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Value Chain Analysis of Maize Production among RuralHouseholds in Oyo State, Nigeria

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Abstract
Maize production activities go beyond cultivation of farmland but also some other actors in the chain of maize business which make the activities more viable and lucrative but profit made by each actor were mutually exclusive. This study analysed maize production value chain among rural households in Oyo State. A multistage sampling technique was employed in selecting various actors along the maize value chain totalling 145 using copies of well-structured questionnaire and interview schedule while descriptive statistics, gross margin analysis(GMA) and ordinary least square(OLS) multiple regression were used as tools of analysis. Result showed that farmers in the five groups were young and active (<50years) while only farmer was 67years and experience was the least of 7years across the value chain actors. Gross margin result showed processors having the highest (N617, 188.00) while farmers had the least (N201, 058.19). The OLS regression for determinants of net returns (NR) revealed that customers and monthly revenue positively influenced net returns among input dealers, quantity of maize marketed extension contacts increased net returns among farmers while in the case of processors, number of customers, input cost and experience related directly with net returns. It was recommended that vital opportunities be made available to farmers in order to cover more than one productive activity in maize production for optimal profit realization.

Key words*: Value chain, Maize Production, Rural Households, Multiple Regression.*

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I. Introduction

Maize is a staple food crop that is frequently found on the tables of Nigerian households either consumed directly of taken in processed form. The massive demand for the crop is encouraged by the supply, based on this, it is widely cultivated by Nigerian farmers regardless of the vegetation belt their farms are situated. International Institute of Tropical Agriculture(2014) established that with more than 5.56 million hectares of land planted to maize in 2013(or about 16% of all Africa's maize area combined), Nigeria has the right to claim the position of the giant of maize in Africa while Tanzania claims a distant second position with about 4.1 million hectares. National Bureau of Statistics- NBS (2012) recorded that maize, sorghum, and millet occupied 5.5 million, 4.9 million and 2.9 million hectares in 2012 respectively. The trend of maize production in Nigeria from 2010 till date fluctuates with almost insignificant margin. The average production in 2010-2012 was 8, 416733.33; 2013-2015 was 9,681,229 and 2016-2018 was 10,983,990.Table 1 shows the annual production of maize in some selected West African countries in tonnes from 2013 to 2017. Nigeria retains the apex position among other countries with 10,202,333.6 tons in the production of the crop and is closely trailed by the respective of Egypt and Ethiopia with 7,747464.40 tons and 7,514,580.20 tons (FAO, 2018).

Competition brings about quality and improvement of livelihood everywhere in the global village. Competitiveness in agriculture remains a means of bringing improvement in the linkages that emerge in the process of linking producers to consumers and evidently increases with dependability and flexibility of production and supply. It is a matter of necessity therefore, if agricultural products will command good prices when marketed in order to have a vibrant and sustainable value chain. Value chain incorporates all the activities including input sourcing, production, transformation, marketing all the way up to final consumption and disposal after use. Kaplinsky and Morris (2001) defined value chain as the full range of activities that are required to make a product or service. Food and Agriculture Organization-

FAO(2006) also defined value chain as the range of activities which are required to bring a product or service from conception, through different phases of production(involving a combination of physical

transformation and the input of various producer services), delivery to final customers, and final disposal after use. United States Agency for International Development-USAID(2006) defined value chain as the full range of activities that are required to bring a product of service from its conception to its end use including all the market channels available to all firms. The value chain concept vividly explains the activities of the chain actor who actually transact a particular product as it moves through the value chain include input(e.g. seed suppliers, farmers, traders, processors, transporters, wholesalers, retailers and final consumers (Mandal *et al*, 2003).

Maize value chain analysis is inevitable if there is going to be assuring quality production and marketing which in turns bring good returns on investment for the main actors along different phases of the chain (Zylberberg, 2011). Products of high prices attract better price in the market and by this increase the purchasing power of the small-holders farmers and the resultant poverty reduction. The gain from all the actors in the value chain is the economic rent which remains the reward for their time and efforts in sustaining and keeping the activities vibrant. Value chain actors need up-to-date information in order to perform efficiently. Knowledge about the value chain of maize will enhance direct communication between end buyer and buyers and producers which can be a powerful tool in helping maize producers to understand the implications of competitiveness as a way of ensuring continued penetration of the national and international markets.

Literature is awash with works on value chain. In 2003, Food and Agriculture Organization's study in Kenya emphasize the improvement in the key area in each stage of mango value chain such as capacity building, credit acquisition, infrastructure development and setting up of collective bargaining bodies for farmers are necessary if competitiveness has to be restored and gains realized across value chain participants. A study by Kumar and Kapur (2010) in Orissa, India, assessed the flow of coconut from farmers through different intermediaries to the consumers by computing prices and marketing margin at the different stages of the chain in order to reflect the value addition through various participants of the chain. A study by Tallontire *et al* (2011) found that farmers were better off dealing directly with exporters rather than through middlemen as this channel offered those more benefits in the value chain such as higher prices, credit acquisition, opportunity to negotiate prices and assurance on the place of sale. Okello *et al*(2007) in his study showed that smallholders have been filtered out of the supply chain by food safety standard that have made them uncompetitive, although through collective action, they have been able to mitigate some of the complaints arising from imposition of these standards.

Despite results indicating that trade in maize in Nigeria is highly profitable. Little is known about the small holder competitiveness of maize production and the distribution of the cost and value-added benefits between the actors. Information on the most costly items within each respective chain is also scarce. The overall objective of the study was, therefore, to map out the maize value chain and assess the competitiveness of smallholder production, taking the case of Itesiwaju Local Government of Oyo State. The following research questions are to be answered in this study: what are the socioeconomic characteristics of the respondents? What is the cost and returns among the actors at every stage of maize production activities? What are the factors influencing the net profit of each of the actors in maize production? The specific objectives are to: identify the socioeconomic characteristics of the respondents; estimate the cost and returns of various actors at every stage of maize production identify factors influencing net profit of actors at every stage of the value chain and examine constraints to maize enterprise among various actors along the value chain.

II. Research Methodology

Study Area

The survey was carried out in Itesiwaju local government area(LGA) of Oyo State with its headquarters in Otu. It is bounded in the North by Atisbo LGA, in the West by Iwajowa LGA, in the South by Kajola LGA, Iseyin LGA and bounded by Oyo West LGA and in the East by Atiba LGA. The LGA is situated on Latitude 70^0 35'Nand longitude 36^0 22'E(Oyo State Diary, 2018). The demographic characteristic of the area shows that it has a population of 128,652 with 65,616 males and 63,036 females(National Population Commission, 2006). Itesiwaju LGA is deeply seated in the guinea savanna vegetation belt with the mean annual temperature and rainfall of $\pm 27.5^0$C and 1,380mm respectively. It has a total land area of 1514km^2 and the notable towns in the area are Oke Amu, Ipapo, Otu, Okaka, Alaga, Komu,Baba Ode and Igbojaye among others. The inhabitants of the area are predominantly farmers and the common crops cultivated among them are maize, millet, sorghum, cassava, yam, pigeon peas, melon, watermelon, cowpea and the likes. The edaphic nature of the area shows that the soil is mostly sandy-loam, moderately weathered and capable of retaining nutrients at the soil surface which is very good for surface feeder crops like maize, sorghum, melon, cowpea and watermelon among others.

Type of Data and Instruments of Data Collection

For the purpose of achieving the lucidly stated objective of the study, primary data were used. These data were collected with the use of structured questionnaire and interview guide. Data collected for the survey among others included age, marital status, years of experience, total revenue and total cost among others.

Sampling Technique

Multistage sampling technique was used in selecting respondents used for this survey. The first stage was the purposive selection of Itesiwaju LGA out of the 13 local government areas in Oke-Ogun area which is referred to as the 'food basket' of the State and the home of cereal crops due to its uniqueness in terms of edaphic and weather advantage. In the second stage, five (5) towns were randomly selected namely: Ipapo, Otu, Okaka, Igbojaye and komu which are well known for vibrant maize business in the study area. Random selection of forty (40) respondents from each of the towns and this comprised of identified relevant actors along the chain, these are: input suppliers (3), maize farmers (20), processors (2), wholesalers (3)and residue collector(2) making a total of 30 respondents selected from each town. Overall number of the respondents used was 150.Table 1 shows details of sampling of respondents in the study area.

Analytical Tools

In order to achieve the various objectives set for this research, descriptive statistics (DS) was used to analyse the socioeconomic characteristics of the respondents. This included the use of mean, percentages and frequency counts. Gross margin analysis (GMA) was used in calculating the cost and returns of various actors along the maize production chain. GMA could be expressed thus:

II = TR-TC

II = TR – (TFC+TVC)

GMA = TR-TVC (Gross margin analysis was preferred in this study because, different types of crops were traded by all actors and the equipment(Assets) used for maize were used for others. Using Total Fixed Cost in this case means, repetition of cost inclusion of fixed assets which is tantamount to frivolous therefore estimate, therefore, only TVC was used.

II: Profit

TR: Total Revenue

TC: Total Cost

TFC: Total Fixed Cost

TVC: Total Variable Cost

Ordinary Least Square (OLS) Model

OLS model was used to identify factors influencing the total profit made by each of the actors along the maize value chain. According to Koutsyannis (1988), Olayemi (2004), Gujarati (2004) and Gujarati and Porter (2009); the model is expressed specifically as follows:

$Q = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + e_i$

Where

β_0 to β_n = parameters to be estimated

X_1 to X_n = Variables modelled.

Four functional forms were fitted to the data and the lead equation was selected based on the following criteria:

(i) Magnitude of coefficient of multiple determination (R^2) and adjusted R^2.

(ii) Signs of the parameters and;

(iii) Number of significant variables in the modelled variables among others.

Table 3 presents the variables determining the profit made by all actors along the value chain.

III. Results and Discussion

Socioeconomic Characteristics of the Respondents

Socioeconomic distribution of the respondents is presented in Table 4. The result on age among input dealers shows that about 47% were within the age bracket (21-40) with the mean age of 40 years. Farmers' age details showed that 69% forming the majority were more than 60 years with the mean age of 67 years. The mean age of the processors was 48 years while 60% formed the highest within the age range of 41-60 years. Marketers aggregated within the range of 21-40 years with 50% and the mean age of 32 years while refuse dealers aged(21-40) with 60% percent formed the most population with the mean age of 28 years. It could be inferred from this result that farmers category were old and non-active and the reason for this is that, farming business is nowadays left in the hands of old ones due to the unattractive nature of the business which had drifted the youths to the urban areas. The result for other actors revealed that they were young and agile to perform optimally at the chosen phase of maize enterprise. Result on gender characteristics of the respondents showed that females formed the majority among the input dealers (66.7%), processors (70%), marketers (80%) and refuse dealers(80%) while males(78%) dominated only the farmers category. This result suggests that among the categories of actors highlighted, it was only the farming category that requires high level of energy commitment due to hard nature of the job while in other categories, though energy were always required but not as in farming.

Distribution of the actors based on their educational level showed that secondary education was highest among input dealers(53.3%), farmers(35% and processors(50%) while marketers(60%) and refuse dealers(60%) were highest in their respective categories with primary education. This suggests that desire for higher education was prevalent in the area. Experience of various actors showed that farmers had the highest years of experience of 22years followed by processors with 15 years while input dealers, marketers and refuse dealers had less than 10 years of experience respectively. This shows that farming requires a high level experience being the foundational phase of the enterprise of which if failure occurs, all other stages of the enterprise are impossible and moreover, aged people dominate the primary production phase.

Result of marital status of the respondents revealed that married status dominated among the input dealers(73.6%), farmers(80%), processors(80%) and marketers(80%) but the reverse was the case among the refuse dealers who were mostly single suggesting that other categories were ardent observers of cultural and traditional requirements while this was not taken into consideration by refuse dealers. Further socioeconomic result on the monthly income of the respondents revealed that input dealers (60%) made more that N40, 000 on monthly bases while the mean monthly income stood at N62, 843. Farmers also realized mean income per month in the tune of N26, 078 and the highest income was realised among respondent earning less than N30, 000. About N81, 000 was realized by processors on monthly basis and the totality of respondents made more than N40, 000. The respective of marketers and refuse dealers realized N102, 885 and N33, 450 while the highest(80%) in the marketers categories and the highest(60%) realized more than N40, 000 on monthly basis. It

could be inferred from this result that all groups realized at least the minimum wage approves by the federal government(N30,000) while only farmers realize less than the national minimum wage, this may affect their welfare adversely I terms of low purchasing power.

Input dealers, farmers, processors and refuse dealers were members of one cooperative society or the other but marketers were indifference towards it. The overwhelming numbers of actors were into cooperative membership because of the inherent advantages of price regulation and ethics regulation of business which could ultimately result in better income welfare and financial breakthrough for better future climate. Farm size was peculiar to farmers among all the categories, the majority (74%) had less than 2 hectares while the mean 1.43 hectares was the average value. This result is in consonance with Daramola and Adubi who established that majority of small farmers have less than 2 hectares of farm land available to them for farming.

An extension contact was found to be insufficient among all the actors highlighted for the study as the highest(30%) receives extension agents in the previous enterprise season. Mean household size showed that all the actors had less than 6 members of households. This result suggest the availability of family planning education which encouraged all household heads the need for family planning in order to bear the number of children their income could cater for.

Gross Margin Analysis of Maize Production among Actors

Gross margin analysis of actors along the value chain of maize production is presented in Table 5. Processors emerged the highest with N617,188,00 while the lowest gross margin of N38,011.20 was realized by refuse dealers. Marketers made N499, 792.00 while farmers and refuse dealers made N201, 058.19 and N380, 011.20 respectively. The gross margin realized by farmers was the least of all while processors made the highest profit margin. Marketer was the second highest profit maker while the third and fourth were the input dealers and refuse dealers. Net profit expressed the same trend as the gross margin values across the actors along the value chain. Farmers realized the lowest net profit (N201, 058.19) while the highest profit makers were the processors (N617, 188.00). Second on the ranking were marketers (N496, 192.00) while the third and the fourth makers of profit along the chain were input sellers (N278, 277.96) and refuse dealers (N253, 313.80). It could be observed from the result that, farmers who were the producers of maize made the lowest net profit; this could be adduced to the raw form that most of the outputs were made on the farm without value addition which can be a veritable source of good income generation. In most cases, farmers sell at the farm-gate which results in being price takers and ultimately low income generation and low revenue. Moreover, it was only farmers that were mostly affected by vagaries of whether while other actor were always slightly affected as they can manage the risk better due to availability of alternatives. In the case of processors, sun-drying .or mechanical drier could be used to reduce the moisture content that is capable of reducing quality of maize when it grows mouldy.

Determinants of Net Income among Actors in the Value Chain

Table 6 presents results on determinants of net income realized by each of the actors highlighted keeping the maize production value chain active. In the case of input sellers, 44 percent of the variation in dependent variable was caused by explanatory variables included in the model. F value was significant at 1 percent and this suggested that the model used was fit for the analysis, double log was chosen as the lead equation. Number of customers (farmers) and monthly revenue generated were found to influence the net profit

positively at 5 percent and 1 percent respectively. This means that, as number of customers and monthly revenue generated from maize seed increases, more net revenue was realized by input sellers.

Result on farmer as a key actor along the maize value chain showed 55 percent of change the net income of farmers was due to the modelled explanatory variables while the lead equation chosen was double log(see Table 6). F-value was found to be very significant at 1 percent suggesting that the model used was appropriate. Quantity of maize marketed and number of extension contacts seasonally were found to be positively significant at 1 percent and 10 percent respectively while years of experience was negatively significant at 5 percent. Quantity of maize marketed and the number extension contacts increased the net income of maize farmers while experience was found to reduce the monthly revenue generated by maize farmers.

Double log equation was also found most appropriate in determining the factors responsible for net income generation among maize processors in the study area. Number of customers and processing experience significantly increased the amount of net revenue generated by the maize processors at 1 percent level (see Table 6). As the number of customers and years of experience increased, the net oncome also increased. This result is suggestive of the fact that with more customers' patronage for processing of maize, more revenue was realized. Moreover, experience enhanced more net returns as, through this, farmers will be able to strategize productively for efficient services and in turn, better revenue. About 87 percent of variation in the net returns of processors was caused by dependent variable included in the model. The significance of F-value at 1 percent indicated the fitness of the model.

Linear was chosen as the line of the beast fit to determine factors influencing net income among marketers in the study area. About 61 percent of variation in the net income of markers in the study area was as a result of explanatory variable included in the model. F-value (3.83; $p<0.01$) was significant at 1 percent and explained the fitness of the model. Marketing experience and monthly revenue were significant at 10 percent and 5 percent respectively and they increase the monthly net revenue of marketers.

Result on determinants of monthly net revenue of refuse collectors(see Table 6) showed that 65 percent of variation in the monthly net revenue was caused by the modelled explanatory variables while the F-value(3.83; $p<0.01$) was suggestive of the fitness of the model for the analysis. Years of experience influenced monthly net income significantly at 10 percent while number of customers and cooperative membership were both significant at 1% respectively. Years of experience of refuse collectors increased their monthly net income while number of customers and cooperative membership decreased the monthly net income of refuse collectors in the study area.

IV. Conclusion and Recommendation

Maize was found to be profitable to all actors in the value chain but the percentage and amount of profit made by each actor was significantly different but appreciable while farmers realized the least (10.8%) and the highest (33.7%) was realized by the processors. Summarily, each of the actors along the maize production value chain made profit but it was not proportional to their stakeholder's performance most especially farmers were at disadvantage. Based on this result, the following recommendations were made:

(i) Maize produced by farmers should be bought up by the government most especially when there is glut in order to prevent low income realization.

(ii) Farmers should have access to cheap and quality basic inputs in order to widen the profit margin when farm produce are marketed after harvest.

(iii) A special market for marketing maize should be created in order to boost sales at good prices.

(iv) More and appropriate technologies must be made available to farmers in order to produce process and sell farm output at worthwhile price and reduce the long chain of middlemen who intercept the profit that would have otherwise accrued to the pockets of the farmers.

References

[1]. Adubi, A.A. and Daramola, A.G. (1996). An Empirical Analysis of Risk and Expected Return in Small Scale Agriculture in Nigeria. *Quarterly Journal of International Agriculture, 35*(4), 384-397.

[2]. FAO (2018). Ethiopia: report on feed inventory and feed balance, Food and Agriculture Organization of the United, Rome, Italy.

[3]. Gujarati, D. (2004). *Basic Econometrics*. Tata Publisher. McGraw Hill Edition (2004). Pp. 235-238.

[4]. Gujarati, D.N. and Porter, D.C. (2009). Basic econometrics. Pp. 188-233, McGraw-Hill/Irwin Publisher, Fifth Edition, New York, NY (10020).

[5]. IITA (2014). "Research for development project chalks up significant progress to save maize from parasitic Striga weed in Nigeria" Annual Bulletin, Issue No. 2219, 7-11 April, 2014.

[6]. Kaplinsky, R. and Morris, M. (2001)." A handbook for value chain Research". Working paper prepared for the IDRC, Brighton, United Kingdom, Institute of Development Studies, http://www.inti.gob.ar/cadenasdevalor/manual.parainvestigacious.pdf.

[7]. Koutsyannis, A. (1988). Modern Microeconomics. Pp. 156-174, Palgrave Macmillan, Second Edition, ISBN 978-1-349-15603-0

[8]. Kumar, N. and Kapoor, S. (2010). "Value chain analysisof coconut in Orissa". Agricultural Economic Research Review, 23, pp. 411-418. http://ageconsearch.umnedu/bitstream/96915/2/3-Niraj-Kumar.pdf

[9]. Mondal, E.O., Ndegwa, A.M., Munene, S. (2003)."French beans production in Nkuene and Abogeta divisions of Meru Central District in Kenya". In proceedings of 6th Biennial African Crop Science Conference, 12th -17th Oct., 2003, Nairobi, Kenya.

[10]. National Bureau of Statistics (2012). Social Statistics in Nigeria. Part III: Health, Employment, public safety, population and vital registration. Report http://www.nigerianstat.gov.ng/report
[11]. National Population Census (2006). Population report of the Federal Republic of Nigeria. Pp. 2-4.
[12]. Okello, J.J., Narrod, C.O. and Roy, D. (2007). "Institutional innovations for smallholder compliance with international food safety standards: Experiences from Kenya, Ethiopia and Zambian Green Beans Grower". African Association of Agricultural Economics (AAAE) Conference proceedings held in Ghana, 2007, pp. 483-487.
[13]. Olayemi, J.K. (2004). *Principles of microeconomics for applied economic analysis*. Pp. 67-92, Mokola, Ibadan, Oyo State: SICO Publishers.
[14]. Oyo State Diary (2018). Pace-Setter Diary, Ministry of Information and Culture, Agodi, Ibadan, Oyo State.
[15]. Tallontire, A., Opondo, M., Nelson, V. and Martin A. (2011). "Beyond the vertical? Using value chains and governance as a framework to analyseprivate standards initiatives in Agri-food chains." Agricultural and Human Values, 28, 427-441.
[16]. USAID (United States Agency for International Deevelopment(2012). Value chain development Wiki, www.microlinks.org/good-practice-centre/value-chain-wiki.
[17]. Zylberberg, E. (2011). "Bloom or Bust? A global value chain approach to smallholder flower production in Kenya." *Journal of Agribusiness in Developing and Emerging Economies*, 3(1), 4-26.

Table 1: Maize Production by Selected African Countries (2013-2017) in Metric Tons

Country	2013	2014	2015	2016	2017	Mean Production
Nigeria	8,422,670	10,058,968	10,562,050	11,547,980	10,420,000	10,202,333.6
Togo	692,610	833,044	794,661	826,896	854,689	800,380.00
Mali	1,635,564	1,744,026	2,276,036	2,811,385	2,811,385	1,907,222.80
Niger	17,813	56,597	35,387	38,022	38,345	37,232.80
Ethiopia	6,491,540	7,234,955	7,882,444	7,847,175	8,116,787	7,514,580.20
Egypt	7,956,593	8,059,906	7,803,183	7,817,640	7,100,000	7,747464.40
Chad	417,986	332,889	349,500	443,779	396,506	388,132.00
Burkina Faso	1,585,418	1,433,085	1,469,612	1,602,525	1,533,431	1,524,814.20
Benin	1,316,659.80	1,354,344	1,286,060	1,376,683	1,454,000	1,357,549.36

Source: Food Agriculture Organization, 2018.

Table 2: Sampling Details of Respondents

1st Stage	2nd Stage		3rd Stage
Local Govt. Area	**Town**		**Actors**
Itesiwaju	(i)	Ipapo	Input sellers(15)
	(ii)	Otu	Farmers(100)
	(iii)	Okaka	Processors(10)
	(iv)	Igbojaye	Wholesalers(15)
	(v)	Komu	Residue collector(10)
Total Sample(150)			

Source: Field Survey, 2020.

Table 3: Determinants of Profit Made Among Maize Value Chain.

1.	2	3	4	5
Input Supplier	Farmer	Processor	Marketer	Residue Collector
X_1:Experience	X_1: No. of customers	X_1:Experience	X_1:Experience	X_1:Experience
X_2:No. of customers	X_2: Input cost	X_2:No. of customers	X_2:No. of customers	X_2:No. of customers
X_3:Quantity sold	X_3: Maize marketed	X_3:Monthly due	X_3:Monthly due	X_3:Monthly due
X_4:Monthly revenue	X_4: Coop. Membership	X_4:Monthly revenue	X_4:Monthly revenue	X_4:Monthly revenue
X_5:Coop. Membership.	X_5: Ext. contact	X_5:Coop. Membership	X_5:Coop. Membership	X_5:Coop. Membership
X_6: Extension contacts	X_6: Experience	X_6: Maize quantity processed	X_6: Maize stock	X_6: Quantity of residue
SS 15	100	10	15	10

Source: Field Survey, 2020. NB: SS=Sample Size

Table 4: Socioeconomic Characteristics of Various Actors along Maize Value Chain

Variable	n=15 Input Dealer Freq. (%)	n=100 Farmer Freq. (%)	n=10 Processor Freq. (%)	n=10 Marketer Freq. (%)	N=10 Refuse Dealer Freq. (%)
Age(in years)	Mean= 40yrs	Mean= 67yrs	Mean=48yrs	Mean=32yrs	Mean=28yrs
≤20	1(6.7)	7(7.0)	-	2(20.0)	1(10.0)
21-40	7(46.6)	19(19.0)	2(20.0)	5(50.0)	6(60.0)
41-60	6(40.0)	5(5.0)	6(60.0)	3(30.0)	2(20.0)
>60	1(6.7)	69(69.0)	2(20.0)	-	1(10.0)
Gender	Mean=nil	Mean=nil	Mean=nil	Mean=nil	Mean=nil
Male	5(33.3)	78(78.0)	3(30.0)	20(20.0)	2(20.0)
Female	10(66.7)	22(22.0)	7(70.0)	80(80.0)	8(80.0)
Educational Level	Mean=nil	Mean=nil	Mean=nil	Mean= nil	Mean=nil
No Formal	-	26(26.0)	-	-	1(10.0)
Primary	4(26.7)	32(32.0)	1(10.0)	60(60.0)	6(60.0)
Secondary	8(53.3)	35(35.0)	5(50.0	40(40.0)	3(30.0)
Tertiary	3(20.0)	7(7.0)	4(40.0)	-	-
Experience(in years)	Mean=9 yrs	Mean=22yrs	Mean=15yrs	Mean=7yrs	Mean=8yrs
≤5	2(13.3)	8(8.0)	-	1(10.0)	1(10.0)
6-10	8(53.3)	15(15.0)	-	5(50.0)	6(60.0)
>10	5(33.4)	80(80.0)	10(100.0)	4(40.0)	3(30.0)
Marital Status	Mean=nil	Mean= nil	Mean=nil	Mean=nil	Mean=nil
Single	1(6.6)	9(9.0)	20(20.0)	20(20.0)	6(60.0)
Married	11(73.6)	80(80.0)	80(80.0)	80(80.0)	4(40.0)
Widowed	1(6.6)	2(2.0)	-	-	-

Separate	1(6.6)	3(3.0)	-	-	-
Divorced	1(6.6)	6(6.0)	-	-	-
Monthly Income(N)	Mean=N62.873	Mean=N26,078	Mean=N81,0	Mean=N102,885	Mean=N33.450
≤30,000	3(20.0)	65(65.0)	50	1(10)	2(20.0)
30,001-40,000	3(20.0)	12(12.0)	-	1(10)	2(20.0)
>40,000	9(60.0)	23(23.0)	-	8(80)	6(60.0)
			10(100.0)		
Coop. Membership	Mean=nil	Mean=nil	Mean=nil	Mean=nil	Mean=nil
Yes	12(80.0)	59(59.0)	8(80.0)	2(20.0)	7(70.0)
No	3(20.0)	41(41.0)	2(20.0)	8(80.0)	3(30.0)
Farm Size(in Hectares)	Mean=nil	Mean=1.43ha		Mean=nil	Mean=nil
≤2.00		74(74.0)			
2.01-5.00	-	26(26.0)	-	-	-
>5.00		-			
Extension Contact(No.)	Mean=nil	Mean=nil	Meal=nil	Mean=nil	Mean=nil
Yes	2(13.3)	23(23.0)	4(40.0)	3(30.0)	3(30.0)
No	13(86.7)	77(77.0)	6(60.0)	7(70.0)	7(70.0)
Household Size(No.)	Mean=6	Mean=7	Mean=5	Mean=4	Mean=5
≤6	8(53.3)	59(59.0)	8(80.0)	7(70.0)	7(70.0)
7-10	6(40.0)	28(28.0)	2(20.0)	3(30.0)	3(30.0)
>10	1(6.7)	13(13.0)	-	-	

Source: Field Survey, 2020

Table 5: Gross Margin Analysis of Maize Enterprise with Specification of Actors' Financial Performance

Cost/Returns Details	Input Dealer(N)	Farmer	Processor	Marketer	Refuse Dealer
Revenue	**394,479.96**	**461,184.56**	**868,200.00**	**743,654.00**	**297,150.00**
		-	-	-	-
Total Variable Cost(TVC)	-		-	-	-
Fertilizer(NPK + Urea)	-	55,342.17	-	-	-
Cost of agrochemicals	-	53,010.00	-	-	-
Cost of seed	-	3,328.20	-	-	-
Cost of labour	60,200.04	99,000.00	-	-	-
Cost of land maintenance	-	33,846.00	-	-	-
Cost of transportation	14,400.00	9,600.00	43,460.00	114,000.00	22,464.00
Shop rent	7,200	-	26,300.00	66,000.00	6,000.00
Cost of packaging	8,223.96	-	74,480.00	42,000.00	6,547.20
Cost of preservation	15,396.00	-	18,000.00	15,662.00	-
Association due/levy	6,000.00	6,000.00	5,000.00	6200.00	3,000.00
Cost of machine maintenance	-	-	30,180.00	-	-
Total TVC	**111,402.00**	**260,126..37**	**197,420.00**	**243,862.00**	**38,011.20**
Gross Margin	**283,077.96**	**201,058.19**	**624,338.00**	**499,792.00**	**380,011..20**
Tax	4,800.00	-	7,200.00	3,600.00	1,200.00
Net Profit	**278,277.96**	**201,058.19**	**617,188.00**	**496,192.00**	**253,313.80**
Rank/Percentage	3rd(15.1%)	5th(10.8%)	1st(33.6%)	2nd(26.8%)	4th(13.7%)

Source: Field Survey, 2020.

Table 6: Ordinary Least Square Multiple Regression on Determinants of Net Income of Maize Actors

Input Seller			Farmer			Processor			Marketer			Refuse Collector		
Equation: Double log			**Equation: Double log**			**Equation: Double log**			**Equation:Linear**			**Equation: Double log**		
Variable	Co-eff	t-val	Variable	Co-eff	t-val	Variable	Co-eff.	t-val	Variable	Co-eff.	t-val	Variable	Co-eff.	t-val
Constant	10.45*	6.40	Constant	8.02***	5.21	Constant	8.88***	3.20	Constant	-867.4	-0.08	Constant	7.65*	1.74
Experience	-0.08	-0.60	Customer(No.)	0.22	0.92	Customer(No.)	0.49***	4.12	Experience	301.2*	1.88	Experience	0.49*	1.88
Extension(No.)	0.05	0.40	Input cost	0.05	0.32	Input Cost	0.29*	1.88	Customer(No)	160.4	0.69	Customer(No)	-0.60*	-1.71
Customer(No.)	0.35**	2.40	Maize Marketed	0.33***	4.50	Maize Traded	-0.03	-0.69	Mth Revenue	0.40**	2.78	Mth. Due	-0.49	-1.58
Total Input(kg)	-0.21	-1.18	Coop. Memb.	0.08	0.64	Coop. Memb.	-0.03	-0.67	Month. Due	-10.8	-0.48	Mth Revenue	0.59	2.41
Mthly Rev.(N)	0.12***	3.96	Ext. Cont.(No.)	0.31*	1.92	Ext. Contact	-0.03	-0.82	Coop. Memb.	2376.6	0.56	Coop. Memb.	-0.33*	-1.79
Coop. Memb.	-0.01	-0.18	Experience	-0.23**	-2.11	Experience	1.32***	3.40	Maize Traded	-1.81	-0.73	Residue Traded	-0.03	-0.07
R^2	0.68		R^2	0.59		R^2	0.95		R^2	0.78		R^2	0.88	
Adj. R^2	0.44		Adj. R^2	0.55		Adj. R^2	0.87		Adj. R^2	0.61		Adj. R^2	0.65	
F-value	12.81		F-value	4.71***		F-value	10.7***		F-value	4.63***		F-value	3.83***	
Prob.	0.00		Prob.	0.00		Prob.	0.00		Prob.	0.00		Prob.	0.00	
Sample size(n)	15			100			10			10			10	

Source: Field Survey, 2020 Note: ***,**,* *are significant levels@1%, 5% and 10% respectively.*

Dr. Isaac O. Ogunwande, et. al. "Value Chain Analysis of Maize Production among RuralHouseholds in Oyo State, Nigeria." *IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)*, 13(9), 2020, pp. 44-50.