Age is not significant to traditional storage techniques usage and there is a negative relationship between age and traditional storage techniques usage. There is a positive relationship between sex and traditional storage techniques usage but sex is not significant to traditional storage techniques usage. Also, farming experience is not significant to traditional storage techniques usage but there is a positive relationship between them.

TEST OF SIGNIFICANCE OF THE MODEL

H₀₍₁₎:- There is no significant relationship between socio-economic characteristics of arable crop farmers and traditional storage techniques usage..

P-value of the model is 0.000.

0.000<0.10 i.e. significant

The test above shows that the model is significant and we reject null hypothesis. Therefore, there is significant relationship between socio-economic characteristics of arable crop farmers and traditional storage techniques usage.

CHI-SQUARE ANALYSIS

H₀₍₂₎:- There is no significant relationship between traditional storage techniques usage and arable crop farmers' productivity.

Variable	X ²	df	P	Decision
Annual Income	38.455	7	0.999	NS

NS= Not Significant

P<0.10, the P value of annual income is 0.999, therefore, there is no significant relationship between traditional storage techniques usage and arable crop farmers' productivity. Therefore, it can be deduced that traditional storage techniques usage does not have relationship with annual income. Increase or decrease in annual income does not have any effect on traditional storage techniques usage.

*Accept null hypothesis.

IV. Conclusion

Post-harvest arable crop losses due to deterioration have posed a major treat and menace to agricultural development in Nigeria. Therefore, storage of arable crops was practiced and many techniques were adopted and are still in use till date. As a result of this, increase in production was experienced by the farmers. The common indigenous or traditional methods of storing root and tuber crops are barn and pit storage. From this study, it is concluded that large farm family will enhance traditional storage techniques usage among arable crop farmers. Large household size will lead to expansion of production and the need to store to make food crops to be available all year round.

Also, increase in arable crop produce will make farmers who did not practice any storage technique to use traditional storage techniques thereby increasing their income. Furthermore, adoption of such storage techniques and/or their improved versions will enable the farmers to expand their scale of production. It is inferred from this study using chi-square, that annual income is not significant to traditional storage techniques usage as its increase makes the farmers to go for improved storage techniques. The level of awareness of improved storage techniques is moderate but their usage is scarce; as many of the respondents only have positive attitudes towards them but do not have access to them. Therefore, if they are made available and proper follow-up is done to make sure that they get to the arable crop farmers, and it is ensured that they are well trained on how to operate it properly; then, the level of usage of improved storage techniques will be high.

V. Recommendations

1. Innovative demonstration should be well and effectively carried out so as to increase the knowledge of arable crop farmers on how to use and improve traditional storage techniques in order to reduce crop yield loss as a result of its usage.
2. Follow-up should be done by extension agent so as to ensure that arable crop farmers are not only aware of improved storage techniques but also use them effectively.
3. Government and non-governmental organizations should ensure that subsidies and other incentives are made available to arable crop farmers, get to them, so as to check corrupt practices that hinder activities of these farmers.
4. Large hectares of land should be made available to farmers to enhance commercial and large scale arable crop production.
5. Traditional storage techniques should be improved and abandoned research works on them should be revisited so as to correct the identified defects and deficiencies that inhibit increased arable crop production.
6. Traditional storage techniques should be made available to arable crop farmers who could not afford to go for any.

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