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Effects of Post-Harvest Losses on the Welfare of Yam Farmers in Ebonyi State, Nigeria

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ABSTRACT
The study determined the effect of the post-harvest losses on the welfare of yam farmers in Ebonyi State, Nigeria. A multistage random sampling procedure was used to select a sample size of one hundred and fifty (150) farmers for the study. Data collection was through a structured questionnaire, and analyzed using descriptive statistics, such as frequency distribution, percentages, mean, and Ordinary Least Square Regression Model. The findings revealed that males (58.7%) were more involved in yam production than females (41.3%), with a mean age of 50years and a mean household size of 6 persons. Also, the mean educational level was 12 years, while the mean farming experience was 20 years. The result revealed also that post-harvest loss of yam affected access to good healthcare services (x =2.2), access to education (x = 2.1), and reduced profit margin and household income (x = 2.0), The grand mean was 1.7. The study recommended among others; that farmers should be educated and enlightened on proper harvesting methods for yam; Agricultural extension agents should communicate knowledge on modern yam storage methods to yam farmers in the area; Also, the Government and private investors should take business opportunity by building yam flour processing factories which will reduce post-harvest losses of yams and increase the economic value of yams in the study area. This will invariably raise the profit margin of yam farmers and consequently improve the welfare of their households.
Keywords: Effects, Post-Harvest Losses, Welfare, Yam Farmers

INTRODUICION

Post-harvest losses could be diverse and could range from losses through handling and storage to marketing and/or consumption (Kitinoga, 2013). The farmers invest in food crop production, expecting to make some profit at the end of harvest, but their expectations are often bashed due to post-harvest losses. They are hence not able to afford the necessities of life. The production of most agricultural food crops like yam is capital intensive. Post-harvest losses of yam are one of the major challenges confronting yam farmers in Nigeria. Considering the fact that majority of the yam farmers in Nigeria are small scale holders and more than 90 % of their livelihoods are dependent

on crop farming. As much as 60% of farming households in Nigeria engage in yam cultivation, not only as a means of household food supply, but also as a primary source of income through marketing surplus ware and seed yams. (Izekor and Olumese, 2010, IITA, 2013).

Despite high cost of yam production and price fluctuations in the markets, yam cultivation seems to be profitable for yam farming households. Post-harvest losses of yams in Nigeria however, is notably high, about 20% to 67% (Gernah*et al*; 2013) or 40% to 50% (FAO 2010, Sanginga, and IITA.,2015). In Nigeria, poor storage methods seem to be the predominant reason for post-harvest losses of yams among all the factors found to be responsible for losses of yams. According to Adamu, (2014), about 20-30% of post-harvest losses of yam result from poor storage. Generally, storage practices remain rudimentary and traditional and causes about30% of both physical and economic losses of yam value chain actors, especially for those yam farmers who engage in yam business as a primary source of income. When losses of yam occur in yam farming households, there can be serious implications for the welfare of the households. In terms of the effect of post-harvest losses of yam on the welfare of yam farming households, Okoedo-Okojie, and Onemolease, (2009); and Verter, and Becvarova, (2015), have all observed that yam post-harvest losses reduce the profit margin of yam farming households. This loss directly affects the income of these farm households, and invariably economic capacity which could have enabled them to improve their welfare by being able to attend to their domestic needs like: access to adequate health care services, access to good housing, access to quality education and other basic domestic needs.

The objectives of the study were to, analyze the factors affecting post-harvest losses of yam, and also determine the effect of post-harvest losses on the welfare of yam farmers in Ebonyi State Nigeria.

METHODOLOGY

The study was carried out in Ebonyi State. A multi-stage random sampling procedure was used in the study. Three (3) agricultural zones namely; Ebonyi North, Ebonyi Central and Ebonyi South were chosen in the first stage. In the second stage, two (2) yam producing Local Government Areas were randomly selected from each of the zones in the study area, giving a total of six (6) LGAs out of the thirteen LGAs in the State. In the third stage, two (2) communities were selected from each of the LGAs, to give a total of twelve (12) communities. Finally, in the fourth stage, twelve (12) respondents were randomly selected from ten (10) communities and fifteen (15) farmers were randomly chosen purposely from two (2) communities to give a sample size of one hundred and fifty (150) respondents. The data for the study were collected through the use of structured questionnaires which were administered to both illiterate and literate yam farmers.

Analytical Technique

The socio-economic characteristics of the farmers were analyzed using descriptive statistical tool, a Likert-type scale was used to measure the effect of post-harvest losses of yam on the welfare of the farmers while Ordinary Least Square Regression Model was used in analyzing the factors influencing yam post-harvest losses among farmers.

The model is specified as follows:

$$Y=f(X_1,X_2,X_3,X_4,X_5,X_6,X_7+ei)$$

Where,

Y= Post-harvest loss of yam (Naira)

X_1 = cost of mounds (Naira)

X_2 = cost of fertilizer application (Naira)

X_3= cost of weeding (Naira)

X_4 = cost of harvesting (Naira)

X_5= cost of transportation (Naira)

X_7 = cost of marketing (Naira)

Ei = error terms

A3 point Likert-type scale was used to measure the effect of post-harvest losses of yam on the welfare. The3 point Likert-type scale had legends ranging from A =3, NA=2 and NAA = 1.
Where,
A = Always
NA = Not Always
NAA = Not At All
The mean cut off was obtained thus;
3+2+1=6/3 =2n

RESULTS AND DISCUSSION

The result on Table 1 showed that males (58.7%) were more involved in yam production than females (41.3%). This exception is more inherent with the activities associated with yam production like clearing, making of mounds, staking, harvesting etc. The result also showed that majority (78.0%) of the yam farmers were married, 14.7% of them were single and only 7.3% of them were widowed. This implies that more couples were among the households that are involved in yam production in Ebonyi State. This may reduce the cost of labour since more of family labour might be used and this can in turn reduce post-harvest losses in yam production. Olawuyi and Rahji (2012) revealed that cooperation of couples reduces post-harvest losses thereby contributing to the household income, and absence of one of the household heads influenced household decision-making.

Table 1 equally showed that 14.7% of the farmers were less than 30 years of age, 28% of them were within the age range of 31-45 years, 41.3% of the farmers were within the age range of 46-65 years, 15.3% were within the age range of 56-65 years, and 0.7% of them were above 65 years with the mean age of 50years. This implies that majority of the yam farmers were in their mid-ages and are still active in production activities. This is in agreement with the findings of Mohammed *et al.,* (2014) that stated similar age bracket of 30-50 years in their study. Age influences the decision-making process of household heads with respect to strategies to adopt in order to reduce post-harvest losses.

The result also revealed that 26% of the yam farmers have a household size of 1-3 persons, 47.3% of them have household size of 4-6 persons and 26.7% of them have household size of 7-9 persons with a mean household size of 6 persons. Greater household size provides labour needs in farming activities. This result agrees with the findings of Tania (2013), who noted that rural households rely more on members of their household for labour supply.

The result revealed also that 13% of the yam farmers attended primary education, 23.3%, 41.3%, and 34% of them attended junior secondary, senior secondary 34% and tertiary education respectively. The mean educational level was 12 years. This implies that majority of the yam farmers were literates and can take productive decisions on farm as it concerns post-harvest losses of yam. According to Bayissa (2010), ability to write and read is important for farmers to participate in farming activities because it increases the ability to acquire and effectively use the available information and resources.

The result also showed that 21.3% of the farmers had 1-10 years of farming experience, 54.7%, 23.3% and 0.7% had 11-20 years, 21-30 years, 31-40 years farming experience respectively. The mean farming experience was 20 years. This implies that the yam farmers in the study area were experienced farmers. Farming experience has effect on farming decisions made by the yam farmers regarding post-harvest losses. This can in turn increase productivity of yam thereby increasing the farming income of the farmers.

Table 1: Distribution of the Respondents according to their Socio-economic Characteristics

Variable Frequency		Percentage	Mean Gender
Female	62	41.3	
Male	88	58.7	
Total	**150**	**100.0**	
Marital Status			
Married	117	78.0	
Single	22	14.7	
Widowed	11	7.3	
Total	**150**	**100.0**	
Age			
<30	22	14.7	50years
31-45	42	28.0	
46-55	62	41.3	
56-65	23	15.3	
>65	1	0.7	
Total	**150**	**100.0**	
Household Size			
1-3	39	26.0	6 Persons
4-6	71	47.3	
7-9	40	26.7	
Total	**150**	**100.0**	
Level of Education			
Primary	2	13	12 Years
Junior Secondary	35	23.3	
Senior Secondary	62	41.3	
Tertiary	51	34.0	
None	-	-	
Total	**150**	**100.0**	
Farming Experience			
1-10	32	21.3	20 Years
11-20	82	54.7	
21-30	35	23.3	
31-40	1	0.7	
>41	-	-	
Total	**150**	**1000.**	

Source: Field Survey,2019

In table 2, the Factors Affecting Post-harvest Loss in Yam was analyzed using Ordinary least square regression model. The four functional forms of the regression model were tried. The lead equation was chosen to be semi-log function; this is because of the high R^2 value, the signs and levels of the significant variables. The coefficient of determination R^2 was 0.715 implying that 71.5% of the variation in the independent variables were accounted for by the dependent variables. The f-statistics value was significant at 1% implying the fitness of the model. From the result, the coefficient of the cost of mounds was significant at 10% level and was directly related to post-harvest losses of yam. This implies that the higher the cost of mounds, the higher the post-harvest loss of yam. This is because rural farmers would want to minimize cost in order to maximize profit. A farmer would prefer making mounds at the minimal cost than spending higher in it not minding the size and depth of the mounds for good yam production. The cost of fertilizer application was significant at 1% level of probability and was positively related to post-harvest losses. This implies that the higher the cost of fertilizer application, the more post-harvest loss of yam would be recorded and vice versa. The coefficient of the cost of transportation was significant and directly related to the post-harvest losses of yam. The effect of transportation cost on post-harvest loss on

yam cannot be overemphasized. High transportation cost in southeast due to poor road networks is a major factor affecting yam farmers, overloading vehicle during loading of yam could cause serious post-harvest loss in yam. Farmers would prefer to pay less on transportation and overload the vehicle than to pay more, thus the higher the transportation cost, the higher the post-harvest loss. This finding is in agreement with Lisa and James, (1999) who reported that overloading of vehicles, lack of adequate ventilation during transport and rough handling during loading are the causes of post-harvest loss in yam during transportation. The constant was significant at 1% level implying the overall significant and fitness of the model.

Table 2: The Factors Affecting Post-harvest Losses in Yam

Variable	Linear	Semi-log	Exponential	Double-Log
Constant	35605.0 (-2.918)	.125 (83.975) ***	403676.59 (-4.842) ***	1.507(.765)
Cost of mounds	.076 (1.118)	.093 (1.727)*	.055 (.621)	.087(1.124)
Cost of fertilizer application	.494 (6.468)***	.546 (8.951)***	-.024 (-.262)	.198(2.274)**
Cost of weeding	.035 (.513)	.025 (.448)	-.226 (-2.147)**	-.254 (-2.743)**
Cost of harvesting	-.115 (-1.693)	-.062 (-1.131)	.413 (4.213)***	.545(6.326)***
Transportation cost	.185 (2.454)**	.269 (4.465)***	.204 (2.299)**	.248(3.180)***
Marketing cost	.069 (1.167)	.063 (1.336)	.0132 (.629)	
F-stat	25.367***	51.236***	6.804***	15.555***
R-adjusted	.532	.701	.194	.376
R^2	.554	.715	.227	.402

Source: Field Survey 2019

Table 3 showed the means of a 3-point Likert-type scale used to measure the effect of post-harvest losses of yam on the welfare of the farmers. The cut-off mean was 2.0, implying that any mean that is above 2.0 will be considered a factor affecting the welfare of the farmers and any mean score below 2.0 will be considered not a factor affecting the welfare of farmers. From the result, post-harvest loss of yam affected access to good healthcare services (x =2.2), reduced profit margin and household income (x = 2.0). There is no gain saying that, income is a primary determinant of welfare of households, because it determines their purchasing power and/or access to domestic necessities such as: quality food and good health care service. This finding is consistent with that of (Halam*et al.*, 2017) that, there is a significant positive relationship between income and standard of living of households. It affected access to good healthcare services (x =2.2), and also has an effect on the access to education (x = 2.1). The grand mean is 1.7, which implies that post-harvest loss of yam affected the welfare of the yam farmers negatively. This finding also corroborates with the finding of (Okoedo-Okojie*et al., 2009*), who established from their study on factors affecting adoption of yam storage technologies in Edo State, that post-harvest losses of yams reduces the profit margin of yam farming households and invariably have negative impact on their income and economic capacity to ensure a good standard of living.

Table 3: Distribution of the Respondents according to Effect of Post-harvest Losses on the Welfare of the Yam Farmers

S/N	Variables	Mean	Std. deviation
1.	Affect access to good healthcare services	2.240	.974
2.	Reduces profit margin and household income	2.000	.000
3.	Affect access to good housing or residence	1.706	.871
4.	Affect access to education	2.126	.943
5.	Affect access to quality food	1.460	.563
	Grand mean	**1.699**	

Source: Field Survey, 2019

CONCLUSION

This study analyzed the effects of post-harvest losses on the welfare of yam farmers in Ebonyi State, Nigeria. These post-harvest losses were directly attributed to a number of factors, particularly, the use of poor yam harvesting methods, the activities of animals and pest attacks on the yams, lack of storage facilities, lack of transportation facilities, lack of processing and unavailability of market. The results revealed that post-harvest losses reduced household income in the area. It equally affected their access to health care services, education, good housing, access to sufficient quality food and their overall welfare. It is therefore recommended that Farmers should be educated and enlightened on proper harvesting methods for yam. Also, agricultural extension agents should communicate knowledge on modern yam storage methods to yam farmers in the area. The Government and private investors should take business opportunity by building yam flour processing factories in the study area, to provide a ready yam market that will reduce post-harvest losses of yams and increase the economic value of yams. This will invariably raise the profit margin of yam farmers and consequently improve the welfare of their households.

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