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ASSESSMENT OF USE OF INDIGENOUS MAIZE STORAGE PRACTICES AMONG FARMERS IN ANAMBRA STATE, NIGERIA

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Abstract

The study assessed the use of indigenous maize storage practices among farmers in Anambra State, Nigeria. Data for the study was collected by the use of interview schedule from a sample of 60 respondents. Percentage, mean score and standard deviation were used for analyzing data collected for the study. Results revealed that the farmers were using indigenous technologies such as baskets, aerial (over fire) in the kitchen, bare floors, among others in storing maize. The respondents indicated that they stored maize cobs undehusked in order to overcome wastage and obtained information about indigenous storage of maize from parents and fellow farmers. Major problems militating against effective storage of maize include: attack of pests such as rodents and weevils, diseases, termite attack and use of poor quality storage materials. The respondents indicated that use of materials free from termite, clearing of surroundings against fire disaster; use of durable materials treated with insecticides will help to solve the problems. The study recommends that provision of appropriate and affordable storage structures should be made available to the maize farmers in order to avoid wasting of the produce under storage. This will help to ensure food security among rural farm households.

Keywords: Indigenous, Knowledge, Storage, Practices, Maize, Farmers, Anambra State, Nigeria

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Introduction

Maize is a major food for most households in Nigeria and the main source of income and employment for the majority of rural households. Food security and welfare of the farming population are dependent on the productive capacity of maize farmers (Wekesa *et al.*, 2003). The importance of appropriate and readily available post-harvest storage practices for agricultural crops cannot be overemphasized in any development plan for increased food production and enhancement of food security. Adequate storage of farm produce remains paramount for preservation of farm produce for future consumption. Maize is the most important cereal in the world after rice and wheat (Eleweanya *et al.*, 2005). It is used as staple food in developing countries, particularly in the tropics. It also serves as raw materials for many finished products.

A lot of mature, ready-to-harvest and harvested crops, especially maize are lost to spoilage, contamination, mould and pests in the field and on storage. Severe pest's infestation may cause losses of up to 50%. The use of pesticides for control of pests is effective but not economical (Echezona and Iloba, 2005). Apart from not being economical, pesticides tend to have severe side effects on the environment (Grant and Tingle, 2002).

According to Uguru (1996), storage techniques or methods can be traditional or improved methods. Collinson (2001) stated that there is urgent need for intensified efforts to be geared towards provision of adequate and efficient storage facilities in order to avoid wastage of farm produce.

Maize production among small scale farmers in Nigeria may have declined due to agricultural reforms. The reforms which commenced in 1980s and is on-going stemmed from the structural adjustment programmes. This led to cut back in government expenditure including removal of subsidies on farm inputs. As a result, greater economic burden was placed on the small scale farmers (Nyangito and Karugia, 2006; Mochoge and Zziwa, 2004). In addition, the open maize market resulting from the agricultural reforms caused fluctuations in maize returns, exploitation by middlemen and low product prices (Kodhek, 2005). The Agricultural reforms thus pose greater risk for small scale maize farmers who are risk averse to adopt improved agricultural practices (Ogada, 2009).

Lack of suitable high yielding variety as well as poor knowledge about production practices are ascribed as main reasons for low productivity of maize in Nigeria. The productivity of maize per unit area could be increased by adopting recommended scientific and sustainable management practices using a suitable high yielding variety.

Maize farmers in Anambra state are using certain local methods and techniques such as storing over fire in the kitchen, use of earthen pots, gourds, among others in preserving maize to be used for future consumption. The study therefore answers the following questions:

- What are the indigenous maize storage practices used by maize farmers in the study area?
- What forms of storage are used for maize? What are the reasons for storing maize?
- What are the problems militating against effective storage of maize?

The specific objectives were to:

i. identify indigenous maize storage practices used by farmers;
ii. ascertain reasons for storing maize; and
iii. ascertain constraints to effective storage of maize among farmers.

Methodology

The study was carried out in Anambra State, Nigeria. There are four agricultural zones in the state, namely; Aguata, Anambra, Awka and Onitsha. Two zones namely: Aguata and Anambra were purposively used for the study. The State shares boundary with Enugu State on the north, Delta State on the south, Kogi State on the west and Imo State on the east. It has an estimated population of 4.18 million and land area of approximately 5,025 sq. km (NPC, 2006). Majority of the farmers in the state are involved in the production of arable crops such as yam, cassava, cocoyam, maize, vegetables and raising of farm animals like sheep, goat, and poultry. Major perennial crops grown in the state include: oil palm, mango, oil bean, pear, breadfruit, among others. The population of the study comprised farmers in the two agricultural zones. Anambra zone is made up of four (4) extension blocks comprising 45 circles, while Aguata zone is made up of six (6) extension blocks, comprising 45 circles. Two blocks and six circles were selected respectively from the zones and circles using a simple random sampling technique. In each of the circles selected, ten farmers were selected randomly for the study. In general, the study comprised four (4) blocks and twelve (12) circles, giving a total of one hundred and twenty (120) farmers. The interview schedule used for data collection was divided into four sections based on the objectives. The first section sought information on socio-economic characteristics of the farmers. Respondents were asked to indicate their age, marital status, level of education, size of household, head of household, sources of farm labour, farming occupational status, size of land holding (hectares) and other non-farm occupations. The second section sought information on indigenous maize storage practices which include: storing over fire in the kitchen, storing on the floor, use of cribs, gourds, and earthen pots, among others. Section three sought information on reasons for storing maize. The respondents were asked to indicate reasons for storing maize. This includes: future consumption, source of income, avoidance of wastage and generate money during off-season periods. The fourth section dealt with problems militating against effective storage of maize. The respondents were asked to indicate the problems using a Likert-type scale of to a great extent (3), to some extent (2), to a little extent (1) and to no extent (0). The mean was 1.5; this was used to determine the cut off point. Data for the study were collected using interview schedule/ questionnaire. Percentage, mean score and standard deviation were used for data analysis.

Results and Discussion

Socio-economic characteristics of respondents

Data in Table 1 show that about 14% of the respondents were within the age bracket of 20-29 years and 25.0% of them were aged 30-39 years and 40-49 years, respectively. About 21.0% of the farmers were within the age of 50-59 years while 14.2% of them were aged 60 years and above. This indicates that majority of the farmers were in most productive ages, hence greater involvement in maize production.

Entries in Table 1 show that majority (69.2%) of the farmers were married, while about 13% and 17.5% were single and widowed, respectively. This implies that most of the respondents have household's hence greater involvement in maize production as well as practicing storage practices for future consumption for household members.

About 20.0% of the respondents never had any form of formal education. Greater proportion (30.0%) had attended primary school while 27.5% and 22.5% attended secondary school and tertiary institutions, respectively. Education is very important to the farmers; this will help them to participate in the farming operations as managers by storing and marketing maize, maintaining computer records, making purchases and helping with long term planning (Taylor, 1997).

About 44.0% of the respondents had a fairly large family size of 6-10 members, 40.8% of them had between 1 and 5 members, while 10.0% and 5.0% had 11-15 and 16-20 members, respectively. Thus, the large family size of 6-10 members constitutes the family labor which most of the respondents rely upon in carrying out certain tasks in the maize farm.

Majority (64.2%) of the farmers were heads of households while 35.8% of them had their husbands as heads of household. This shows that in the absence of men as heads of households, women are becoming increasingly involved in agriculture. This helps to make their families economically stronger as well as ensuring food security. FAO (2002) points out that there is a great increase in the proportions of households headed by women this had resulted to women taking more responsibilities in agricultural production. According to UNESCO (1991), women are the heads of one third of the world's households.

Most (70.8%) of the farmers depended on their family members for provision of labour used in the farm; about 6.0% and 4.2% of them obtained assistance from their relations and friends, respectively. Hired labour was rated 51.7% while about 1.3% depend on exchange labour. This implies that most of the labour used in their farms comes from household members.

Most (55.8%) of the farmers engaged in part-time farming while 44.2% were on full-time basis. Those on part–time had other non-farm occupations. They were mostly involved in petty-trading and this helps them to sustain their families during off-season periods.

Majority (50.8%) of the farmers had access to 1-2 hectares of land while about 20.0% had 3-4 hectares of land. Also, 27.5% had less than 1 hectare of land while 1.7% had more than 5 hectares. This finding shows that greater proportion of the farmers had enough farmland for maize production; hence access to land is not seen as a major obstacle for their farm work. The findings are in agreement with Ali-Olubandwa *et al*. (2010) who observe that farmers grow maize on less than three acres of land.

A greater percentage (70.1%) of the farmers was traders, 7.5% were civil servants, 4.5% were hair dressers while 10.4% were teachers. This result shows that farmers were seriously involved in other occupations. This is to enable them meet up with their family responsibilities, since most of them are heads of households.

Table 1. Distribution of the respondents according to socio-economic characteristics (n= 120)

Characteristics	Frequency	Percentage
Age (years)		
20-29	17	14.2
30-39	30	25.0
40-49	30	25.0
50-59	26	21.7
60 and above	17	14.2
Marital status		
Single	16	13.3
Married	83	69.2
Widowed	21	17.5
Level of education (years)		
No formal education	24	20.0
Primary school	36	30.0
Secondary school	33	27.5
Tertiary institutions (NCE, Polytechnic, University	27	22.5
Size of household		
1-5	49	40.8
6-10	53	44.2
11-15	12	10.0
16-20	6	5.0
Head of household		
Husband	43	35.8
Wife	77	64.2
Sources of farm labour*		
Household members	85	70.8
Relations	8	6.7
Friends	5	4.2
Hired labour	62	51.7
Exchange labour	16	13.3
Farming occupational status		
Full-time	53	44.2
Part-time	67	55.8
Farm size (hectares)		
<1	33	27.5
1-2	61	50.8
3-4	24	20.0
5 and above	2	1.7
Other non- farm occupations		
Trading	47	70.1
Civil service	5	7.5
Hair dressing	3	4.5
Teaching	7	10.4
Catering	1	1.5
Tailoring	3	4.5
Artisan	1	1.5

*Multiple responses

Indigenous maize storage practices used by the farmers

A greater percentage (41.7%) of the respondent's stored maize in crib, 18.3% stored over fire in the kitchen, 16.7% stored on the floor, among others. About 3.0% indicated that they did not store at all. This implies that they sold maize when they were fresh and had no need for storage. It could equally be that they lacked adequate storage facility and instead of allowing the maize to spoil under storage they had to sell them immediately after harvesting. The findings also indicate that the respondents had various methods of storing maize for future consumption.

Table 2. Percentage distribution of the respondents according to indigenous methods used for storing maize (n= 120)

Storage methods	Percentage
Storing over fire (aerial storage)	18.3
Floor	16.7
Gourds	1.9
Earthen pots	6.5
Solid wall bins	11.7
Crib	41.7
Do not store at all	3.3

Forms of storing maize

Data in Table 3 indicate that 85.0% of the respondents stored undehusked maize, 75.0% stored dehusked maize cob, 46.7% stored shelled maize grains, while 25.0% process into flour before storage. This implies that the respondents did not store maize in forms which can be used for immediate consumption. This could be attributed to the fact that those stored in that form cannot last for a long period of time.

Table 3. Percentage distribution of respondents based on forms of storing maize (n= 120)

Forms of storage*	Percentage
Dehusked cob	75.0
Shelled grains	46.7
Flour	25.0
Undehusked cob	85.0

*Multiple responses

Sources of information on indigenous maize storage techniques

Table 4 indicates that fellow farmers (57.1%) were the major source of information on indigenous maize storage techniques. Other sources of information include: neighbours (33.0%), parents (29.7%), and extension agents (21.7%), among others. This implies that the respondents obtained information mostly from informal sources. The finding agrees with Anyanwu *et al.* (2002) who report that farmers receive their farm information from non-professional inter-personal sources more often than professional sources.

Table 4. Percentage distribution of respondents based on sources of information on indigenous maize storage techniques (n= 120)

Sources of information*	Percentage
Fellow farmers	57.1
Extension agents	21.7
Parents	29.7
Relations	15.0
Neighbours	33.0

*Multiple responses

Reasons for storing maize

The major reasons for storing maize among farmers include: household consumption (60.0%), generate income (40.0%), avoidance of wastage (36.7%) and acquisition of money during off season period. This implies that the respondents were storing maize in order to feed members of their household. This could be attributed to the fact that maize is a major staple food consumed by most households which can be used for preparing pap, flour and other diets.

Table 5. Percentage distribution of respondents according to reasons for storing maize (n= 120)

Reasons*	Percentage
Household consumption	60.0
Generate income	40.0
Avoid wastage	36.7
Acquire money during off season period	13.3

*Multiple responses

Constraints to effective storage of maize

The major constraints to effective storage of maize include: poor finance (M= 3.1), poor knowledge of preservation materials (M= 3.0), poor access to proper storage facilities (M= 2.8) and inadequate knowledge of better storage methods (M= 2.5). Other constraints were moldiness of stored produce (M= 2.3), lack of market for produce (M= 2.1), high costs of farm inputs (2.0), among others. This implies that the respondents were highly constrained by infrastructural problems. The findings agree with Ajani and Igbokwe (2011) who report that the major constraints to crop production among farmers were lack of farm inputs such as fertilizer, herbicides, etc. However, the findings disagree with Wekesa *et al.* (2003) who state that technological information is not a major constraining factor to maize production in Kenya.

Table 6. Distribution of respondents according to constraints to effective storage of maize

Constraints	Mean score (M)	Standard Deviation (SD)
Poor knowledge of preservation materials	3.0	0.445
Poor access to proper storage facilities	2.8	0.553
Pests and rodents attack	1.9	0.745
Inadequate knowledge of better storage methods	2.5	0.719
Poor finance	3.1	0.667
Moldiness of stored produce	2.3	0.509
High cost of farm inputs such as fertilizer and herbicides	2.0	0.520
High cost of labour	1.8	0.653
Lack of market for produce	2.1	0.523

Strategies for effective storage of maize

The respondents indicated strategies that will help to alleviate the problems they encounter in maize production. They include: availability of storage facilities (93.5%), better storage methods (87.0%), provision of funds (84.4%), and use of pesticides (61.1%), among others. This implies that the farmers need to be supplied with appropriate storage technologies in order to minimize storage losses. This will in turn enhance household food security.

Table 7. Percentage distribution of respondents according to strategies for effective storage of maize

Strategies	Percentage
Good knowledge of preservation materials	38.2
Availability of storage facilities	93.5
Better storage methods	87.0
Use of pesticides	61.1
Adequate storage structures	10.2
Provision of funds	84.4

Conclusion and Recommendations

Maize farmers were using indigenous storage practices such as baskets, aerial (over fire) in the kitchen, bare floors, among others in storing the packages disseminated. The farmers should be facilitated in order to adopt improved agricultural practices by providing them with soft loans, which they can use to buy farm inputs. maize. They indicated that they stored maize cobs undehusked in order to overcome wastage emanating from storage.

Efforts should be made by the government to encourage farmers to adopt improved maize storage practices in order to reduce losses emanating from storage. The educational level of the farmers should be considered when coming up with extension packages and methods to ensure maximum adoption of

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