ANALYSIS OF YAM VALUE CHAIN IN PAIKORO LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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ABSTRACT

The study analyzed yam value chain in Paikoro Local Government Areas of Niger State, Nigeria. A multi-stage sampling technique was used to select actors for the study. First stage involved purposive selection of Paikoro LGA of Zone B due to their prevalence in yam production and marketing. The second stage involved random selection of five villages from the LGA while the third stage involved random selection of 100 producers, 25 processors, 25 wholesalers and 25 retailers from the selected villages. Data collected were analyzed using descriptive and inferential statistics. The results showed the mean age of various actors, producers 43, wholesalers 37, retailers 35 and processors 40 years respectively. From which 99.0%, 88.0%, and 64.0% were male respectively, while 64.0% of processors were female. Majority of the actors had formal education with a mean farming experience of 9.5, 13, 9, and 11 years respectively. The OLS analysis revealed the coefficient age of producers (0.005), household size (0.013), educational level (0.009), farming experience (0.401) and credit availability (6.44e) were statistically significant at 0.10 and 0.01 probability level respectively while wholesalers had coefficient of educational level (2795.015), labour input supplied (3124.298) and credit (13.150) were statistically significant at 0.10 and 0.01 probability level. The retailers education level coefficient (25129.64), experience (3245.863), labour input (6219.373) and cost of transportation (5.798) were significant at 0.10, 0.05, 0.01 probability level. Furthermore, processing experience (10.073), educational level (2300.661) and labour input (2795.015) were significant at 0.10 and 0.01 probability level. The above affect value added by their various actors respectively in the study area. Constraints to yam production include pest and disease, inadequate finance and transportation. The study therefore recommends that actors in the yam value chain should form cooperative societies to access finance and government should provide efficient road network system to facilitate transportation.

Key word: Value chain, Actors, Value addition

INTRODUCTION

Agriculture is a major and strategic component of the Nigerian economy contributing between 19.65% and 26.63% to real GDP in 2014 (Ezeano, 2015). Crop production constituted an important activity in the agriculture sector and the main driver of growth contributing between 85.39% and 90.13% between first quarter and third quarter in 2014 (Ezeano, 2015). Only yam and cassava among all other food crops are producing at a level of comparative advantage in Nigeria (Ibitoye *et al.*, 2013).

Yam is a tuberous crop that belongs to the family of Dioscoreaceae. It is an energy-giving food that is widely accepted. A thick tropical vine-tuber, it is native to warmer region hemispheres and popular in Africa, West Indies, parts of Asia and South-Central America (Offor *et al.,* 2016).

Nigeria which is a tropical country is one of the highest yam producers of yam in the world. Recent world data showed that Nigeria accounts for 65% of the total world production; about 38 million metric ton which is cultivated on 2.9 million-ha cultivated area of land in 2012 and valued at $7.75 billion (Odigbo *et al.,* 2015).

Yam is considered an important energy giving staple food in Nigeria as in other parts of the tropics. It constitutes an important source of food and income and plays a major role in the socio-cultural life of many smallholder households. It ranks second after cassava among roots and tubers (Odigbo *et al.,* 2015). In the West African sub-region, yam has the potential to alleviate poverty and ensure food security among rural producers, traders, processors and consumers (Offor *et al.,* 2016). Its tubers can be eaten in different forms, ranging from roasting, boiling, frying, pounding into paste as well as processing into yam flour which can be eaten with soup. Its peels can also be processed into livestock feed. Hence it is considered an important staple to combat food insecurity in areas where it is cultivated.

Value chain is a line of activities carried out to add value to a product, it involves the various processes a yam goes through before getting to the final consumer which are basically from producer, to the supplier, down to the consumer and its disposal after use. The thoughts of value chain therefore are lifted to wide-reaching change in agriculture and food security and it is now demand-driven, that is, there has been a shift from production in agriculture to consumer demand, marketing and coordination of production flows from producer to consumer (Amaza and Maurice, 2015). Yam value chain shares light on the fact that production must have a linkage to demand.

Despite the contribution of yam to the human diet, its value chain is in the hands of smallholder farmers who are resource poor and as such, cannot afford all it takes to boost the sector. These actors are constrained with diverse problems that range from production to marketing. However, research on yam has focused more on pre-production issues to the neglect of post-harvest issues like processing, marketing and consumer demand. Robert *et al.* (2012) stated that in developing countries with Nigeria inclusive, more emphasis is usually placed on policies to increase food production with little or no consideration given to the efficient distribution of the food produced in a manner that will enhance increased productivity. Food marketing by farmers and traders, mostly in the immediate post-harvest period, usually involves huge costs in Nigeria. For yam, lowering the costs through an efficient marketing system may be as important as increasing yam production. Hence the broad objective of the study was to analyze the yam value chain in Paikoro Local Government Area (LGA) of Niger State. Specifically, the study (i) describes the socio-economic characteristics of the different actors along the yam value chain, (ii) analyzes the factors affecting the total value added by different actors in the yam value chain and lastly identifies the constraints faced by yam producers in the study area.

MATERIALS AND METHODS

The study was carried out in Paikoro LGA of Niger State, Nigeria. Paikoro LGA is located at latitude 3°320E and longitude 10°30′N. The area has a land mass of 2066 km^2. It has a population of 158,086 people (NPC, 2006). The people of Paikoro are Hausa and Nupe speaking people and farming is one of their major occupations. A multi-stage sampling technique was used to select the actors for the study. Stage one involved the purposive selection of Paikoro Local Government Area of Zone B due to the prevalence of yam production and marketing in the Local Government. The second stage involved the random selection of five (5) registered villages under Niger State Agricultural Mechanization and Development Agency (MAMDA) from the LGA while the third stage involved the random selection of 100 producers, 25 processors, 25 wholesalers and 25 retailers (marketers) from the selected registered villages under NAMDA. The data for the study were collected with the aid of a structured questionnaire. Objective I and III were analyzed using descriptive statistics while objective II was analyzed using Ordinary Least Square (OLS).

Multiple Regression Analysis

This analytical tool was used to achieve objective ii. The profit margin realized by various actors were influenced by some specific variables. The Ordinary Least Squares (OLS) multiple regression analysis was used in examining those variables that influence the various actors in the yam value chain in the study area. The models are clearly specified:

Producers:

Model:

$Y_{ij} = f(X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, X_{8i}, X_{9i}, X_{10i}, X_{11i}, X_{12i}, X_{13i}, X_{14i}, X_{15i}, X_{16i}, U)$

Where;

Y_{ij}= Total value addition on yam by i^{th} respondent in the j^{th} period;(defined as the selling price less purchase price)

X_{1i}= Age of i^{th} respondent (in years),

X_{2i} = Sex of i^{th} respondent (Binary Variable: Male = 1, Female = 0),

X_{3i} = Household size of i^{th} respondent (No. of persons),

X_{4i} = Education level of i^{th} respondent (measured in actual number of years spent in school),

X_{5i} = Years of farming experience of i^{th} respondent (number of years in the activity),

X_{6i} = Labour input supplied by i^{th} respondent (man-days),

X_{7i} = Fertilizer cost (kg)

X_{8i} = Cost of agrochemicals (₦),

X_{9i}= Cost of yam root cuttings (₦),

X_{10i} = Cost of harvesting and transportation

X_{11i}= Capital inputs (includes depreciation on fixed input) (₦),

X_{12i} = Credit availability of ith respondent (received amount in Naira)

X_{13i} = Membership of association of i^{th} respondent (Dummy variable; member = 1, non-member = 0)

X_{14i} = Distance to the market (km)

X_{15i} = Access to market information by i^{th} respondent (Dummy variable; access = 1, non-access = 0)

X_{16i} = Size of the farm (in hectares)

U = standard error

Processors:

Processors model;

$Y_{ij} = f(X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, X_{8i}, X_{9i}, X_{10i}, U)$

Where;

Y_{ij}= Total value addition on yam by i^{th} respondent in the j^{th} period;(defined as the selling price less purchase price)

X_{1i} = Age of i^{th} respondent (in years),

X_{2i} = Household size of i^{th} respondent (No. of persons),

X_{3i} = Years of experience of i^{th} respondent (number of years in the activity),

X_{4i} = Education level of i^{th} respondent (measured in actual number of years spent in school),

X_{5i} = Labour input supplied by i^{th} respondent (man-days),

X_{6i} = Transportation cost (₦),

X_{7i} = Depreciation (₦),

X_{8i} = Distance to the market (km)

X_{9i} = Cost of yam root cuttings (₦)

X_{10i} = Credit availability of i^{th} respondent (received amount in Naira)

U = standard error

Wholesalers:

Wholesalers' model;

$Y_{ij} = f(X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, X_{8i}, X_{9i}, X_{10i}, U)$

Where;

Y_{ij}= Total value addition on yam by i^{th} respondent in the j^{th} period;(defined as the selling price less purchase price)

X_{1i} = Age of i^{th} respondent (in years),

X_{2i} = Gender of i^{th} respondent (Binary Variable: Male = 1, Female = 0),

X_{3i} = Household size of i^{th} respondent (No. of persons),

X_{4i} = Education level of i^{th} respondent (measured in actual number of years spent in school),

X_{5i} = Years of experience of i^{th} respondent (number of years in the activity),

X_{6i} = Labour input supplied by i^{th} respondent (man days),

X_{7i} = Cost of haulage (₦),

X_{8i} = Transportation cost (₦)

X_{9i} = Credit availability of i^{th} respondent (received amount in Naira)

X_{10i} = Distance to the market (km)

U = standard error

Retailers:

Retailers' model;

$Y_{ij} = f(X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, X_{8i}, X_{9i}, U)$

Where;

Y_{ij}= Total value addition on yam by i^{th} respondent in the j^{th} period;(defined as the selling price less purchase price)

X_{1i} = Age of i^{th} respondent (in years),

X_{2i} = Sex of i^{th} respondent (Binary Variable: Male = 1, Female = 0),

X_{3i} = Household size of i^{th} respondent (No. of persons),

X_{4i} = Education level of i^{th} respondent (measured in actual number of years spent in school),

X_{5i} = Years of experience of i^{th} respondent (number of years in the activity),

X_{6i} = Labour input supplied by i^{th} respondent (man days),

X_{7i} = Transportation cost (₦)

X_{8i} = Credit availability of i^{th} respondent (received amount in Naira)

X_{9i} = Distance to the market (km)

U = standard error

RESULTS AND DISCUSSIONS

Socio-economic characteristics of the various Actors

Age

The results in Table 1 revealed that majority (54.0%) of the yam producers were between the age of 41- 50 years, 19.0% of the sampled producers were between 31 – 40 years, 415.0% were above 50 years while 12,0% of the producers were between 21 – 30 years. The mean age of the sampled producers was 43 years. This implies that yam producers in the study area were within the youthful age group regarded as economically active, innovative, productive and are still energetic to carry on with yam production. This is in line with the findings of Ibitoye, Stephen and Onimisi (2013), in their study conducted on Economic assessment of yam production in Kabba Bunu Local Government Area of Kogi State, Nigeria.

The results in Table 1 further revealed that majority (48.0%) of the sampled wholesalers were within the age bracket of 31- 40 years, 32.0% of the respondents were within the age bracket of 41 – 50 years, while 20.0% of the sampled wholesalers were within the age bracket of 21 – 30 years. The mean age of the respondents was 37 years. This implies that the sampled wholesalers in the study area were young, vibrant, agile, active, and still energetic to carry on with the strenuous nature of the enterprise activities. This corroborates with the findings of Asogwa, Ezhihe and Alter, (2013) in their work on socio – economic analysis of yam wholesalers in Benue State, Nigeria.

The results in Table 1 also revealed that the mean age of the sampled retailers was 35 years. 40.0% of the retailers were between 31- 40 years, 32.0% of the respondents were between 21 – 30 years, while 28.0% of the sampled retailers were between 41 – 50 years. The mean age of 37 years implies that the sampled retailers in the study area were young, and energetic to carry out the business aggressiveness involved in retailing, such as day to day buying and direct selling activities. This is in consonance with the findings of Odigbo *et al.* (2015) who reported in their study that majority (40%) of the sampled retailers are within the active age.

Result from Table 1 further revealed that majority (44.0%) of the yam processors were between 31 - 40years, which means that bulk of the respondents are within the active age, 36.0% are within the age of 41-50 years, 12.0% of the sampled processors were above 50 years, while 8.0% of the producers were between 21 – 30 years. The mean age of the yam processors was 40 years. This implies that the respondents were young and energetic, within the productive age which could increase their yam processing activities and will be able to use resources efficiently. This is in agreement with earlier studies by Nwosu and Okon (2013) who revealed that most (70.0%) of tuber processors are between 26 and 45 years

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Table 1: Distribution of actors according to age, gender, marital status and household size

Variable	Producers Frequency and Percentage	Wholesalers Frequency and Percentage	Retailers Frequency and Percentage	Processors Frequency and percentage
Age range (years)				
21 – 30yrs	12 (12.0)	5 (20.0)	8 (32.0)	2 (8.0)
31 – 40yrs	19 (19.0)	12 (48.0)	10 (40.0)	11 (44.0)
41 – 50yrs	54 (54.0)	8 (32.0)	7 (28.0)	9 (36.0)
Above 50yrs	15 (15.0)	-	-	3 (12.0)
Mean	43	37	35	40
Gender				
Male	99 (99.0)	22 (88.0)	16 (64.0)	9 (36.0)
Female	1 (1.0)	3 (12.0)	9 (36.0)	16 (64.0)

Note: Figures in parenthesis ( ) are the respective percentages.

Gender

The finding in Table 1 shows the gender of the yam producers in the study area with the majority (99.0%) representing male, while 1.0% were females. This implies that the yam production in the study area was dominated by the male folks. The dominance of male in the study area may be due to the fact that the production of yam is male gender biased and the female gender may participate largely in complementary farm operations like planting, harvesting and processing. This finding is in line with that of Ayodeji *et al*. (2014) which stated that majority of the cowpea farmers were males, implying that production in the study area is male gender bias.

The result in Table 1 further revealed that the majority (88.0%) of the sampled wholesalers were male while only 12.0% were females. This implies that the majority of the yam wholesalers were men. This may be as a result of the strenuous nature of loading and unloading involved in yam whole-selling which demands much physical energy. This finding agrees with the work of Asala and Ebukiba (2016) who reported that wholesalers were male dominated as indicated by 83.3% of the sampled

respondents in a similar study in southern guinea savanna zone of Nigeria.

The finding in Table 1 further revealed the gender of the sampled retailers with the majority (64.0%) representing male, while 36.0% were females. The dominance of male may be due to the sociocultural factors in the study area that limits participation to complementary farm operations like planting, harvesting and processing.

The result in Table 1 further revealed that the majority (64.0%) of the yam processors were female while 36.0% of the sampled processors were male. This implies that the majority of the yam processors were women. The dominance of females in the study area implies that women participate largely in complementary farm operations like planting, harvesting and processing. This is in consonance with the findings of Odigbo *et al.* (2015) who reported in their study that processing of agricultural produce such as yam is performed mostly by women.

Educational level

Educational status refers to the position individuals have attained in acquiring knowledge, skill, and experience through teaching and learning process. The result in Table 2 shows the educational level of the yam producers in the study area. Majority (75.0%) of the sampled producers had one form of formal education or the other while 25.0% of the producers 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).

Table 2: Distribution of actors according to educational level, experience, access to credit, cooperative society and access to market information

Variable	Producers Frequency and Percentage	Wholesalers Frequency and Percentage	Retailers Frequency and Percentage	Processors Frequency and percentage
Educational level				
Non-formal	25 (25.0)	5 (20.0)	6 (24.0)	-
Primary	18 (18.0)	5 (20.0)	2 (8.0)	5 (20.0)
Secondary	33 (33.0)	7 (28.0)	6 (24.0)	8 (32.0)
Tertiary	24 (24.0)	8 (32.0)	11 (44.0)	12 (48.0)
Experience (years)				
1 – 10yrs	67 (67.0)	12 (48.0)	15 (60.0)	14 (56.0)
11 – 20yrs	26 (26.0)	10 (40.0)	10 (40.0)	11 (44.0)
Above 20yrs	7 (7.0)	3 (12.0)	-	-
Mean	9.5	13	9	11

Note: Figures in parenthesis ( ) are the respective percentages.

The result in Table 2 revealed the educational level of the sampled wholesalers in the study area with the majority (80.0%) having formal education, and 20.0% of the sampled respondents had no formal education. This implies that the enterprise in the study area is dominated by literate individuals. This has implications which can facilitate the logistic

aspect of the enterprise which in this translates to increase in income. This is in line with the findings of Ekine and Onu (2008).

The findings in Table 2 revealed the educational level of the sampled retailers with majority (76.0%) having formal education, and 24.0% of the sampled respondents had no formal education.

The result in Table 2 further revealed the educational level of the yam processors in the study area. Majority (80.0%) of the processors had one form of formal education or the other while 20.0% of the sampled respondents had no formal education. It implies that the majority of the processors are literate. The level of education affects the type of decision taken in agricultural processing and determines the level of opportunities available to improve livelihood strategies and managerial capacity in yam processing (Robert *et al.,* 2012). The finding of this study agrees with the findings of Amaza and Maurice, (2015) who reported that education enhances productivity among rice processors.

Experience

Farming experience is the number of years spent in farming. The result of Table 2 shows the farming experience of the yam producers with a mean of 9.5 years. The outcome shows that the majority (67.0%) of the producers had 1-10 years of experience, 26.0% had 11 – 20 years of farming experience while 7.0% of the sampled producers had above 20 years of farming experience. This indicates that most of the producers in the study area have adequate farming experience in yam production and know how to use resources efficiently. Experience enables the farmers to set realistic targets. Experience however goes with longevity. This finding is in consonance with the reports of (Augustine and Emmanuel, 2011; Godson-Ibeji *et al.,* 2016).

The results in Table 2 revealed that 48.0% of the sampled wholesalers had 1-10 years' experience in the enterprise, 40.0% of the respondents had 11-20 years, while 12.0% of the sampled wholesalers had above 20 years in the enterprise. The mean experience of the sampled respondents was 13 years. This indicates that most of the wholesalers in the study area were experienced and knew how to handle the logistics aspect of the enterprise efficiently, as well as providing the utility needed by the goods at the adequate time and place respectively. This is in line with the findings of Simoyan and Obiakor (2012), who asserted that experienced wholesalers are capable of providing all the forms of utilities needed by agricultural produce.

The findings in Table 2 revealed that the majority (60.0%) of the sampled retailers had 1-10 years of experience, and 40.0% of the sampled respondents had between 11-20 years of experience. The mean experience of the sampled retailers was 9 years. This indicates that most of the sampled respondents in the study area were experienced and know how to handle the tasks and challenges involved in day to day buying and selling. This corroborates with the findings of Asogwa *et al.* (2013).

Table 2 further revealed that the majority (56.0%) of the yam processors had 1-10 years of processing experience, while 44.0% of the sampled respondents had 11-20 years of yam processing experience. The mean processing experience of the sampled processors was 11 years. This indicates that most of the yam processors in the study area were experienced and know how to use resources efficiently and also handle processing problems which in this leads to increase in output. This finding is in conformity with the reports of

Augustine and Emmanuel, (2011) which revealed that high experience in groundnut processing can raise productivity.

Factors affecting the Value added by different Actors in the Study Area

Factors affecting the Total Value added by the Producers in the Study Area

Results in Table 3 showed that the exponential functional form was selected as the lead equation. It had an R- square (R^{2}) value of 0.7507 which indicates 75.07% of the variation in the value added by producers was accounted for by the explanatory variables included in the model. The F-value of 16.86 was also statistically significant at 0.01 probability level. This implies that the explanatory variables included in the model adequately explained the dependent variable.

Out of the variables included in the model, five were significant at explaining the value added by producers. The result showed that the coefficient of X_1 (age) was 0.005, and significant at 0.10 probability level. This implies that as age of the producers' increases, the value added also increases since the producers will be more experienced and knows how to use resources efficiently and also knows how to handle production problems. The results corroborate with the findings of Ekunwe *et al.* (2008), who noted that age is positively significant at explaining the value added by producers.

The coefficient of X_3 (household size) was 0.013, and found to be statistically significant at 0.10 probability level. This implies that as household size increases, the value added also increases. This is in consonance with the findings of Offor *et al.* (2016) who asserted that household size is positively significant at explaining the value added by producers. Educational level (X_4) was positively signed and significant at 0.10 probability level. The estimated regression coefficient with respect to education was 0.009. This implies that an increase in the number of years spent in school by the producers will also increase the value added by the farmers. This may be attributed to the fact that respondents with higher qualification will be more innovative and adopt modern production technology to enhance productivity which in thus increase output.

The coefficient of X_5 (farming experience) was 0.402, and found to be statistically significant at 0.01 probability level. This implies that as farming experience increases, the value added also increases. This may be attributed to the fact that the respondents will know how to use resources efficiently. This is in line with the findings of Ibitoye *et al.* (2013), who noted that farming experience is positively significant at explaining the value added by producers.

Credit availability (X_{12}) was positively signed and significant at 0.01 probability level. The estimated regression coefficient with respect to credit availability was 6.44e-07. This implies that an increase in the accessibility and availability of credit for the producers will also increase the value added by the farmers. This may be due to the fact that credit availability will enable the producer to procure adequate input needed to add value to yam production. This corroborates with the findings of (Oluwatayo, 2009) who asserted that credit availability is positively significant at explaining the value added by producers.

Factors affecting the Total Value added by the Wholesalers in the Study Area

The results in Table 3 indicated that the linear functional form was selected as the lead equation. It had an R- square (R^{2}) value of

0.5353 which indicates 53.53% of the variation in the value added by the wholesalers was accounted for by the explanatory variables included in the model. The F-value of 5.09 was also statistically significant at 0.05 probability level. This implies that the explanatory variables included in the model adequately explained the dependent variable.

Out of the variables included in the model, three, namely educational level (X_5), labour input supplied (X_6) and amount received on credit (X_7) were significant at explaining the value added by the wholesalers. The result showed that educational level (X_5) was positively signed and significant at the 0.10 probability level. The estimated regression coefficient was 2795.015. This implies that an increase in the number of years spent in school by the respondents will also increase the value added by the wholesalers. This may be attributed to the fact that respondents with higher qualification will be more innovative in handling the logistics aspect of the enterprise. The result is in consonance with the findings of Oboh *et al.* (2016), who reported a positive sign for this variable in explaining the value added by yam wholesalers.

Table 3: Regression estimates of the factors affecting the value added by various actors

Variables	Producers	Wholesalers	Retailers	Processors
Constant (b_o)	2.652173 (23.81) ***	111223.12 (1.18) *	-28297.69 (-0.55)	-17889.29 (-0.60)
Age (X_1)	.0052415 (1.70) *	-596.3033 (-0.24)	1965.063 (1.25)	-931.9993 (-1.50)
Gender (X_2)	-593.4563 (-1.39)	` -4686.78 (-0.50)	24853.5 (2.38) **	-
Household size (X_3)	.0133783 (1.14) *	312.386 (0.15)	458.8995 (0.14)	` - 137.3038 (-0.05)
Education level (X_4)	.0094964 (1.91) *	2795.015 (1.74) *	25129.64 (1.85) *	2300.661 (1.82) *
Farming experience (X_5)	.4016324 (3.90) ***	-206.3676 (-0.10)	3245.863 (2.23) **	10.0738 (3.16) ***
Labour (X_6)	-.0101538 (-0.66)	3124.298 (1.82) *	6219.373 (2.87) **	2795.015 (1.74) *
Cost of fertilizer (X_7)	1.15e-06 (1.16)	-	-	-
Cost of agrochemical (X_8)	-2.38e-06 (-0.79)	-	-	-
Cost of yam sett (X_9)	2.45e-08 (0.05)	-	-	-
Cost of harvesting (X_{10})	1.57e-07 (0.03)	-	-	-
Capital input (X_{11})	-.0000191 (-0.29)	-	-	-
Amount received on credit (X_{12})	6.44e-07 (9.37) ***	13.15039 (3.21) ***	-.916565 (-0.25)	2162.614 (0.18)
Cooperative member (X_{13})	-.0035434	-	-	-

	(-0.24)			
Distance (X_{14})	-.0063134	-	-17741.31	4622.4
	(-0.67)		(-1.48)	(1.13)
Access to market information (X_{15})	.0236209 (0.56)	-	-	-
Farm size (X_{16})	-.0122197	-	-	-
	(-1.12)			
Transportation cost (X_{17})	-	.741375	5.798455	864.2113
		(-0.17)	(3.06) ***	(0.75)
Total fixed cost (X_{18})	-	-	-	1.079064
				(0.79)
R-squared	0.7729	0.5846	0.6489	0.6836
Adj.-R_squared	0.7323	0.5353	0.5782	0.6238
F value	19.05	5.09	3.08	3.60

Note: *** = Significant at 0.01, ** = Significant at 0.05, * = Significant at 0.10
Numbers in parenthesis are the respective t – values

The estimated coefficient for labour input supplied (X_6) was 3124.298 and was found to be statistically significant at 0.10 probability level. This shows that there was a positive and statistically significant relationship between value added and labour input supplied, and this implies that as labour input supplied increases, the value added also increases. The result of the findings disagrees with the findings of Nathan *et al.* (2015) who found that labour input supplied led to increase in the expenses incurred and thus affect the total value added by the wholesalers.

The coefficient of amount received on credit (X_7) was 13.15039, and significant at 0.01 probability level. This implies that an increase in the amount of credit received by the wholesalers will also increase the value added by the respondents. This corroborates with the findings of (Oluwatayo, 2009), who asserted that the amount received on credit is positively significant at explaining the value added by the wholesalers.

Factors affecting the Total Value added by the Retailers in the Study Area

The results in Table 3 revealed that the linear functional form was selected as the lead equation. It had an R- square ($R^{2)}$ value of 0.6489 which indicates 64.89% of the variation in the valued added by the retailers was accounted for by the explanatory variables included in the model. The F-value of 3.08 was also statistically significant at 0.01 probability level. This implies that the explanatory variables included in the model adequately explained the dependent variable.

Out of the variables included in the model, five were significant at explaining the value added by the retailers. The result showed that the coefficient of gender (X_2) was 24853.5, and significant at the 0.05 probability level and implies that the male retailers are more productive in value added to yam than female retailers. Educational level (X_4) has a coefficient value of 25129.64 and significant at the 0.10 probability level. This implies that an increase in the number of years spent in

school by the respondents will also lead to an increase in the value added by the retailers.

The coefficient of X_5 (experience) was 3245.863, and found to be statistically significant at 0.05 probability level. This implies that as the experience of the retailers' increases, the value added also increases. The estimated coefficient for labour input supplied (X_6) was 6219.373 and was found to be statistically significant at 0.05 probability level. This shows that there was a positive and statistically significant relationship between value added and labour input supplied, and this implies that as labour input supplied increases, the value added also increases. The result of the findings disagrees with the findings of Nathan e*t al.* (2015), who found that labour input supplied led to increase in the expenses incurred and thus affect the total value added.

Transportation cost (X_7) was positively signed and significant at 0.01 probability level. The estimated regression coefficient with respect to cost of transportation was 5.798455. The implication is that, if the cost of transportation increased, it would lead to an increase in the value added by the retailers. The result is in consonance with findings of Oboh *et al.* (2016), who reported that despite increase in the cost of transportation, there was a relative increase in the value added of yam retailers. This is not consistent with economic theory. Rising costs are expected to bring about reduction in the value added and should have been negatively signed.

Factors affecting the Total Value added by the Processors in the Study Area

The results in Table 3 revealed that the linear functional form was selected as the lead equation. It had an R- square (R^2) value of 0.6836 which indicates 68.36% of the variation in the value added by the processors was accounted for by the explanatory variables included in the model. The F-value of 3.60 was also statistically significant at 0.01 probability level. This implies that the explanatory variables included in the model adequately explained the dependent variable.

Out of the variables included in the model, three were significant at explaining the value added by the processors. The coefficient of X_3 (processing experience) was 10.0738, and found to be statistically significant at 0.01 probability level. This implies that as processing experience increases, the value added also increases. This may be attributed to the fact that the respondents will know how to use resources efficiently. This is in line with the findings of Ibitoye *et al.* (2013), who noted that experience is positively significant at explaining the value added by processors.

Educational level (X_4) was positively signed and significant at 0.10 probability level. The estimated regression coefficient with respect to education was 2300.61. This implies that an increase in the number of years spent in school by the processors will also increase the value added by the respondents. This may be attributed to the fact that respondents with higher qualification will be more innovative and adopt modern processing technology to enhance productivity which in thus increase output.

The estimated coefficient for labour input (X_5) was 2795.015 and was found to be statistically significant at 0.10 probability level. This shows that there was a positive and statistically significant relationship between value added and labour input, and this implies that as labour input increases, the value added also increases. The result of the findings disagrees with the findings of Nathan e*t al.* (2015), who found that labour input led to increase in the expenses incurred and thus affect the total value added.

Constraints to Yam Production

The result in Table 7 shows the constraints faced by yam producers in the study area. Majority of the farmers ranked pest and disease (70.0%) as most constrained in the study area. Yam is susceptible to attacks by several pests and disease throughout the life cycle. The pest might be both field and storage pest, and it has a great effect on the yield of yam. The effective control of these is inevitable, if reasonable yield is expected. These were responsible for both pre-harvest and post-harvest losses.

Inadequate finance is another constraint in the study area. This might be due to their inability to access credit as a result of the difficulty in securing loans due to high interest rates, and collateral requirements by the banks and some other corporate groups in the area. The implication of this is that yam producers may find it difficult to acquire farm inputs such as yam sett, agrochemical, fertilizer, labour and to expand their farms. This finding agrees with (Ezeano, 2015) in which it was reported that inadequate funds or credit was the major constraint faced by respondents in the study area.

Other constraints to yam production in the study area include: dwindling rainfall, lack of improved varieties, inadequate storage and transportation problems. This is in consonance with the findings of (Ibitoye and Attah, 2012) and (Zaknayiba and Tanko, 2013).

Table 7 Distribution of respondents according to constraints to yam production

Information needs	*Frequency	%
Pest and disease	70	70.0
Transportation problem	51	51.0
Lack of market for the produce	21	21.0
Pilfering	14	14.0
Inadequate finance	53	53.0
Poor extension education	14	14.0
Lack of improved varieties	49	63.0
Inadequate storage	49	61.0
Dwindling rainfall	50	97.0

*Multiple Response

CONCLUSION

The study was able to analyse yam value chain in Paikoro LGA of Niger State. The results showed that yam value chain actors in the study area are relatively dominated by young people and there is hope for a gradual increase level among the people in the study area. The higher percentage of male actors to female actors along the value chain in the study area shows that the yam value chain is gender biased. Judging by the value of yam in the society, the yam value chain will continue to play a prominent role in the area.

From the findings of the study the following were recommended: Actors in the yam value chain should form cooperative societies to increase their access to credit facilities, and the government should provide a good road network system to reduce transportation cost.

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