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Analysis of Postharvest Stressor and Poverty Status of Amaranthus Farmers in Niger State, Nigeria

Adamu, D. A. *, Oyebamiji, I. T*., Olatilewa, M. O., Babatunde, O., Lijoka, O., Adedoyin, E. A., Ogundele, B. A. and Sanni, N. K.

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

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***CORRESPONDING AUTHOR:**
adamu.davida@gmail.com; oyebamijiisaac74@gmail.com

ABSTRACT

The study analyzed the postharvest stressor and poverty status of Amaranthus processors in Niger State. A multi-stage sampling technique was used to select respondents for the study. First Stage involved purposive selection of two LGA each from the three agricultural Zones in the state, due to its prevalence in Amaranthus processing activities. Second stage involved random selection of five communities where Amaranthus processing is dominant, third stage employed Taro Yamane`s formula (n=N/(1+N(e)2) to calculate the sample size of the respondents. Total of 100 respondents was used for the study. Data were collected using computer assisted personal interview. Mean age of respondents was 38 years. 88.0% were female, Majority about 94.3% were married and 62.7% have house size of about 10. However, 60.1% have farming experience in Amaranthus processing and about 58.8% have basic education. Mean income generated was ₦ 710,307.00. Processors' poverty status in the study area were analyzed using FGT. The total per capital expenditure per year was ₦ 22,591,331.78 while the mean per capital expenditure per year was ₦ 99,084.79. The poverty line used was ₦ 66,056.53. Stakeholders and other agencies should assist farmers through the period of epidemics with relief and technologies to thrive in their production.

INTRODUCTION

Agriculture is vital component and an important factor to Nigeria's economy and has a key part to play in the country's long-term growth. It is the country's major employer of labor, employing more than one-third (35%) of the total workforce (World Bank, 2020) and contributing around 24% of GDP (National Bureau of Statistics (NBS), 2020). The agriculture industry in Nigeria is critical to the country's economic diversification strategy (PWC, 2020). It comprises of animal production and crop production such as vegetable fruits etc. According to Deepak, *et al.*, (2020), green leafy vegetables such as Amaranthus holds a significant position in human food consumption since they offer a sufficient quantity of several vitamins and minerals that are necessary for human health. Due to their numerous health benefits, green leafy vegetables have attracted attention from all over the world. This is because they have grown alongside human evolution to guarantee consistent availability, safety, and variety, as well as an improved nutritional composition for the good of all people (Abu, 2023). According to estimates from the Food and Agriculture Organization (FAO, 2019), on the postharvest loss, they affirmed that before food reaches the consumer's level of the food system, over 15% of the food produced worldwide including vegetables, is lost during the post-harvest production stage. However, they consider food losses and wastages as a decline in the amount or quality of food along the food supply chain. It also includes all quantities of human-

edible commodities, such as crops, cattle, and fish, that entirely leave the postharvest supply chain during processing, transportation, and storage and are disposed of, never to reenter it.

According to High Level Panel of Experts, (HLPE) (2011) who affirmed that in low-income countries such as Nigeria, significant levels of leafy vegetable losses occur upstream, at harvest and during post-harvest handling, owing to poor infrastructure, low levels of technology, a limited knowledge base and lack of investment in production. Leafy vegetable losses also tend to be caused by managerial and technical constraints in harvesting, storage, transportation, processing, packaging and marketing. Antonio and Warwick (2015) stated that leafy vegetable postharvest losses vary considerably with maximum average losses of up to 50 per cent or higher occurring in developing countries. This could also arise due to the feature of supply chains in these countries which are often typified by hot and humid tropical climates, where there is a lack of knowledge, techniques and facilities in produce handling and processing. Despite the numerous interventions by Government, donor agencies, Agricultural development project and other stakeholders in Agriculture, amaranths farmers still experience significant loss, income reduction and resultantly led to low standard of living. In order curb or limit the stressor highlighted, this study seeks to provide answers to some pertinent question to postharvest loss in amaranths farming. The study therefore seeks to achieve the following specific objectives, to describe the socioeconomic characteristic of Amaranthus farmers in the study area, to ascertain the poverty status and analyze the constraints to Amaranthus farming in the study area.

METHODOLOGY

The study was carried out in Niger State, Nigeria. The State is located within Latitudes 8º 21ˈ N11º 30ˈ N and Longitudes 3º30ˈ E 7º20ˈ E. The State covers a total land area of 76,000 km^2 or about 9% of Nigeria area (Niger State Bureau of Statistics, 2014). The population of the state in 2006 was 3,950,249 and is projected to be 5,016,816 in 2016 with annual growth rate of 2.7% (NBS, 2016). The people of Niger State are Nupe, Gwari and Hausa speaking people and farming is one of their major occupations. A multi-stage sampling technique was used to select respondents for the study. First Stage involved the purposive selection of two Local Government Area each from the three agricultural Zone I, II and III which are namely; Lavun and Gbako, Paikoro and Bosso, and Wushishi and Mashegu respectively. Due to the prevalence of Amaranthus production in the Local Government. The second stage involved the random selection of five (5) registered villages each under the Niger State Agricultural Mechanization and Development Agency (MAMDA) making a total of 30 villages. While the third stage employed Taro Yamane`s formula as adopted by Adamu and Garba (2019) to obtain a proportionate sample at 0.10 confidence interval which gives a scientific sample size from the sample frame. A sample frame of 228 registered Amaranthus farmers was obtained from the study area with a proportionate selection of 100 respondents which was used for the study. The data for the study were collected with the aid of a structured questionnaire designed in kobo toolbox and collected using kobo collect application. Objective I and III were analyzed using descriptive statistics while objective II was analyzed using Foster-Greer Thorbecke (FGT) poverty index.

Model Specification

Foster-Greer Thorbecke (FGT) poverty index.

Foster-Greer Thorbecke (FGT) poverty index was used to achieve objective II. The respondents were disaggregated into groups of poor and non-poor categories. Pα was used in analyzing poverty. The model (Pα) relates to different dimensions of the incidence of poverty P0, P1, and P2. These were used for head count (incidence), depth and severity of poverty, respectively. The three measures were based on a single formula but each index puts different weights on the degree to

which a household or individual falls below the poverty line. The mathematical formulation of poverty measurements as adopted by (Sallawu *et al.*, 2016) is estimated as:

$$p_{\propto} = \frac{1}{N}\sum_{i=1}^{q} \left[\frac{Z_1 - Y_1}{Z_1}\right]^{\alpha} \quad (1)$$

Where,

P_{α}= the weighted poverty index for the ith sub-group,

α = Foster-Greer- Thorbecke (FGT) index and takes on the values of 0, 1 and 2 for incidence, depth and severity of poverty measures respectively,

Z_1 = the poverty line for ith sub-group,

q = the number of individuals below the poverty line,

N = the total number of individuals in the reference population,

Y_{ij} = the income of household j in the subgroup i,

Z - Y_{ij} = poverty gap of the ith household and

$\frac{(Z_1 - Y_{ij})}{Z_1}$ = poverty gap ratio (2)

The quantity in bracket is the proportionate shortfall of income below the poverty line.

$\frac{q}{n}$ = the proportion of the population that falls below the poverty line.

This is called the head count or incidence of poverty.

If α = 0, then FGT measures the incidence of poverty,

If α = 1, then FGT measures the depth of poverty and

If α = 2, then FGT measures the severity of poverty.

In this study, the poverty status was defined on the basis of accrued income of the farmers; as a result, poverty line was defined on the basis of average income of the farmers per annum. Estimation of poverty based on the FGT index was then used to disaggregate farmers' households into poor and non-poor categories.

RESULTS AND DISCUSSIONS

Socioeconomic Characteristics of the Farmers

The results in Table 1 revealed that about 36.8% of the respondents were between the ages of 31-40 years, 28.5% were between 41 – 50 years, while 25.0% were between 21-30 years. The mean age of the respondents was 38 years. This implies that Amaranthus farmers in the study area were within the youthful age group regarded as economically active, innovative, productive and are still energetic to carry on with amaranthus production. This is in line with the findings of Ibitoye *et al.*, (2013). The result further shows that majority (88.0%) of respondents were male, while 11.8% were females. This implies that the respondents in the study area was dominated by the male folks. The result also revealed that majority (94.3%) of the respondents were married furthermore, Majority (62.7%) of the respondents have household size between 10 and below while 32.0% have household size of between 11-20 implies the supply of household labour for more production. The

result also revealed the farming experience of respondents which affirmed that about (60.1%) of has farming experience of 11- 20 years while 25.0% have been farming for 10 years and less. This implies that youthful involvement in Amaranthus production in the study area cannot be down turn and this indicates that most of the producers in the study area have adequate farming experience in Amaranthus production and know how to use resources efficiently. Experience enables the farmers to set realistic targets and it however goes with longevity. This finding is in consonance with the reports of (Godson-Ibeji *et al.,* 2016). The result also shows the educational level of the respondents in the study area. Majority (58.8%) of the respondents had one form of formal education or the other while 38.2% of them had no formal education. This implies that a considerable number of the respondents had formal education which could enhance adoption of new agricultural technology to enhance production. This corroborates with the findings of Izekor and Olumese (2010). More so, the result show that majority (66.7%) of respondent have farm land of 2 ha while 33.4 have above 3 ha of farm land. The respondent has mean income of about 710307. Majority (76.3%) of the respondents have annual income of about 510000 – 1000000. This implies that respondents have sufficient income to fend for their various household basic need however incentive would also help to improve living standard.

Table 1. Socioeconomic Characteristic of the Respondents

Parameters	Frequency	Percentages	Mean
Age			38
Less than or equal to 20 years	1	.9	
21 – 30	25	25.0	
31 – 40	37	36.8	
41 – 50	29	28.5	
51 and above	9	8.8	
Gender			
Female	12	11.8	
Male	88	88.2	
Marital Status			
Single	6	5.7	
Married	94	94.3	
Household Size			
Less Than or Equal 10	63	62.7	
11 – 20	32	32.0	
21 – 30	4	3.5	
31 and Above	2	1.8	
Farming Experience			
Less Than or Equal 10	25	25.0	
11 – 20	60	60.1	
21 – 30	14	13.6	
31 and above	1	1.3	

Educational Level			
Quranic Education	3	3.1	
Adult Education	7	7	
Primary Education	9	8.8	
Secondary Education	36	35.5	
Tertiary Education	7	7.5	
Did not attended any	38	38.2	
Farm Size			
Less Than or equal 2	66	66.7	
3 – 4	18	18.0	
5 an above	15	15.4	
Annual Income			710307
16000 – 500000	5	4.8	
510000 – 1000000	76	76.3	
1000001 – 2000000	17	16.7	
2000001 and above	2	2.2	

Source Field Survey 2024

Analysis of Farmer's Poverty Status of Amaranthus Farmer in the Study Area

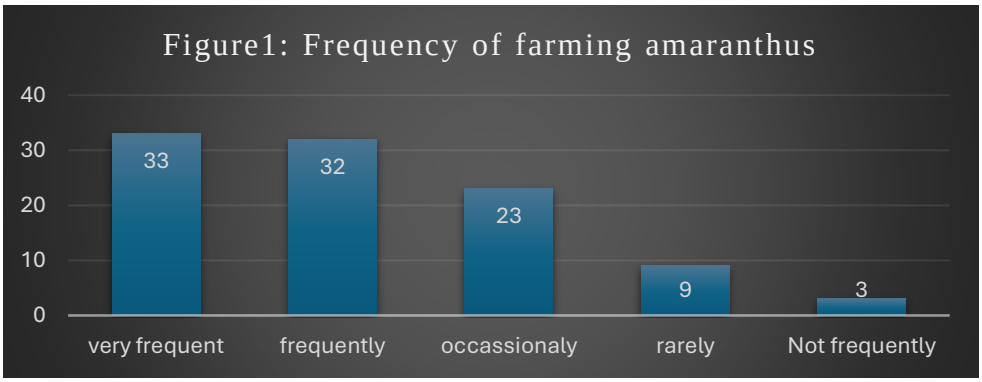
The result in Table 2 revealed the poverty status of respondents. The amaranthus farmers' poverty status in the study area were analyzed using FGT. The three indicators used are incidence of poverty (P0), poverty depth (P1) and severity of poverty (P2). The incidence of poverty indicates the percentages of households that falls below the poverty line, poverty depth indicates the amount by which the poor fall short of the poverty line while the severity of poverty shows the sum of square of poverty depth divided by the number of poor households in the sample. The result shows that the total per capital expenditure per year was ₦ 22,591,331.78 while the mean per capital expenditure per year was ₦ 99,084.79. The poverty line used was ₦ 66,056.53 which is defined as the two-third (2/3) of the mean value of per capita expenditure in the study area. The farmers were therefore categorized in poor if he or she spend below ₦ 66,056.53 in a year, otherwise the farmer is non-poor. The poverty incidence among the respondents in the study area was 0.42 representing that 42% of the respondents with consumption expenditure level below the poverty line. The poverty depth was 0.19 representing that 19% of respondents whose average consumption expenditure was below the poverty line. This implies that, the gap which represent the percentage of expenditure required to bring poor respondents below the poverty line up to the level of poverty line was 19%. The severity of the poverty index was 0.13 which represent that 13% of the poorest respondent among the poor. This implies that they required assistance from Governments and stakeholders as the incidence postharvest loss has infringed deep into their livelihood status leaving them in the mist of poverty severity. This finding corroborates with the report of Ademiluyi (2018) who affirmed that poverty ravage farming household in Zangon-Kataf Local Government Area of Kaduna State as farmers Income was not sufficient to meet annual consumption expenditure of farmers in the study area.

Table 2: Analysis of Poverty Status of Amaranthus farmers

Poverty Indices		**FGT Value**
Poverty Incidences (P0)		0.42
Poverty Gap (P1)		0.19
Poverty Severity (P2)		0.13
Mean Per capital Expenditure per year	₦ 99,084.79	
Mean Per capital Expenditure per month	₦ 8,257.07	
Poverty line	₦ 66,056.53	

Source: Field Survey, 2024

The result in figure 1 shows the frequency of farming amaranthus in the study area. The result revealed that 33% of the respondents were very frequently engaged farming amaranthus, while 32% were frequently involved. This indicates that, postharvest activities will be sufficiently required as most of the respondents were significantly involve in production of this leafy vegetable.



The result in Table 3 shows the constraints to Amaranthus postharvest activities in Niger State. From the table, the result shows that limited extension service was ranked 1st as the constraint to Amaranthus postharvest activities, followed by Price differential of substitute leaves, cost of transportation, Substitute vegetables to Amaranthus, Poor storage method, Distance from market and Consumers preference which were all ranked 2nd, 3rd, 4th, 5th , 6th and 7th respectively. This implies that prices differential of substitute vegetables and cost of transportation were very severe constraint to postharvest activities. Furthermore, poor storage method of this vegetable is also reported to be a severe constraint limiting the postharvest activities hence is directly affect the poverty status of the respondents in the study area.

Title 3: Constraints to Amaranthus Postharvest Activities in Niger State

Parameters	Very Severe	Severe	Undecided	Not very Severe	Not Severe	Weighted mean	Weighted Sum	Rank
Limited Extension Services	81(81.0)	16(16.0)	2(2.0)	1(1.0)	NA	4.77	477	1ST
Price differential of substitute vegetables	76(76.0)	19(19.0)	4(4.0)	1(1.0)	NA	4.70	470	2ND
Cost of transportation	64(64.0)	29(29.0)	6(6.0)	1(1.0)	NA	4.56	456	3RD
Substitute leaves to Amaranthus	59(59.0)	30(30.0)	5(5.0)	6(6.0)	NA	4.42	442	4TH
Poor storage method	48(48.0)	42(42.0)	5(5.0)	5(5.0)	NA	4.33	433	5TH
Distance from market	35(35.0)	54(54.0)	8(8.0)	3(3.0)	NA	4.21	421	6TH
Consumers preference	35(35.0)	45(45.0)	12(12.0)	7(7.0)	1(1.0)	4.06	406	7TH

Source: Field Survey, 2024

CONCLUSION

The study therefore concludes that Amaranthus farmers were within their active age, education with at least primary school certificate, with household of equal and less than 10, and a mean annual income of 710,307 naira. The study further concludes that the postharvest activities of Amaranthus farmers is affected by limited extension services, price of substitute leaves, cost of transportation, poor storage handling among others.

RECOMMENDATIONS

The study recommends that Government and Non-Governmental Agencies should assist the leafy vegetable farmers/processors with modern processing equipment to help improve Amaranthus processing. Then the government should see to the problem of cost of transportation of this leafy vegetable from the farm gate to the market. Also, farmers should be encouraged and supported in way or the other through incentives to enhance their production and eventually reduce their poverty status

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