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Agriculture and Food Security

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Abstract
Food is important for growth, repair of damaged body cells, and provision of energy. The bulk of the materials that perform these tasks are derived from food which are taken in the form of plant and animal products. Therefore these should be preserved for our well being. This is achieved from proper attention given during pre-planting, planting and post planting operations**.** The study investigated the post-harvest handling of agricultural produce. The population of this research comprises most of the farmers in the two states, Benue and Kogi. Data were collected from 240 farmers who were randomly selected from the four agro-ecological zones of Kogi State (Zone A, B, C and D) and three zones of Benue State (A, B and C) using interview schedule. Descriptive statistics were used to analyze the data collected. Results show that most (78.75%) of the farmers were engaged in transporting of agricultural produce from farm to home, home to markets or farm to markets. Analysis on the level of information needs shows that 50.00% of the farmers were highly in need of information on storage of the produce in the study area. Analysis on the access of farmers to improved post-harvest management technologies shows that majority (77.50%) of the farmers had access to improved transportation system and 14.28% had least access to storage of the produce in the warehouse. It is recommended that farmers should have access to information on improved post-harvest management, and the practices of some effective indigenous post-harvest management of the produce would ensure better value addition on the produce.

Keywords: Agriculture, Postharvest food and losses, Handling of Agricultural produce, Storage. Preservation, Transportation, Packaging, Selection and Grading.

Introduction
Food is important for growth, repair of damaged body cells, and provision of energy. The bulk of the materials that perform these tasks are derived from food which are taken in the form of plant and animal products (Akinsanmi, 2000). This is achieved from proper attention given during pre-planting operation, planting operation, post planting operations and the operations at harvest (Akinsanmi, 2000).

All fruits, vegetables and root crops are living biological organisms, having a respiratory system, similar to that of humans. They continue their living processes after harvest (Okoedo-Okojie & Onemolease, 2009). On the basis of their respiration rate and ethylene production patterns during maturation and ripening, fruits can be classified in two groups: climacteric fruits (they exhibit a large increase in carbon dioxide and ethylene production rates coincident with their ripening) and non-climacteric fruits (which exhibit no changes in their generally low carbon dioxide and ethylene production rates during ripening) (Omolehin et al., 2008).

Most of the well known crops are well established in Nigeria. Details on harvesting and handling of crops are given in this work. Special emphasis are laid on post-harvest handling such as preservation, drying, storage and/or transportation to the final consumers. (Omolehin,. et al., 2008). This is based on careful observation and long experience since there is a difference in the maturity period of the various cultivars to handle and, when dropped, cause heavy damage to the roots., (Okoedo-Okojie,.& Onemolease, 2009).

Agricultural technologies that can produce nutritious and marketable food in agro-ecologies and socioeconomic contexts are urgently needed. Sweet potato offers strategic opportunities to improve

nutrition and rural incomes in several countries and regions affected by micronutrient deficiency. It is already an important component of the cropping systems in Africa because of its robustness to produce under difficult conditions. It will become more important in the face of a changing climate.

In many settings, it is also considered a "women's crop" reflecting the relatively strong control women have in decision making in production and marketing. While this often provides particular opportunities to use root crops as an entry point to strengthen nutrition and economic outcomes for women and their children, cultural and gender-defined roles need to be addressed to improve outcomes at household and community levels. At the core of the approach is an increasing range of nutritious, productive, and locally adapted. (Nnadi & Akwiwu, 2007).

Root crops are grown principally as a subsistence crop. Root crops are normally harvested by carefully scraping the soil away from the tubers in order to avoid damaging them. Wooden digging sticks or spades are less likely to cause damage to the tubers than are metal forks or hoes (Adereti & Fasina 2017).

Where Crops are cut or deeply injured, a new skin can be formed on the damaged surfaces by curing the tubers at high temperature and humidity. Curing has been shown to be effective in crops. Injuries caused by skin abrasion or bruising tend to dry out rather than form replacement skin. This provides the necessary conditions for raising the temperature and moisture content of the air to suitable levels by restricting ventilation (Osunde, 2008).

Crops being sent to local markets may be carried in bulk by vehicle, in ordinary baskets or in plastic or wooden field crates. When they are carried in bulk, the floor and sides of the vehicle should be padded with sacks loosely packed with straw, or with grass mats or plastic foam covered with polythene sheet. Whether the crops are carried in bulk, in crates or in baskets, the vehicle must not be overloaded and should be driven with care. For internal urban markets the tubers are best packed in wooden or plastic field crates or ventilated cardboard boxes. These containers should not be over-packed and must be handled and transported carefully. (Tinsley, 2009).

Most agricultural crops may keep in storage for several months; they shrink over such a period owing to water loss and to natural living processes which use up stored dry matter (starch). There may also be additional losses because of decay caused by moulds. There are many different storage practices in various countries. Owing to the generally non-commercial nature of crop production and limited resources of growers, most storage uses low-cost methods.

Root crops are generally stored during the hot dry part of the year when the provision of ventilation and other conditions which help to reduce their temperature are key factors (Reuben & Barau, 2012). Food crops kept in the ground and harvested progressively when needed are subject to attack by insects and other pests. They are also exposed to attack by moulds. Food crops kept undugged may also tie up limited land resources. The tubers can be piled in small numbers in shaded situations or in well ventilated huts built of local materials, in which case they are best stored on racks or shelves. In West Africa, crop "barns" are a common method of storage. They are vertical frames to which individual yams are tied. The uprights supporting the frames are bush poles up to two or more meters in height. The use of poles which will take root and provide a protective canopy of leaves to shade the food crop is of benefit. (Ofem, et al., 2011).

Objectives

Lack of storage and preservation facilities have always reduced agricultural production in West Africa. Preservation and storage have been so paramount in Agriculture generally. There are little or no knowledge in existence on this topic in the study area. Based on the above, the main objective of this work was to ascertain Agriculture and Food Security. Other specific objectives were to:

i. Ascertain means of transportation of goods by farmers in the state are in existence.
ii. Ascertain in the level of storage information by the farmers.
iii. Ascertain access of farmers to post-harvest management technologies.

iv. Make some recommendations to farmers and stakeholders in the area.

Methodology

Population and sample size selection: This study considered all farmers in Kogi and Benue States as its population. A sample size of 346 respondents was selected using multi-stage sampling techniques. The first stage is the purposive selection of six local government areas from the stratified four agro-ecological zones of Kogi State (A, B, C and D) and the three agricultural zones of Benue State (A, B and C) in the study area based on the concentration of yam farmers in these areas.

Primary data were collected using interview schedule since majority of the farmers were not literate and could not read or write. The enumerators helped in recording and interpreting to those respondents who could not read or write. The interview schedule was used to generate the following information:

(1) Personal characteristics of the respondents such as age, gender, marital status, educational attainment, income level, household size and farm size.

(2) Post-harvest operations peculiar to yam production in the study area.

(3) Post-harvest information need of yam farmers in the study area.

(4) Sources of information on improved post-harvest technologies of yam in the study area.

(5) Farmers level of access to needed post-harvest information on yam.

The level of post-harvest information needs of farmers: level of information needs of yam farmers was measured using a 4-point Likert scale ranging from "low" to "high, and not needed at all". The responses and the assigned points are:

(1) Not needed at all=0 (2) Just needed=1 (3) Moderately needed=2 (4) Highly needed=3

Data generated from the interview schedule were subjected to descriptive such as percentage, Frequency distribution, y for the nominal data and pictorial presentation.

Results and Discussion of Findings:

Post-harvest management practices of agricultural food crops: The result on post-harvest management practices of crops by farmers is contained in Table 1. Most of the respondents (78.75%) claimed that transportation (including loading and unloading) is one of the post-harvest management practices of crops they engaged in. Transportation of yam tubers is done by some of the farmers on their heads using a container like a basket, sack or tied together. Bicycles could also be used to transport the tubers. It could be done using improved transportation system like motorcycle, pick-up vans, Lorries and trucks in conveying their crops from the farm to their homes or markets. The farmer may employ extra hands for the job of loading or off-loading respectively where and when necessary.

Table 1: **Post-harvest management practices of agricultural crops (N=189).**

crop operations	Frequency	Percentage
Processing	90	37.5
Storage	174	72.5
Grading/sorting/packaging	122	50.83
Transportation	189	78.75

It was indicated that 72.50% of the respondents mentioned storage as an important post-harvest Management practice of crops. Crops are stored using indigenous barns, burring in the ground or heaped under shade of trees. About 50.83% of the respondents claimed that they carried out grading/sorting/packaging. Sorting/grading was normally done by selecting good tubers from the rotten ones, the big ones from the small and medium ones. Some of the respondents (37.50%) said that they carried out processing of yam by cutting/peeling, drying, grinding, boiling and pounding. Most root crops are cut, peeled and boiled, then, eaten directly or further pounded before eaten with soup. These root crops are sometimes cut into pieces before drying as slabs or chips and then, later grinded into flour (Osunde, 2008).

The majority of the farmers in Kogi and Benue States were mostly engaged in both indigenous and improved post-harvest management practices to ensure maximum food security. This result agrees with that

of who identified the above-mentioned activities to be the post-harvest management practices common among farmers (Osunde, 2008).

Post-harvest handling information needs of farmers: Table 2 indicates that 17.92, 28.75%, 50.00% and 3.33% of yam farmers said they just needed, moderate, high information on storage of food crops, and not needed at all. Emphasis on the needed information was in the area of access to warehouses in order to improve the shelf life of crops and also, to protect them from theft. This result agrees with that of who reported that the highly sought information by

yam farmers was that of storage of crops. (Ofem, et al., 2011).

Table 2: Distribution of respondents according to their level of post-harvest management information needs on agricultural crops, n=154.

Variables	Just needed 1 (Freq)	Moderate 2 (Freq)	High 3 (Freq)	Not needed at all
Storage	43 (17.92)	69 (28.75)	120 (50.00)	8 (3.33)
Processing	85 (35.42)	40 (16.67)	36 (15.00)	79 (32.92)
Transportation	42 (17.50)	102 (42.50)	73 (30.42)	23 (9.58)
Markets/market prices	58 (24.17)	39 (16.25)	94 (39.17)	49 (20.42)
Weather	67 (27.91)	54 (22.50)	22 (9.17)	97 (40.42)
Pesticides/insecticides	60 (25.00)	52 (21.67)	45 (18.75)	83 (34.58)
Credit availability	41 (17.08)	50 (20.83)	96 (40.00)	53 (22.08)
Drying	76 (31.67)	30 (12.50)	37 (15.42)	97 (40.42)

The figures in parenthesis are in percentages (%). With respect to information on markets/market prices, 24.17%, 16.25%, 39.17% and 20.42 of the respondents said they just needed, moderate, high information and not needed at all respectively. The proportion of respondents who did not indicate need for the information at all may be due to fact that market integration among farmers is high in terms of getting information readily from neighbors/friends and fellow farmers and as such may not consider the response to this information necessary. In terms of information on credits, 17.08%, 20.83%, 40.00% and 22.08% claimed they just needed, moderate, high information and not needed at all, especially on the availability of credits in order to boost their post-harvest activities. With respect to pesticides/insecticides, 25.00%, 21.67%, 18.75% and 34.58% of the respondents claimed the needed low, moderate, high information, and not needed at all respectively; on where and how to procure and apply them on food crops.

Conclusion

In a good post-harvest handling of food crops, little or nothing is wasted because some slightly bruised crops are always selected for consumption and others are cured and packaged and subsequently transported to the market. Others are stacked for future multiplication. We considered all the biomaterial properties in post-harvest handling of our crops. Conclusively, all the primary operations of our biomaterials were taken into account

Recommendations

We therefore recommend that the Federal Government should support farmers by way of giving them subsidies as most farmers are poor. Government should encourage Agricultural extension services to these local farmers. Properly fashioned silos should be built to store grains and good barns for the storage of our root crops.

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