AGGREGATORS' INFORMATION NEEDS ON POST-HARVEST MANAGEMENT PRACTICES OF CASHEW NUTS IN KWARA STATE, NIGERIA

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ABSTRACT

Post-harvest management practices have significant roles in the quality and marketability of cashew nuts. This study assessed cashew nut aggregators' information needs on cashew nuts' post-harvest management practices in Kwara State, Nigeria. A three-stage sampling procedure was used in selecting 130 respondents for the study. Data were obtained using structured questionnaire. Frequencies, percentages, means and regression analysis were used to analyse the data. The mean age of the respondents was 46.8 years, and they were predominantly male (85.4%) with an average of 13.7 years' experience in cashew nut aggregation. The major post-harvest management activities of the nut aggregators were buying and selling of nuts ($\bar{x}$ =1.80). The respondents had highest information needs in 'determination and maintenance of kernel out-turn ratio of the nuts ($\bar{x}$=1.84). 'Unfavourable climate and weather conditions' was identified as a major challenge impeding post-harvest management practices ($\bar{x}$ = 2.02). Aggregators' years of formal education (B = 0.071) and years of experience (B = -0.108) had significant contribution to their information needs at 0.05 level of significance. The study concluded that cashew nut aggregators require more information on nut testing and quality assessment. It recommended that agricultural extension services be strengthened and specifically designed to deliver practical, up-to-date guidance on best practices in nut testing and quality assessment.

Keywords: Cashew Nut Aggregators, Economic Trees, Kernel Out-turn Ratio, Information Needs, Post-Harvest Management Practices

INTRODUCTION

Cashew (*Anacardium occidentale L.*) is cultivated in agro-ecological zones of Nigeria including the semi-arid areas, with a high concentration in the north central areas of the country. Cashew is an important cash crop contributing significantly to foreign exchange earnings of many developing countries, including Nigeria. Nigeria is ranked among the leading exporters of raw cashew nuts, with an average kernel Output Ratio KOR of 48 (Nmeregini *et al*., 2023; Azeez and Olabanji, 2024). Improving the quality of Nigerian cashew is dependent on the application of Good Agricultural Practices (GAP) at the farm level and postharvest handling from the farm to the market (Agbongiarhuoyi *et. al.*, 2020; Olabanji *et al*., 2021a).

Cashew production in Nigeria is predominantly carried out by small-scale farmers, who typically rely on middlemen to connect their harvests with the market. After harvest, the nut handling has significant impact on the overall quality of the nut (Azeez and Olabanji, 2024). High quality nut is of primary concern to buyers in local and international markets and a principal criterion for success. Poor postharvest handling leading to shrivelled, discoloured, infected and pitted nuts is a major setback to the quality, market value, and overall profitability of Nigerian cashew nuts in international market space (Nmeregini *et al*., 2023; Valenzuela, 2023). Clean nuts with higher percentage of kernel out-turn and lower moisture content usually attract higher price.

Cashew nut aggregators play a central role in the collection, and distribution of cashew nuts. These aggregators serve as intermediaries between farmers and the market, making their involvement in postharvest management essential. This position puts them at the forefront of determining the quality of the nuts that get to the market. They are most times responsible for storage and packaging of the cashew nuts. This pivotal role demands adequate knowledge and skills regarding effective postharvest practices.

To take the leading position, supply of quality nuts is crucial. This is achievable with adequate technical support and capacity upgrade for the nut handlers. Therefore, assessing the information needs of cashew nut aggregators regarding post-harvest management practices is critical for enhancing the overall quality and marketability of cashew nuts. Understanding these needs will help in designing targeted training programs, extension services, and information dissemination strategies to support the aggregators. By improving post-harvest management, the cashew industry in Nigeria can achieve higher standards in nut quality, reduce postharvest losses, and enhance income for all stakeholders involved in the cashew value chain. It is against this backdrop that the study assessed the cashew nut aggregator's information needs on nuts' postharvest management practices in Kwara State, Nigeria. Specifically, the objectives of the study were to;

1. describe the socioeconomic characteristics of the respondents in the study area

2. identify post-harvest management activities of the cashew nut aggregators in the study area
3. assess the information needs of cashew nut aggregators on post-harvest management practices
4. identify the major challenge impeding cashew nut's post-harvest management practices

The hypothesis of the study was stated that selected socioeconomic characteristics of the respondents has no significant contribution to their information needs.

METHODOLOGY

The study was carried out in Kwara State, Nigeria. The State is located in the North Central geo- political zone of Nigeria with its capital in Ilorin. Kwara State is one of the leading states in Cashew nut production in Nigeria and hosts the presence of aggregators due to the volume of nuts in the State. The State extends from latitude 7° 45`N in its southern end, latitude 2° 45`E to the west and longitude 6° 40`E to south east. It has an estimated total population of 3,390,330 (Nigeria Bureau of Statistics, 2022) with a population density of 66 people/km^2. The population in the state makes up 1.7% of Nigeria's total population. The State is typically agrarian. It lies exclusively within a tropical hinterland. The State experiences both the wet and dry seasons each lasting for about 6 months. Cashew mut aggregation and marketing of raw nuts is usually carried out from February to April in Kwara State. The State has sixteen (16) Local Government Areas. Agricultural Development project (ADP) classified the 16 LGAs into four (4) Agricultural zones, 23 blocks and 184 cells in consonance with ecological characteristics and cultural practices. The zones comprise Zone A (with headquarters at Kaiama), Zone B (with headquarters at Lafiaji), Zone C (with headquarters at Ilorin East) and Zone D (with headquarters at Igbaja). The population of this study comprised all cashew nut aggregators in Kwara State. A three -stage sampling procedure was used to select respondents for the study. In the first stage, four Local Government Areas (LGAs) Isin, Asa, Edu and Barutene LGAs were purposively selected from each of the Agricultural Development Zones of the State due to the number of cashew plantations in those areas. In the second stage, four communities were purposively selected from each of the LGAs based on the volume of aggregation activities and the influx of aggregators in those communities. Lastly, 70% of the total numbers of aggregators (186) in the communities were proportionately selected to make a total of 130 respondents for the study. The selection was from a list of aggregators generated through the assistance of lead farmers in each community. A structured interview schedule was used to collect data from the respondents. The level of involvement in post-harvest management activities was measured as highly involved, slightly involved, and not involved. These operational terms were assigned 2, 1 and 0 scores respectively. The weighted mean score for each item was computed and its average was used as decision to categorize the level of involvement in post-harvest management activities as either high or low. The information needs were measured as highly needed, moderately needed, needed and not needed, these operational measures were assigned scores of 3, 2, 1 and 0 respectively. Furthermore, the weighted mean for each item was computed and its average was used as decision to categorize the information needs as high, moderate or low. The challenges impeding cashew nut's post-harvest management practices was measures with response options of very severe, mildly severe, severe, and not a challenge with scores of 3, 2, 1 and 0 assigned respectively. The weighted mean average was used to rank the severity of the challenges. Descriptive statistical tools of frequency distribution, percentages, mean counts and standard deviations were used in achieving the objectives. While multiple regression analysis was used to test the hypothesis at 0.05% level of significance.

RESULTS AND DISCUSSION

Socioeconomic characteristics

The result in Table 1 shows that more male (85.4%) were involved in cashew nuts' aggregation than their female counterparts (14.6 %). This aligns with broader trends observed in agricultural sectors across Nigeria and other developing countries in which gender disparities in agricultural value chains is often observed, with men frequently occupying major roles (Folarin *et. al*., 2021; Bello *et. al.*, 2021). The average age of the respondents was 46.8 years, with a notable proportion (39.2%) in the age bracket of 41-50 years. This is an indication that the respondents are in their middle age and are able to carry out post-harvest management practices. This finding is in consonance with the findings from Agbongiarhuoyi *et al.*, (2020), that suggests that cashew aggregation and similar agricultural enterprises attract middle-aged individuals who have developed networks and resources that are critical to successful aggregation. Majority (83.9%) of the respondents were married, while few were single (14.6%) and divorced/separated (1.5%). This data highlights the economic stability often associated with marital status in rural settings. A study by Louzek (2022) shows that married individuals tend to engage more in economically secure and income-generating activities to support family livelihoods. In terms of educational attainment, majority of the respondents (78.5%) had from primary to post-secondary education and only a few (21.5%) had no education. Education increases an individual's ability to comprehend and utilise information capable of improving their practices. Close to half (46.9%) of the respondents identified farming as their primary occupation, followed by artisanship (30.0%). This is consistent with the finding of Iraoya and Isinika (2020) who asserted that rural economies in Nigeria typically exhibit a strong linkage between farming and other supplementary income generating activities. Annually, the respondents earn an average income of about ₦687, 549 from aggregation. This income level highlights the economic potential of cashew aggregation. According to Olukunle (2020), aggregation in high-demand export crops like cashew offers substantial income potential. The mean years of experience of the respondents in nuts' aggregation was 13.7 years. Experience is known to significantly impact efficiency in value chain activities as it tends to improve the proficiency of the individuals concerned (Olabanji *et. al*., 2021b).

Table 1: Distribution of respondents based on the socioeconomic characteristics

Socioeconomic variables	Percentages (%)	Mean
Sex		
Male	85.4	
Female	14.6	
Age (in years)		**46.8 years**
Below 20	3.1	
20-30	14.6	
31-40	25.4	
41-50	39.2	
51 and above	17.7	
Marital Status		
Married	83.9	
Single	14.6	
Divorce/separated	1.5	
Years of Formal Education		**10.9 years**
No Formal Education (0)	21.5	
Primary School Certificate (1-6)	27.7	
Secondary School Certificate (7-12)	45.4	
Post-Secondary Education (12-18)	5.4	
Primary Occupation		
Trading	20.8	
Civil Servant	2.3	
Artisanship	30.0	
Farming	46.9	
Annual income from aggregation (₦)		**₦687, 549**
≤ 100,000	16.2	
100,001 – 500,000	35.4	
500,001 – 1,000,000	45.3	
>1,000,000	3.1	
Years of Experience in nut's aggregation		**13.7 years**
Less than 5	8.5	
5-10	36.9	
11-15	30.8	
Above 16	23.8	

Source: Field Survey, 2024

Level of involvement in post-harvest management activities

The data in Table 2 show that the major post-harvest management activities of the cashew nut aggregators was buying and selling of nuts which ranked 1st ($\bar{x}$ =1.80). This was followed by nut testing ($\bar{x}$ =1.72) which ranked 2nd and quality assessment ($\bar{x}$ =1.50) ranking 3rd. Transporting of the nuts ($\bar{x}$ =0.57) ranking 8th, processing of nuts ($\bar{x}$ =0.28) ranking 9th and the separation of apples from nuts after harvest ($\bar{x}$ =0.23) ranking 10th were the least post-harvest management practices aggregators were involved in. This finding aligns with the studies of Abraham (2022) and Agbongiarhuoyi *et al*. (2020) on the structure of post-harvest management in cashew value chains in Nigeria and other West African countries, where small-scale aggregators are generally more focused on immediate sales and quality checks than on value-added activities such as processing and transportation.

Table 2: Distribution of the respondents based on level of involvement in post-harvest management activities

Post-harvest management activities	Highly Involved	Slightly Involved	Not Involved	WMS	Std. Dev	Rank
Buying and selling of nuts	85.4	9.2	0.0	1.80	1.089	1st
Nut testing	73.8	24.6	1.5	1.72	0.786	2nd
Quality assessment	59.2	31.5	9.2	1.50	0.862	3rd
Grading and sorting	35.4	45.4	19.2	1.16	0.991	4th
Drying	33.1	43.1	23.8	1.09	0.899	5th
Loading/off loading	26.2	31.5	42.3	0.84	1.009	6th
Bagging	23.8	32.3	43.9	0.80	1.102	7th
Transportation	16.2	24.6	59.2	0.57	0.920	8th
Processing	6.2	16.2	77.7	0.28	1.026	9th
Separation of apples from nuts	6.2	10.7	83.1	0.23	0.867	10th

Source: Field Survey, 2024

The result in Table 3 shows that the highest information needs were in the areas of quality assessment of cashew nuts. These include determination and maintenance of kernel output ratio (KOR) $\geq$ 44 with a weighted mean score ($\bar{x}$) of 1.84 ranking as 1st and determination of total defects ($\leq$ 10%) having a weighted mean score ($\bar{x}$) of 1.76 and ranked 2nd. This was followed by determination of the percentage of good kernel ($\bar{x}$ =1.75; ranking 3rd), determination of nut count ($\bar{x}$ =1.53; ranking 4th) and sorting and grading ($\bar{x}$ =1.24; ranking 5th). The least information needs were on insect and disease prevention ($\bar{x}$ =0.50; ranking 9th) and assessing raw nut quality through floatation test ($\bar{x}$ =0.48; ranking 10th). A study by Agbongiarhuoyi *et al.*, (2020) and Castka *et al*., (2023) underscores the importance of accurate KOR and defect measurements in meeting international buyer standards, which in turn allows aggregators to secure higher prices and better contracts. A lack of information in these areas can affect aggregators' ability to ensure consistency in quality, which could limit market access and pricing.

Table 3: Distribution of the Respondents based on information needs on post-harvest management practices

Post-harvest Management Practices	HN	MN	N	NN	WMS	Std. D
Nut Harvesting						
Determining nuts ready for harvest.	7.6	10.8	16.2	65.4	0.61	1.011
Nut test						
Assessing raw nut quality through floatation test	6.2	8.4	12.3	73.1	0.48	0.768
Determination of nut count (nuts per kilogram).	26.1	28.5	17.7	27.7	1.53	0.896
Determining the percentage of good kernel by opening the nut	28.5	32.3	24.6	14.6	1.75	1.009
Sorting and grading	18.4	22.3	23.8	35.3	1.24	0.998
Quality assessment						
Determination of total defects ($\leq$ 10%).	33.1	23.8	29.2	3.8	1.76	0.909
Determination and maintenance of kernel output ratio (KOR) $\geq$ 44.	37.7	24.6	21.5	16.2	1.84	0.896
Proper storage method						
Determination of proper drying method for moisture level (8-10%)	14.6	16.2	19.2	0.50	0.95	1.087
Insect and disease prevention	6.9	9.2	10.8	73.1	0.50	0.916

Source: Field Survey, 2024

Keys: HN = Highly Needed; N= Needed; NN =Not Needed

Table 4 reveals that unfavourable climatic and weather conditions was noted as the major challenge impeding cashew nuts' post-harvest management practices having a weighted mean score of 2.02. This was followed by shady practices of mixing of immature nuts with matured nuts on the part of the sellers ($\bar{x}$ =2.00; ranking 2nd) and poor infrastructure and technological deficit ($\bar{x}$ =1.67; ranking 3rd). Other challenges with minimal severity were limited knowledge and training ($\bar{x}$ =1.52; ranking 8th), limited access to processing technology ($\bar{x}$ =1.27; ranking 9th) and lack of market ($\bar{x}$ = 0.42; ranking 10th). Quange (2024) noted that adverse weather patterns can increase post-harvest losses due to rapid deterioration of harvested produce, affecting quality and reducing shelf life. Climate variability has led to increased unpredictability in cashew production, intensifying the challenges of maintaining quality in post-harvest stages. The low ranking for market access suggests that market demand for cashew nuts is relatively strong, meaning that aggregators have fewer challenges finding buyers compared to overcoming quality and infrastructural hurdles.

Table 4: Distribution of the respondents based on the major challenge impeding cashew nut's post-harvest management practices

Challenges	VS	MS	S	NS	WMS	Std. D	Rank
Unfavourable climate and weather conditions	36.9	39.2	13.1	10.8	2.02	0.991	1st
Shady practices of mixing of immature nuts with matured nuts on the part of the sellers.	33.1	43.1	14.6	9.2	2.00	1.090	2nd
Poor infrastructure and technological deficit	26.9	35.4	15.4	22.3	1.67	1.012	3rd
Inadequate skilled labour	25.4	31.5	23.7	20.0	1.62	0.901	4th
Bad quality of nuts	22.3	33.1	26.1	18.5	1.59	1.006	5th
Inadequate storage facilities	26.2	31.5	15.4	26.9	1.57	0.863	6th
Combination of old and new season nuts	29.2	22.3	20.8	27.7	1.53	0.910	7th
Limited knowledge and training	23.8	22.3	36.2	17.7	1.52	1.102	8th
Limited access to processing technology	15.4	23.8	33.1	27.7	1.27	1.011	9th
Lack of market	6.1	8.5	6.9	78.5	0.42	0.876	10th

Source: Field Survey, 2024

Data in Table 5 shows that among the seven characteristics entered the model, two were found to be statistically significant predictors at 5% level of significance. These include years of formal education (B = 0.071) and years of experience (B = -0.108). The coefficient for age is positive and statistically significant ($p < 0.05$) indicating that the older the aggregators the more their information needs. On the other hand, years of experience is negative and statistically significant ($p < 0.05$) indicating that the more the years of the respondents' experience in aggregation of nuts the lesser information needs. This could be because the number of years spent on the field of aggregation can make an individual garner requisite knowledge on handling various issues. This finding aligns with the work of Adefalu *et al.* (2021) who observed that less experienced farmers had greater needs for extension services due to limited exposure and practical understanding of modern agricultural practices. Similarly, Olabanji *et al*., (2021b) emphasised that experience in agricultural activities reduces information gaps as individuals tend to learn from hands-on practices and repeated exposure to similar challenges.

Table 5: Contribution of Socioeconomic characteristics to Information Needs

Variables	**Coefficient (B)**	**SE**	**t-value**
Age	0.087	0.317	0.380*
Sex	0.164	0.245	1.327
Marital Status	0.547	0.087	5.259
Years of formal education	0.071	0.213	0.640
Annual Income	-0.060	0.182	-0.168
Years of experience	-0.108	0.170	-0.567*

R^2= 0.698, Adjusted R^2 = 0.571, F = 19.237, $p<0.05$

Source: Data Computation, 2024

CONCLUSION AND RECOMMENDATIONS

The study concluded that the respondents have information needs on the determination of quality nuts and the major constraint impeding cashew nut's post-harvest management practices was unfavourable climate and weather conditions. Given the adverse impact of climatic conditions on post-harvest quality, introducing climate-resilient storage and handling methods would be beneficial. This includes training on proper drying techniques and low-cost storage innovations to preserve nut quality during adverse weather.

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