



Research Article



Socio-economic factors influencing postharvest loss among yam traders in Niger State, Nigeria

Adamu, D. A.¹, Adamu, B. A.², Orimafo, P. K.³, Ohaeri, V. C.³, Babatunde, O.³, Kazeem, A. A.³ and Oyewopo, A. O.⁴

¹Department of Agricultural Economics and Farm Management, Federal University of Technology, Minna, Niger State, Nigeria

²Department of Environmental Science, Federal College of Education, Zuba, Abuja, Nigeria

³Research Outreach Department, Nigerian Stored Products Research Institute, Ilorin, Kwara State, Nigeria.

⁴Library Department, Nigerian Stored Products Research Institute, Ilorin, Kwara State, Nigeria

*Corresponding author e-mail: adamu.pg2115246@st.futminna.edu.ng

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ABSTRACT

Despite high production of yam tubers in Niger State, its potentials have not been fully maximized due to postharvest loss at market level. This study assesses socio-economic factors influencing postharvest loss among yam traders in Niger State, Nigeria. A multistage sampling technique was used to randomly select a representative sample size of 176 respondents from 6 major yam markets within the State. Data were analyzed using descriptive statistics and Logistic regression analysis. The result of the analysis showed the average age of respondents as 44, with the majority (60.1%) being within the ages of 31-50 years. Marketing experience in Yam with an average of 19 years, with an average monthly income of 55,000 Naira. A majority (70.8%) were male, while 50.6% were reported to be married, with an average household size of 6 persons. The results further revealed that the majority (54%) affirmed having experienced losses in yams during trading due to improper handling. Perceived methods to reduce losses include: usage of yam barn, platform storage, piled into heaps and storage in a conical protective roof, which were all ranked as 1st, 2nd, 3rd and 4th, respectively. On the other hand, the result from the logistic regression analysis showed the significant relationships between yam traders age, trading as major occupation, years of experience in yam trading, structural condition of yam barns, loading and offloading operations and poor transportation system in/out of the market as socio-economic factors contributing to postharvest losses in yam at market level in the study area. The study recommended that stakeholders should provide traders' adequate storage facilities, such as an improved yam barn and an adequate transportation system within the market. Traders should adopt the best techniques during handling to help reduce losses, which will in turn enhance food security and sustainable livelihood.

Keywords: Yam, Storage, Postharvest, Loss, Traders, Logistics

INTRODUCTION

Yam, also known as *Dioscorea spp* is a tuberous crop, described by its physical nature as a thick tropical vine-tuber and a native to tropical regions hemispheres and is popular in Africa. International Institute for Tropical Agriculture (IITA) (2016) reported that Nigeria is one of the highest yam producers in the world. Other reports have it that Nigeria is the top producer of yam in Africa, as affirmed by (FAOSTAT, 2023), due to its large area

of 5.9 million ha, which is 68% of the global area harvested of yam. Yam tuber is an important staple food crop in Nigeria, as the majority depend on it as a source of food and raw material for manufacturing industries. It is ranked fifth behind cassava, maize, guinea corn and cowpea (FAO, 2019). Notably, about 45.7 million tonnes worth 21.1 billion USD are consumed in the country, with a per capita consumption of 252kg according to

(Verter and Becvarova, 2015). Unfortunately, almost \$10 billion worth of food crops are lost annually in Nigeria. This postharvest loss is yams is estimated to be about half of the total quantity of foods produced every year, as affirmed by (Elemo, 2017). Putting the term postharvest loss into perspective, it is described as the after-harvest loss, which includes all produce losses incurred in quantity and quality of crops along the value chain (Goldsmith *et al.*, 2015).

In spite, Nigeria been known for its high production of yam by the farmers while its trading activities remain prominent especially for yam handlers in Niger State. However, during handling of this yam there is usually an unfortunate experience of loss due to improper handling, that many of these yams being lost and becoming unfit for human consumption and a reduction in monetary value. This is as a result of poor handling, especially at the market levels, due to inadequate postharvest handling measures. This trend of postharvest losses in yam has directly affected food security and also leads to price instability in yams and yam products, thereby reducing the expected income of the traders. Although, despite numerous shareholders' efforts in helping traders curtail this loss through postharvest handling training and providing traders of postharvest facilities. Some significant losses were still prevalent at the market level. Hence, this study was necessitated to research the socio-economic factors that contribute to postharvest loss at the market level. The main aim of the study is to assess the socio-economic factors influencing postharvest loss among yam traders in Niger State, Nigeria, while the specific objectives is to describe the socioeconomic characteristic of yam traders, asses the perceived percentage loss within the market, examine respondents' method of storage within the market and to determine the socio-economic factors influencing postharvest loss in yam within the market.

MATERIALS AND METHODS

This research was conducted in some major yam markets in Niger State, Nigeria. The State is located within Latitudes 8° 22' N and 11° 30' N and Longitudes 3°30' E and 7°20' E of the equator. The State have a total land area of about 76,000 km² or about 9% of Nigeria's area. The population as of 2006 was 3,950,249, which is projected to be 6,513,919 in 2025, with an annual growth rate of 3.1% (NBS, 2025). An annual rainfall that ranges between 1100 mm and 1,200 mm, with its peak around July and August and a temperature that

ranges between 15.22°C and 36.5°C, with relative humidity between 60% at noon and 80% at late night. The state is an Algerian State with soil type suitable for agriculture.

The study used a multi-stage sampling technique. First stage was purposive selection of two yam predominate Zones A and B from the three agricultural zones A, B and C in the State, second stage was random selection of two major yam market each from the selected zones (in Zone A, Kataregi and Lapai; while Zone B, Garatu and Paikoro respectively) while the third stage is the selection of 44 yam traders each from four the markets which gives a total of 176 respondent used for the study. Data were analysed using descriptive statistics such as Mean, frequency and percentage, while Logistic regression was used for making inferences.

Model specification

The empirical logistic regression model was specified as in equation (1)

$$Y_i = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_{11}x_{11} + u_i \quad (1)$$

Where

Y_i = Postharvest loss index in yam tuber (1= Losses experienced, 0= No losses experienced)

X_1 to X_{11} (independent variables) specified as:

X_1 = Age of respondents

X_2 = Marital Status of marketers;

X_3 = Yam trading as major occupation (years);

X_4 = Number of years spent in acquiring education

X_5 = Years of experience in yam trading

X_6 = Membership in the traders association

X_7 = Market task force/Revenue activities

X_8 = Poor structural condition of the yam barn

X_9 = Poor climatic conditions

X_{10} = Inadequate transportation system in/out of the market

X_{11} = Perception on demand for Yam

Error term = e_i

RESULTS AND DISCUSSION

The result of the socioeconomic distribution showed the average age of respondents as 44, with the majority (60.1%) being within the ages of 31-50 years. This implies that they are within their active age of carrying out economic activities and being productive. More so, trading experience in yam with reported to have an average of 19 years with an average monthly income of 55,000 Naira. This means that the majority have been trading yams for about 2 decades, is reflected in the monthly income of the respondents. That is,

respondents have acquired a lot of experiences in yam trading which validate the correctness of information received. On the other hand, Majority (70.8%) of the respondents were male while majority 50.6% were reported to be married with average household size of 6 persons with majority (60.1) who were less than 5 people. This implies that male counter parts are really involved in trading as they also constitute the larger proportion in it farming. Also, the marital status and household size reflects the availability of labour supply and high responsiveness of the respondents. Furthermore, the result showed that respondents have basic education as 34.5% and 31.5% claiming to have acquired primary and secondary education, respectively. Lastly majority (92.1%) affirmed that to were aware that postharvest training on yam can actually be beneficial to their trading and improve their livelihood.

The result in Figure 1 showed that the postharvest experience in yam traders has been recorded in their trading experience. The results revealed that the majority (54%) of traders affirmed to have experienced one form of losses in yam during trading due to improper handling. These losses include breakage of yams, peeling off of the cover during loading and offloading due to poor handling, sprouting and rottenness of tubers. Although 46% never reported any losses. This implies that yam tuber handlers still require capacity building and training to completely curtail the perishability nature of yam tubers to ensure profit maximization. This finding corroborates the finding of Obi-egbedi, & Ifoga (2023), who affirmed that losses in yams were low among handlers.

Fig1. Perception of yam tuber loss during trading

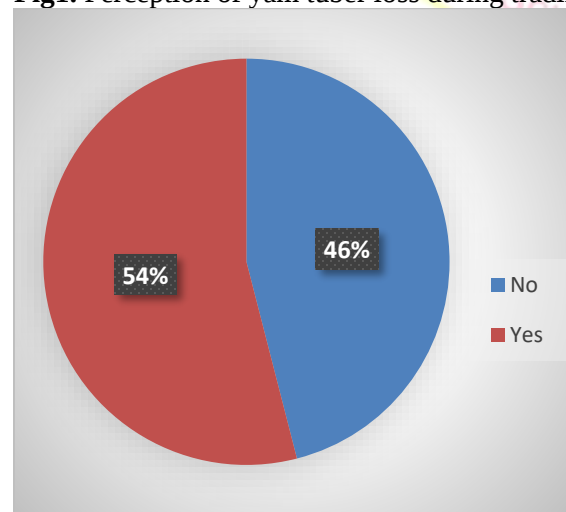


Table 1. Distribution of Socio-economic characteristics of respondents

Variable	Frequen cy	Percen tage	Mea n
AGE (Years)			
≤ 30	48	27.5	44
31 – 50	106	60.1	
≥51	22	12.4	
MONTHLY INCOME (₦)			55,000
≤ 50,000	18	10.1	
50,001 – 100,000	68	38.8	
≥100,001	90	51.1	
GENDER			
Male	125	70.8	
Female	51	29.2	
MARITAL STATUS			
Single	81	46.1	
Married	90	50.6	
Widowed/widower	5	3.4	
EDUCATIONAL STATUS			
Primary	61	34.3	
Secondary	55	31.5	
Tertiary	2	1.1	
Non formal Education	58	33.1	
TRADING EXPERIENCE IN YEARS			
≤ 10	26	14.6	19
11 – 20	98	55.6	
21 – 30 ≥31	52	29.8	
AWARENESS ON POSTHARVEST TRAINNG BENEFIT			
Yes	163	92.1	
No	13	7.9	
HOUSEHOLD SIZE			6
≤ 5	106	60.1	
6 - 10	30	19.0	
≥11	40	20.9	
TOTAL	176	100	

Source: Field survey 2025

The result in Table 2 showed the distribution of methods used for yam tuber storage within the market. A 5-point likert scale type with a threshold mark of 3.0 was used for the study. The result revealed that the majority (63.1%) strongly agree that yam barn is preferred to store yam tubers within the market. This finding agreed with Adamu et al., (2014), who opined that the factors responsible for losses of yams are poor storage and handling methods were recorded as the predominant reason for postharvest losses of yams in Nigeria. On the other hand, about 48.9% strongly

agree that yam kept in the platform were safe, likewise. On the other hand, 46.0% said that yam tubers piled into heaps are preferred, while 39.8% revealed that storage in a conical protective roof serves a good purpose. All responses were ranked accordingly as 1st, 2nd, 3rd and 4th respectively, as

each having a mean greater than the Likert threshold mark of 3.0. This implies that yam barn within the market, platform storage, piled into heaps and storage in a conical protective roof were regarded as storage methods agreed and perceived as feasible to thrive in the study area.

Table 2. Distribution of methods used for yam tuber storage within the market

Storage Method	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Weighted Mean/Sum	Rank
Yam barn within market	111(63.1)	50(28.4)	8(4.5)	4(2.3)	3(1.7)	4.49±790	1 st
Platform storage	86(48.9)	78(44.3)	6(3.4)	6(3.4)	NR	4.38±772	2 nd
Piled into heaps	81(46.0)	79(44.9)	6(3.4)	9(5.1)	1(0.6)	4.31±758	3 rd
Storage in conical protective roof	70(39.8)	71(40.3)	11(6.2)	12(6.8)	12(6.8)	3.99±703	4 th
Pit/hole underground	NR	10(5.7)	8(4.5)	53(30.1)	105(59.7)	1.56±275	5 th
Leave tubers inside Ridges	NR	NR	2(1.1)	55(31.2)	119(67.6)	1.34±235	6 th

Source: Field survey 2025, Note: (NR Denote No response). (5-point Likert scale threshold of 3.0)

Table 3. Estimation of Socio-economic factors influencing losses in yam at the market level

Parameters	Coefficient	Standard error	P-value
Age of respondents (X ₁)	-0.1484828	0.0786498	1.66*
Marital Status of marketers (X ₂)	0.5496884	1.502265	1.21
Yam trading as major occupation (X ₃)	0.155947	0.0765748	2.52**
Years of spent in acquiring education (X ₄)	0.8854775	0.9249114	1.03
Years of experience in yam trading (X ₅)	0.2151178	0.1085814	2.31**
Membership in traders association (X ₆)	-0.46067	1.562754	1.45
Market task force/Revenue activities (X ₇)	1.70e-06	6.54e-06	0.23
Poor structural condition of yam barn (X ₈)	4.06511	0.4217106	2.68***
Poor climatic condition (X ₉)	0.2058991	0.2204214	2.34**
Inadequate transportation system in/out of the market (X ₁₀)	3.276556	1.507783	2.23**
Perception on demand for yam (X ₁₁)	0.0000199	0.0000817	1.12
Constant	-97.29847		
Pseudo R ² =	0.5831		
LR Chi ² =	46.86		
Prob.> Chi ² =	0.0035		
Log likelihood=	-134.54341		

Source: Field Survey 2025. ***,** and * denote P< 0.01, P< 0.05 and P< 0.10 Respectively

Table 3 revealed the results of the logistics regression analysis. The logistic regression coefficient is used to estimate the socioeconomic factors influencing losses in yam tuber within the selected market in Niger State, Nigeria. The result showed the log likelihood value to be -134.54341, pseudo R² value of 0.5831, This implies that 58% variation in the dependent variable was explained by the explanatory variables, leaving 42% to the error term and unexplained inconsistency in the data. The Prob.> Chi² 0.0035, indicating a good fit and the correctness of the estimated model and confirms that all the slope coefficients are not equal to zero. In other words, the explanatory variables are collectively significant in explaining the factors influencing losses within the market.

The result in Table 3 showed that the age of respondents with a coefficient (-0.1484828) was

negatively significant at P< 0.10. This implies that a unit increase in the age of the respondents will lead to a proportionate decrease in the measure of attempts to reduce losses in yam tuber within the market by the traders. This may be attributed to the fact that as respondents get older, the ability to handle yam tuber within the market becomes inadequate due to a loss in human capacity and tenacity. On the other hand, yam trading as major occupation with coefficient of (0.155947), years of experience in yam trading (0.215117), poor climatic condition (0.205899) and inadequate transportation system in/out of the market (3.276556) were all positively significant at P< 0.05 level of probability with their various coefficients respectively. This implies that a unit increase in yam trading as a major occupation will lead to an increase in loss of yam tuber by (0.155947) units.

This implies that respondents have not yet acquired the capacity and method to handle a larger scale of yam tubers (the more the tubers, the more the tendency to loss) or this can also be attributed to market factors. More so, a unit increase in the years of experience in yam trading will lead to an increase by (0.2151178) unit in ensuring reduction in loss in yam due to verse level of experience acquired through the years in trading yam within the market. Furthermore, a unit increase in poor climatic conditions around the market leads to a proportionate increase (0.2058991) in the tendency of yam tuber loss within the market due to the unpredictable nature of temperature and humidity. This finding followed the finding of Agba et al., (2019), who affirmed that exposure of yams to sunlight is another major cause of postharvest loss of yam. They opined that such exposure may have begun right at the time of harvesting where yam tubers are left under the sun for a long time it usually caused losses significantly while inadequate transportation system in/out of the market influence positively as a factor that leads to loss in yam tuber within the market with a unit increase leading to 3.276556-unit loss in yam due poor transport system. Nwafor, *et al.* (2023) found that efficient transportation systems within the market, proper packaging, and proper handling methods are key to minimising losses during yam transfer in and out of the market. Although structural conditions of the yam barn with coefficient (4.06511) were reported to be significant at the $P < 0.01$ level of probability. This implies that a unit increase in the Poor structural condition of yam barns will lead to a proportionate increase in losses in yam tubers within the market. This study agreed with Nwafor *et al.* (2023) who affirmed that Proper storage facilities and practices, which include adequate ventilation, temperature control, and pest management, are essential for preserving the quality and quantity of yam tuber.

CONCLUSION

Yam tuber loss reduction within the market can actually help in achieving increase in income of traders and ensuring food security and food sustainability. This study concluded by revealing the factors influencing losses among yam traders at the market level to include, structural system of the yam barn, the transportation system in/out of the market, poor climatic conditions and years of experience in yam trading, which play a significant role in postharvest losses in yam. All these factors

influencing yam losses are essentially significant in the ability to sustain trading in yam. The quantity loss in yams reduces income expectations among traders. Furthermore, the continuation of this loss incurred during trading is detrimental to the goals of food security in Nigeria. Therefore, this study recommended that yam traders should endeavor to maintain proper yam handling within the market, stakeholders should provide traders' adequate storage facilities and an adequate transportation system. Traders should adopt the best techniques to reduce losses, which will enhance traders' livelihood and improve trading effectiveness.

CONFLICT OF INTEREST

The author here declares that there is no conflict of interest in the publication of this article.

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