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## Assessment of Farmers Knowledge on Post-Harvest Management of Beans in Niger State, Nigeria

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### Abstract

*This study assessed farmers' knowledge on post-harvest management of beans in Niger State, Nigeria. A four-stage sampling technique was used to select one hundred and eighty (180) bean farmers in the study area. A structured questionnaire, complemented by the interview scheduled, was used for data collection. Data collected were described through frequency, percentages, and mean and analyzed using knowledge tests. The result showed that all the respondents were aware of post-harvest management practices for beans. Other farmers and farm forums were the most common sources of awareness among bean farmers. About 83.3% of bean farmers had high knowledge of the use of clay pots for storing beans, while 82.2% had high knowledge of the winnowing method of grading. The most significant constraints to post-harvest management of beans were shortage of funds ( $\bar{X} = 3.76$ ) and inadequate training on post-harvest ( $\bar{X} = 3.48$ ). It is recommended that the cost of post-harvest materials and tools be subsidized by the government and stakeholders for farmers' access at an affordable price. Also, funds should be made available by governments and non-governmental organizations so that farmers' could purchase post-harvest tools that are needed to enhance the longevity of agricultural produce.*

**Keywords:** Farmers' knowledge, Post-harvest, Management, Beans

### INTRODUCTION

Beans (*Vigna unguiculata*) are a nutritious and versatile legume that is mostly cultivated worldwide as a source of protein, fiber, vitamins, and minerals. Beans have low fat and cholesterol, which makes them healthy for consumption (Akintobi *et al.*, 2021). Post-harvest management of beans is essential to maintaining the quality of the produce and preventing spoilage. The essence of post-harvest management is to maintain the safety of beans, minimize losses, and maximize profits for farmers. Each step is crucial in ensuring that beans reach consumers in good condition. Post-harvest management is a proactive step taken to reduce the incidence of losses immediately after harvesting (Pelemo *et al.*, 2022). Post-harvest management in beans includes cleaning, drying, sorting, grading, packaging, storage, and transportation. The role of post-harvest management in beans is overemphasized. Post-harvest management promotes agricultural production by reducing post-harvest losses to the barest minimum, enhancing nutrition, adding value to agricultural products by opening new marketing

opportunities, generating new jobs, and enhancing other related economic sectors for viable growth. Close to 5% of beans produced in Nigeria are lost to pests, disease, and poor management practices (Akintobi *et al.*, 2021). It is believed that post-harvest management will reduce post-harvest losses in beans. Specifically, this study tends to address these objectives: determine the level of awareness of post-harvest management in beans, identify sources of awareness of post-harvest management in beans, determine the farmers' knowledge of post-harvest management, and identify constraints associated with post-harvest management in beans.

## **METHODOLOGY**

The research was done in the Niger State of Nigeria. The state is located within longitudes 3° 30' and 7° 20' East and Latitudes 8° 20' and 11° 30' North. The state has a population of about 6,220,617 (National Bureau of Statistics (NBS)) (2019). However, with a growth rate of 3.2%, the state will have an estimated population of 6,625,106.376 in 2021 (NBS, 2019). Some of the crops grown in the area are yam, cotton, shea butter, maize, sorghum millet, cowpea, soybean, beans, rice, and groundnut. Some of the tree crops are mango, citrus, coconut, cashew, banana, and pawpaw. The inhabitants of the state also rear some livestock, like goats, sheep, cattle, and chickens, among others. A multi-stage sampling technique was employed for this study. The first stage involved the random selection of three (3) agricultural zones in the state. The second stage involved the random selection of one (1) local government area from each of the zones, making a total of three (3) LGAs. The third stage involved the random selection of four (4) communities each from the selected LGAs, making a total of twelve (12) villages. The fourth stage involved the use of proportional sampling to select 10% of the farmers from the sampling frame to give a total of one hundred and eighty (180) respondents. Primary data was used for this study area. Data was collected by the researcher, assisted by trained enumerators, using a structured questionnaire complimented with interview schedules. The objectives of the study were achieved using frequency, percentage, and mean. Objective iii was achieved by carrying out knowledge tests for the farmers. The knowledge test was based on the post-harvest management used for beans by the farmers. A total of twenty-one (21) knowledge questions in beans were subjected to a knowledge test. Knowledge scores were recorded for each farmer. Each of the statements carried a full weight of one (1). Farmers were asked to choose one response against alternative responses as right, wrong, or I don't know. For each right response, a farmer received a full weight of 1, for each wrong, or, I don't know, a farmer received 0. Thus, the knowledge score ranged from 0 to 100, where < 50 = low knowledge level, 51–69 = average knowledge level, and >70 = high knowledge level.

## **RESULTS AND DISCUSSION**

### **Level of Awareness of Post-harvest Management Practices in Beans**

Table 1 revealed that all the farmers (100%) were aware of all post-harvest management practices for beans. This result showed that there was a high level of awareness about post-harvest management of beans in both states. This might be due to the fact that beans are produced extensively in the study area. This finding agreed with Elemosho *et al.* (2017), who reported high levels of awareness of post-harvest management among farmers in River State, Nigeria.

**Table 1: Distribution of the farmers according to level of awareness on post-harvest management in beans (n=180)**

Post-harvest management practices	Freq (%)	Freq (%)
	Aware	Not Aware
Sorting methods	180 (100.0)	0
Packaging materials	180 (100.0)	0
Storage materials	180 (100.0)	0
Transportation methods	180 (100.0)	0
Preservation methods	180 (100.0)	0
Processing	180 (100.0)	0
Pest controls	180 (100.0)	0
Diseases controls	180 (100.0)	0

Sources: Field survey, 2018

### Information Sources of Awareness on Post-harvest Management

Results in Table 2 indicated that other farmers ranked 1<sup>st</sup> as the major sources of awareness on post-harvest management in the study area, which was followed farmers forum which ranked 2<sup>nd</sup> and community meetings ranked 3<sup>rd</sup>. The findings showed that other farmers, farmers forum and friends were the major sources of awareness on post-harvest management in the study area. This finding agreed with Tsado *et al.* (2018), who stressed that other farmers and friends were the major sources of information on the improved rice varieties in Niger State, Also, Elemosho *et al.* (2017) reported that other farmers were the major sources of awareness on post-harvest management in River State, Nigeria.

**Table 2: Information sources of awareness on post-harvest management (n=180)**

Sources of awareness*	Frequency	Percentage	Rank
Others farmers	138	76.7	1 <sup>th</sup>
Farm forum	130	72.2	2 <sup>nd</sup>
Community meeting	68	37.8	3 <sup>rd</sup>
Extension officers	64	35.6	4 <sup>th</sup>
Friends	64	35.6	4 <sup>th</sup>
Mass media	55	30.6	6 <sup>th</sup>
ADP	30	16.7	7 <sup>th</sup>
Ministry of agriculture	29	16.1	8 <sup>th</sup>
Parents	22	12.2	9 <sup>th</sup>
Field days	20	11.1	10 <sup>th</sup>
Exhibition	20	11.1	10 <sup>th</sup>
Written information	14	7.8	12 <sup>th</sup>

Sources: Field survey, 2018. \*Multiple responses

### Knowledge Level of Farmers on Post-harvest Management in Beans

Table 3 indicated 67.2% of the beans producers had high and average knowledge on sorting of beans by hand picking and use of tray. Also, 82.2% had high knowledge on winnowing grading method in beans. Proper winnowing of beans is mostly used to remove chaff and other particles in order to increase the market value of beans, it is expected that chaff free beans attract more market value and will probably improve farmers' income and livelihood. About 53.3% of farmers had average knowledge on use of basket for packing beans. Moreover, 83.3% of the farmers had high knowledge on the use of clay pot for storing beans. Furthermore, 62.8% and 49.4% of the farmers had average and low knowledge on the use of aluminum phosphate and trap in controlling storage pest in beans. Moreover, 65.0% had high and average knowledge on the use of sun drying for beans. Proper sun drying of beans becomes imperative to reduce the

menace of weevil attacks that is accounted to more that 50% loss in beans (Center for Food Technology and Research, 2017).

**Table 3: Knowledge level of farmers on post-harvest management in beans (n=180)**

Knowledge	Frequency	Percentage	KL
<b>Sorting methods</b>			
Hand picking and use of tray	121	67.2	Average
<b>Grading methods</b>			
Manual sieving	125	69.4	Average
Winnowing	148	82.2	High
Selective picking	82	45.6	Low
<b>Packing methods</b>			
Use of basket	96	53.3	Average
Use of heapan	1	0.6	Low
<b>Storage materials</b>			
Use of metal tank/silo	12	6.7	Low
Use of concrete tank/silo	8	4.4	Low
Use of warehouse	71	39.4	Low
Use of clay pot	150	83.3	High
Use of hermetic storage	5	2.7	Low
Use of sack bag	52	28.9	Low
<b>Transportation methods</b>			
Use of open pickup/lorry/trucks	76	42.2	Low
Use of motorcycle	106	58.9	Average
<b>Control of storage pest</b>			
Use of trap	89	49.4	Low
Use of aluminum phosphate	113	62.8	Average
<b>Diseases control</b>			
Cleaning of storage material	92	51.1	Average
<b>Preservation methods</b>			
Use of open air drying	46	25.6	Low
Sun drying	117	65.0	Average
<b>Processing products</b>			
Processed to beans flour	102	56.7	Average
Processed to beans cake	138	76.7	High

Sources: Field survey, 2018. Note:  $\leq 50$ =Low Knowledge, 51-69=Average Knowledge,  $\geq 70$ =High Knowledge, KL = Knowledge Level

### Constraints Associated with Post-harvest Management in Beans

Table 4 revealed that shortage of funds ( $\bar{X}$  =3.76), high cost of post-harvest materials ( $\bar{X}$  =3.61), inadequate training ( $\bar{X}$  =3.48) and lack of technical knowledge ( $\bar{X}$  =3.27) were the severe constraints associated with post-harvest management in beans. This finding is in tandem with that of Agada and Ijih (2019) that inadequate training is a serious menace to post-harvest management practices in Benue State, Nigeria. However, lack of farmers' participation ( $\bar{X}$  =2.98) was not a severe constraint associated with post-harvest management in beans.

**Table 4: Constraints associated with post-harvest management in beans (n=180)**

Constraints	Mean
Inadequate training on post-harvest	3.48
Shortage of fund	3.76
High cost of post-harvest materials	3.61
Lack of farmers participation	2.98
Lack of technical knowledge	3.27
Knowledge and skills limitation	3.33
Insect attack	2.84

Sources Field survey, 2018

## CONCLUSION AND RECOMMENDATIONS

It can be concluded that all the respondents were aware of post-harvest management in beans. Other farmers, farm forum and community meeting were the major sources of awareness on post-harvest management. Also, beans farmers had high knowledge on winnowing method of grading and processing method of beans to cake. The most severe constraints associated with post-harvest management in beans were shortage of funds and high cost of post-harvest materials. It is recommended that the cost of post-harvest materials and tools be subsidized by the government and stakeholders for farmers' access at an affordable price. Also, funds should be made available by governments and non-governmental organizations so that farmers' could purchase post-harvest tools that are needed to enhance the longevity of agricultural produce.

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