JOURNAL OF AGRICULTURAL ECONOMICS, EXTENSION & SCIENCES
Official Journal of the College of Agricultural Economics and Extension
www.jaees.org
www.uam.edu.ng
JAEES Vol. 10 No. 2 2024, Pages 134 - 161
ISSN (Print) 2545-5179, ISSN (Online) 2714-5018

ECONOMIC ANALYSIS OF CASHEW PROCESSING AND MARKETING IN OTUKPO LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

Weye, E.A., Soom, A. and Ugwu, H.I.

Department of Agricultural Economics, Joseph Sarwuan Tarka University, Makurdi, Nigeria

Email: weyeemmanuel@gmail.com

ABSTRACT

This study was conducted to analyze economics of cashew processing and marketing in Otukpo Local Government Area of Benue State, Nigeria. Multi-stage sampling procedure was used to select 100 cashew processors and marketers. Data were collected with the aid of structured questionnaire and analyzed using descriptive statistics, Gross margin analysis and linear regression. The results on socio-economics of cashew processors and marketers revealed that their mean age was 35 years and more than half (59.0%) of the respondents were females. About 49.0% of the respondents were married, while 100% of the processors and marketers had formal education. The mean household size and marketing experience were 6 persons and 9 years, respectively. Result on gross margin analysis revealed that cashew processing and marketing was profitable with an average gross margin of ₦63,516.9040 in the study area. The results on linear regression analysis revealed that age, education, processing and marketing experience, amount of cashew nut and capital significantly influenced cashew processing and marketing ($P \leq 0.01$), while household size significantly influenced cashew nut processing and marketing ($P \leq 0.10$). The study concluded that cashew processing and marketing in the study area was profitable. It was recommended that processors and marketers of cashew should seek for more improved production practices so as to improve on level of production to obtain higher profits. Also, government and Non-governmental organizations should assist farmers in providing farming inputs so as to increase their productivity.

Keywords: Analysis, Cashew, economics, marketing, processing.

1.0 Introduction

Cashew (*Anacardium occidentale L.*) is one of the commodities that have given Nigeria recognition worldwide. According to Hammed and Anikwe (2008), cashew was introduced into Nigeria between 15th and 16th centuries by the Portuguese explorers

and the crop has rapidly spread to all agro-ecological zones of the country. The cashew tree grows with minimum attention and is easily cultivated (Aliyu, 2001). The tree is capable of living for between fifty and sixty years and produces nuts for about fifteen to twenty years (Salau *et al.,* 2017). In Nigeria, cashew grows successfully in virtually all agro-ecological zones including the semi- arid areas but with high concentration in the middle belt areas. Cashew production comes from over 20 States. It was reported by Olomola in Farayola *et al,* (2013) that in 1995, total hectares of land under cultivation was estimated at 40,000 with about 60% of the holdings owned by smallholders; another 30% were available in the wild; while 10% was in the large and medium size commercial plantation sector.

Cashew processing is a series of unit operations essential to make available, the edible nut. Variations in processing methodology between different manufacturers are attributed to differences in cashew, availability of equipment, human resource and fuel source. In Nigeria, most cashew processing units are at rural level. After 1960, unit operations such as roasting, shell liquid extraction and shelling have been mechanized. Cashew nut processing allows for the development of an important by-product, which can increase its added value. The liquid inside the shell represents 15 percent of the gross weight and has some attractive possible medicinal and industrial uses. Cashew nut shell liquid (CNSL) is one of the few natural resins that is highly heat resistant and is used in braking systems and in paint manufacture (Farayola *et al.,* 2013). It contains a compound known as *anacardium* which is used to treat dermatological disorders. The main markets for cashew nut shell liquid (CNSL) are the United States, the European Union (mainly the Kingdom), Japan and the Republic of Korea. Together these account for over ninety percent of world trade, most of which is supplied by India and Brazil.

The cashew nut fruit consists of a peduncle and a seed. The peduncle, often called the false fruit, is pear shaped, yellow or red in colour and made up of a soft juicy pulp. The seed which develops below the peduncle is kidney shaped and resembles a large bean. Internally, the seed contains the kernel or cashew nut of commerce surrounded by an oily liquid called cashew nut shell liquid. (CNSL) which is a triglyceride and contains a high proportion of phenolic compounds and finds it use in industry as a raw material for brake lining compounds as well as waterproofing agent, a preservative and in the manufacturing of pant and plastics (Farayola *et al.,* 2013). The kernel contains 47% oil. The main market of cashew nut is as a high value edible nut. The cashew nut shell liquid and Cashew apples can also be made into drinks, wines and pickles. Due to the high value of cashew nuts even small pieces find a market in confectionery industries (Farayola *et al.,* 2013).

Marketing is one of the significant aspects of Nigerian agriculture. Agricultural marketing is the performance of all the activities involved in the flow of agricultural products and services from the initial points of production until they reach the hands of the ultimate consumers. Poor trading systems of some crops and their products partly lead to the inherent inefficient agricultural commodity marketing in Nigeria. For the cashew nut produce, its marketing involves several players and channels. It starts from the sale of raw cashew nuts by gatherers and farmers to the retailers who then sell to the wholesalers until it reaches the level of the processors, for selling of the processed and graded kernels to the ultimate consumers. The marketing channel may vary for different commodities depending on the nature, use, value of commodities, marketing margin and the mark-up policy of the traders in the marketing system (Onyenobi *et al*., 2009).

Several studies have been carried out on cashew's production, processing and

marketing separately. For instance, Salau *et al.* (2017) worked on analysis of cashew nut marketing in Kwara State, Nigeria, Uwagboe *et al.* (2006) worked on information delivery and its effects on cashew production in Oyo State, Nigeria; Farayola *et al.* (2013) worked on Economic analysis of cashew nut marketing among produce buyers in Ogbomoso metropolis of Oyo State, Nigeria. However, none of such studies has been done in the study area. Therefore, this study filled the research gap by analyzing cashew nut processing and marketing in Otukpo Local Government Area of Benue State, Nigeria.

2.0 objectives of the Study

The brand objectives of this study was to analyse economic of cashew processing and marketing in Otukpo L.G.A of Benue State Nigeria. The specific objectives were to:

I. Describe the socio-economic characteristics of cashew processors and marketers in Otukpo Local Government Area of Benue State,

ii. Identify cashew processed and marketed products in the study area,

iii. Estimate costs and returns in cashew processing and marketing in the study area,

iv. Determine the factors influencing cashew processing and marketing in the study area.

3.0 Methodology

Otukpo Local Government Area of Benue State was the study area. Otukpo is the oldest and most developed Local Government Area in Idoma land and is the third largest town in the State after Makurdi and Gboko. Otukpo Local Government came into existence in 1923, with its headquarters at Otukpo. It then comprised twenty-two (22)

districts, and was known as Idoma Native Authority. However, with Local Government reform of 1976 and subsequent Local Government creation exercises, the Otukpo Local Government has thirteen (13) council wards, which are Adoka Haje, Adoka Icho, Allan, Entekpa, Ewulo, Okete, Otobi, Otukpo Town Central, Otukpo Town East, Otukpo Town West, Ugboju Ehaje, Ugboju Icho and Ugboju Otahe 1,269km2with a population of 266,411 people (NPC, 2006).

The people of the Otukpo Local Government Area predominantly speak a dialect of Idoma language, except for the Akpa people (found around Otobi – Allan axis) who speak Akweya language. Tribes such as Igede, Igala, Igbo, Hausa, Yoruba and other predominant ethnic groups are also found here. The people are mostly traders and farmers (Wikipedia, 2017). Geographically, Otukpo town lies between latitudes 7o0 and 7o 30N and longitudes 7o 30 and 8o 10E of the equator (Benue State Ministry of Land and Survey, 2010). Otukpo has two basic weather conditions, which are the dry and rainy seasons. It has an annual rainfall of about 893mm, concentrated in the rainy season, which lasts from June to October. It records the highest temperatures of between 32-37°C, while December to February records the lowest temperatures of 20-24oc (harmattan period). The climate is tropical-humid in nature (not too much rainfall and not too much sunlight). The soil found In Otukpo Local Government Area are sandy-loam and a little porous during rainy season (Wikipedia, 2017).

The main economic activity undertaken in the area is agriculture and the agricultural activities commonly practiced in Otukpo Local Government Area can be categorized into two namely; annual crops such as yam and livestock farming. Livestock farming is another important agricultural activities practiced by Otukpo farmers and the livestock

reared include swine, goats and poultry.

The Local Government Area also has rich forest reserves; hence the presence of man sawmills in the area. The Local Government Area has large reserves of kaolin with the potential for commercial exploration in addition to the large deposit of clay soil, which has given rise to clay brick cottage industries in the area. Mixed farming is also practised by some inhabitants of the study area. The Local Government Area provides the best and wide range of investment opportunity in small scale agro allied industries in areas like palm kernel, palm oil production and palm wine preservation in Benue State. Otukpo is a fast- developing commercial center as business investors are beginning to harness its potentials by establishing commercial business centers such as boutiques, computer centers, small telecommunications outlets, just to mention but a few (Ogbodo, 2016).

The population of this study consists of Cashew processors and marketers in Otukpo Local Government Area of Benue State. Multistage sampling procedure was employed to select respondents for this study. Firstly, five council wards were purposively selected based on their predominance in Cashew processing and marketing activities. The second stage involved the random selection of one community from each of the selected council wards. In the third stage, a sampling frame was developed for each of the communities and using a proportion of 10% (0.10) across board, a total sample size of 100 respondents was selected Data for the study were collected mainly from primary source. The data were generated through the use of well- structured questionnaire designed to capture the objectives of the study and consequently, provide answers to the research questions. This study employed both descriptive and inferential statistics to analyze the

data obtained from cashew processors and marketers in the study area. Descriptive statistics such as frequency, percentages and mean were used to analyze data on socio-economic characteristics of cashew processors and marketers in the study area and identify cashew processed and marketed products. Inferential statistics such as Gross margin analysis was used to estimate costs and returns in cashew processing and marketing and linear regression was employed to determine the factors influencing cashew processing and marketing.

4.0 Results and Discussion

4.1 Socio-Economic Characteristic of Respondents

Table 1 shows that more than half (59.0%) of the processors and markers in the study area were female, while 41.0% were male. This implies that more females were involved in cashew processing and marketing. This result disagrees with Salau *et al.* (2017) who found that 81% of cashew nut processors and marketers were male. The result of age distribution of respondents revealed the mean age of 35 years, implying that processors and marketers are in their productive age and this could lead to increase in processing of cashew nut in the study area. Specifically, 53.0% of the respondents were between 18-30 years; 22.0% of the respondents were between 31-40 years; 6.0% of the respondents were between 41-50 years, 5.0% were between 51-60 years, while 14.0% were within 61-65 years. This result agrees with Enete and Achike (2008) who made similar observations in the south east Nigeria, that cashew processors and marketers were in their productive age.

The results on marital status revealed that about (49.0%) of the respondents were married, 42.0% of the respondents were single, 7.0% were divorced, while 2.0% were widowed. This implies that majority of the respondents were married and this is expected

because married people are supposed to provide daily meal to their children. This result is in line with the finding by Salau *et al*. (2017). Furthermore, the result on education of respondents showed that majority (61.0%) of the processors and marketers attained primary education, 32.0% of the respondents attained secondary education, while 7.0% of the respondents have tertiary education, with mean of 8 years in education. This implies that the respondents are knowledgeable and will be opened to adopt new technologies. Sofoluwe *et.al* (2011) confirmed that education influences people's perception and adoption of innovations.

Table 1 also shows that the mean processing experience was 9 years, which implies that processors and marketers had considerable years of experience which is an advantage towards production and adoption of technologies. Specifically, 58.0% of the respondents had 1-5 years of processing and marketing experience, 23.0% of the respondents had 6-15 years of processing and marketing experience, 3.0% of the respondents had 16-25 year of processing experience, while 16.0% of the respondents had 26- 35 year of processing experience This agrees with Hailu (2008) who reported that more experienced processors and marketers are knowledgeable and more likely to adopt new techniques. The result on household size revealed that respondents had a mean household size of 6 persons; specifically, 64.0% of the respondents have 1-5 household size, 24.0% have household size of 6-10 persons, 6.0% have household size of 11-15 persons, 3.0% of the respondents have household size of 16-20 persons, while 3.0% of the respondent have household size of 21-25 persons. The result agrees with Salau *et al*.(2017) who reported that majority of cashew nut processors and marketers in Kwara State had relatively large household size. This implies that majority of the households had large number of persons, which is an indication of availability of labour for cashew

processing and marketing.

The results on other occupation of respondents revealed that majority (73.0%) of the processors and marketers have other major occupations, while 27.0% have no other occupation. The result on ownership of cashew farm indicates that 49.0% of the respondents have cashew farm; while 51.0% do buy cashew nut from other sources with about 52.0% ownership from inheritance, 7.0% purchased, 2.0% from husband's farm, 3.0% from leasing and 36.0% from other means. Also about 5.0% of the respondents that buy cashew nut from outside do buy from Agricultural Developments Project (ADP), 23.0% from market and 67.0% from farmers. The result also revealed that about 88.0% of the respondent do hired machines for processing, while about 12.0% have machines of their own.

Table 1: Socioeconomic Characteristic of Respondents (n=100)

Variable	Frequency	Percentage	Mean
Sex			
Male	41	41.0	
Female	59	59.0	
Age (years)			**34.74**
18-30	53	53.0	
31-40	22	22.0	
41-50	6	6.0	
51-60	5	5.0	
61-65	14	14.0	
Marital Status			
Single	42	42.0	
Married	49	49.0	
Divorced	7	7.0	
Widowed	2	2,0	
Processing and Marketing Experience(years)			**9.42**
1-5	58	58.0	
6-15	23	23.0	
16-25	3	3.0	
26-35	16	16.0	
Education			**8.26**
Primary	61	61.0	
Secondary	32	32.0	
Tertiary	7	7.0	
Other Occupation			
Yes	73	73.0	
No	27	27.0	
Household size			**6.21**
1-5	64	64.0	
6-10	24	24.0	
11-15	6	6.0	
16-20	3	3.0	
21-25	3	3.0	
Owner of Cashew Farm			
Buy cashew nut	51	51.0	
Own cashew farm	49	49.0	
Means of Ownership			
Inheritance	52	52.0	
Purchased	7	7.0	
Husband's Farm	2	2.0	
Leasing	3	3.0	
Others	36	36.0	
Source of Cashew nut			
ADP	5	5.0	
Market	23	23.0	
Farmers	72	72.0	
Owner of Processing Machine			
Used hired machine	88	88.0	
Have machine	12	12.0	

Source: Field survey (2023)

4.2 Cashew Processed and Marketed Products in the Study Area.

Table 2 revealed that majority (75.0%) of the respondents were involved in raw cashew nut processing, 42.0% of the respondents were involved in cashew kernel processing, 53.0% were involved in fried/toasted nut processing, 34.0% of the respondents were involved in cashew nutshell liquids processing, while about 22.0% were involved in cashew apple processing. This result implies that majority of the respondents in the study area were involved in raw cashew nut processing. The finding agrees with Trox *et al.* (2009) who reported that cashew processing and marketing in Nigeria were under-utilized apart from raw cashew nut processing.

Table 2: Cashew Products Processed and Marketed

Cashew Products	Frequency	Percentage
Raw Cashew Nut	75	75.0
Cashew kernel	42	42.6
Fried/Toasted Cashew nut	53	53.0
Cashew Nutshell Liquids	34	34.0
Cashew Apple	22	22.0

Source: Field survey (2023) multiple responses

4.3 Costs and Returns Analysis in Cashew processing and Marketing

This consists of cost of purchasing cashew nut, cost of utilities, cost of labour, cost of firewood, cost of frying pan, cost of transportation and cost of tax/levies. Table 3 shows that the average cost of purchasing 25kg of cashew nut as ₦5535, the average cost of utilities in processing 25kg of cashew nut as ₦832.4110, the average cost of labour of processing 25kg of cashew nut was ₦6318.32 and the average cost of firewood for processing 25kg was ₦1201.000. Table 3 also revealed that the cost of frying pan for processing 25kg of cashew nut was ₦9262.00, average cost of transportation for

processing 25kg was ₦1201.000, average cost of tax/levies for processing 25kg was ₦18939.000, while the overall average total variable cost stood at ₦32891.22. The average total revenue from the processing of 25kg of cashew nuts was ₦ 95733.600.

Table 3 further showed that the minimum and maximum revenue were ₦21000.00 and ₦156000.00, respectively. The result revealed that the gross margin for processing 25kg of cashew nut in the study area as ₦63516.9040. The minimum and maximum gross margin in the study was ₦-7642.00 and ₦853466.00. The minimum value of ₦-7642.00 implies that some processors and marketers were processing at a loss. Since the average total revenue of ₦95733.60 is higher than the total variable cost of ₦32891.22.00, cashew processing and marketing is profitable in the study area.

Table 3: Cost and Returns in Cashew Processing and Marketing

Variables	Min (₦)	Max (₦)	Mean (₦)	Std. deviation
Cost of purchasing	5600.00	19000.0	5535.0000	4352.5456
Cost of utilities	1500.00	8000	832.4110	761.5541
Cost of labour	00	34000.00	6318.3200	5005.53
Cost of fire wood	350.00	6200.00	1201.0000	922.0213
Cost of frying pan	800	12300	6512.20	5251.20
Cost of transportation	500	35000.00	9262.0	7026.02461
Cost of tax/levies	100	148000.00	18939.0	20877.60692
Total variable cost	18000.00	85000.00	32891.00	8299.40
Total Revenue	21000.00	156000	95733.6000	699457.0
Gross margin	-7642.00	853466.00	63516.9040	595870.0

Source: Field survey (2023)

4.4 Factors Influencing Cashew Processing and Marketing

Table 4 revealed that the coefficient of (R^2) determination was 0.7223 indicating that 72.23% of the factors influencing cashew processing also influenced marketing. The result shows that F statistics (25.531) is positive and significant at 1% level, indicating the goodness of fit for the model and overall significance of variables used in the model. Table 4 also shows that age, education, amount of cashew nut, processing and marketing experience and capital were statistically significant at 1% level, while household size was significant at 10% level of probality. Specifically, the coefficient of age was positive and significant at 1% level, implying that age and processing are directly related. The older the age, the more cashew nuts are being processed and marketed. This is not unlikely because the processors and marketers will prefer to process and market the nut with higher experience of age.

The coefficient of education was negative and significant at 1%, implying that education and processing are in inverse relation. The more the educational qualification attained by the respondents, the less their involvement in cashew nut processing and marketing and vice versa. As the education level increases, the processors and marketers might likely avoid their usual business and seek other enterprises, such as white-collar jobs. The results also showed that the amount of cashew nuts has direct significant relationship with the coefficient at 1% level. The results further showed that capital have influenced cashew processing and the coefficient was significant at 1% level, implying that the more capital is available, processors and marketers will perform more cashew nut processing and marketing activities. The estimated coefficient of household size was negative and significant at 10% level. This implies that the larger household size reduces cashew nut processing and marketing in the study area. In order words, processors and

marketers with larger household size will achieve lower level of cashew processing and marketing compared to those with smaller household size.

However, the coefficient of cost of frying pan, and cost of processing were not significant and therefore do not significantly influenced cashew processing and marketing in the study area.

Table 4: Linear Regression Analysis of Factors Influencing Cashew Processing and Marketing

Variables	Coefficient	std. error	F statistics	Sign
Constant	4553.042	1265.40	3.598	0.000
Age	-88529.214	32523.5	-2.722	0.000***
Sex	8.348	8.908	0.937	0.130
Education	-179	68.529	-2.612	0.005***
Amount of cashew nut	2.077	2.768	.7503	0.000***
Household size	-.149	119.678	-1.245	0.062*
Capital	1.341	1.189	1.127	0.004***
Cost of firewood/gas	-13206.028	9247.647	-1.428	0.188
Cost of frying pan	722.252	1204.521	0.599	0.550
Processing and marketing experience	-58690.132	18913.146	-3.103	0.003***
R^2	0.7223			
F-statistics	25.531			

Source: Field survey (2023), *** significant at 1% and * significant at 10%

5.0 Conclusion and Recommendations

5.1 Conclusion

The study was on economic analysis of cashew processing and marketing in Otukpo Local Government Area of Benue State, Nigeria. The result found that various cashew

processed and marketed products were raw cashew nut, cashew kernel, fried/roasted cashew nut, cashew nutshell liquids and cashew apple in the study area. The result on costs and returns analysis of cashew processing and marketing in the study area showed that the enterprise is profitable due to the positive values of the average gross margin. The study also revealed certain factors that significantly influenced cashew processing and marketing in the study area were age, education, amount of cashew nut, capital and processing and marketing experience.

5.2 Recommendations

Based on the findings of this study, the following recommendations were made:

1. Government and other well-meaning individuals and organizations should help provide inputs and facilities needed by processors and marketers to reduce the cost incurred in processing and marketing of cashew in order to increase the profitability of cashew processing and marketing in the study area.
2. Processors marketers and other individuals should come together to form cooperatives that will enable them access credit from banks and other financial institutions.
3. Processors and marketers of cashew should seek for more improved production practices so as to improve on level of production to obtain even higher profits.

References

Aliyu, O.M. (2001). Development of rapid method of propagating improved cultivars of cashew through budding, grafting and marcotting. Annual Research Report of the cocoa Research Institute of Nigeria, Ibadan, Nigeria. pp. 30-31.

Enete, A. A. and A. I. ACHIKE,(2008). "Urban Agriculture and Urban Food Insecurity/Poverty in Nigeria: The Case of Ohafia, South-East Nigeria", Outlook on Agriculture, 37(2): 131-134

Farayola, C. O., Adedeji, I. A., Popoola, P. O. and Amao, S. A. (2013). Determinants

of Participation of Small Scale Commercial Poultry Farmers in Agricultural Insurance Scheme in Kwara State, Nigeria. World Journal of Agricultural Research,. 1(5): 96-100.

Farayola, C.O., Akintonde, J.O., Awoyemi, S.O. and Akintaro, O.S. (2013). Economic analysis of cashew nut marketing among produce buyers in Ogbomoso metropolis of Oyo State, Nigeria. *International Journal of Agriculture Innovations and Research, 2(1):130-136.*

Hailu, A. S. (2008, January). Public Policy and Firm Level Investment Behaviour in Ethiopia*. Economics of Development (ECD)*. Retrieved from http://hdl.handle.net/2105/6733

National Population Commission (2006). 2006 Census.

Ogbodo, R.O.A. (2016).A dress code for students: Addressing the moral decadence in tertiary institution. Journal of the Federal Ministry of Education Today, 12(1), 8- 12

Onoh S. C. and Udah S. C. (2015). Economics of Cashew Harvesting and Marketing in Oghe, Ezeagu Local Government Area, Enugu State, Nigeria. American Journal of Business, Economics and Management, 3(6): 379-383.

Salau, S.A., Popoola, G.O. and Nofiu.B. N. (2017). Analysis of cashew nuts marketing in Kwara Sate, Nigeria. *Fuoye Journal of Agriculture and Human Ecology,* 1(1): 34- 44,

Trox, J, Vadivel, V. and Vetter, W, (2010) Bioactive compounds in cashew nut (*Anacardium occidentale* L.) kernels: effect of different shelling methods. J Agric Food Chem 58, 5341–5346.

Uwagboe, E., Obatolu, B. and Adeogun, S. (2006). Information delivery and its effects on production of cashews in Oyo State. Proceedings of the Farm Management Association of Nigeria (FAMAN), held at Forestry Research Institute of Nigeria, Federal College of Forestry, Plateau State.

JOURNAL OF AGRICULTURAL ECONOMICS, EXTENSION & SCIENCE
Official Journal of the College of Agricultural Economics and Extension
www.jaees.org
www.uam.edu.ng
JAEES Vol. 10 No. 2 2024, Pages 150 - 161
ISSN (Print) 2545-5179, ISSN (Online) 2714-5018

ANALYSIS OF COST IMPLICATIONS OF HUMAN IMMUNO-DEFICIENCY VIRUS AND ACQUIRED IMMUNE DEFICIENCY SYNDROME SCOURGE ON FARMING HOUSEHOLDS IN THE NORTH CENTRAL NIGERIA

Weye, E. A. and Bogbenda, A

Department of Agricultural Economics, Joseph Sarwuan Tarka University Makurdi, Nigeria

Email: weyeemmanuel@gmail.com

ABSTRACT

This study was carried out to analyze cost implications of Human Immuno-Deficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) scourge on farming households in North Central Nigeria. A simple random sampling technique was used to select a total sample size of 408 respondents. Structured questionnaire was employed to collect primary data. The analytical tools used were descriptive statistics and cost of illness approach. The results obtained showed that majority (68.6%) of the respondents were males and married (64.0%) with average household size of 9 persons. Majority (83.1%) of the household heads were primary or secondary school holders and 51.1% had farming as the major occupation. Land ownership was mainly through inheritance (66.9%), while majority (87.5%) of farm sizes ranged from 1.0 – 6.0 hectares. Majority (65.69%) of the respondents had annual farm incomes ranging from N100,000 – N200,000 and a similar pattern of off–farm incomes. The average cost of HIV/AIDS treatment in orthodox health facilities was N23,118.07 per household per annum. The costliest items paid for were bed charges (22.28 %), drugs (21.89%) excluding Anti-Retroviral Therapy drugs and feeding (20.98%). Households on the average spent N5,850 on HIV prevention. The total direct cost of HIV/AIDS per household per year was N28,968.07(24.43%), while the indirect cost amounted to N89,609.40 (75.51 %). The study concludes that HIV and AIDS constitute a heavy financial and economic burden on households through catastrophic health expenditures and adversely reduce farm productivity. Social security programmes like National Health Insurance Scheme (NHIS) to poor households to help their smooth consumption in the face of HIV/AIDS is recommended.

Keywords: Analysis, Cost, implication, HIV/AIDS, households.

1.0 Introduction

Acquired Immune Deficiency Syndrome (AIDS) is a human viral disease that

ravages the immune system, undermining the body's ability to defend itself from infection and diseases. It is caused by the Human Immunodeficiency Virus (HIV). AIDS leaves an infected person vulnerable to opportunistic infections. These are infections by microbes that take advantage of a weakened immune system and cause life-threatening effect on people with AIDS, whereas such infections are usually not serious in healthy people. Not only has the cure for the disease not been found to date, but the rate of its spread, morbidity and mortality has been overwhelming. In 2011, there were 34.0 million people living with HIV/AIDS in the world with 2.5 million new infections and 1.7 million AIDS-related deaths (UNDP, 2012). Regional distribution of HIV/AIDS, show that sub-Saharan Africa has 23.5 million people living with HIV/AIDS, 1.8 million new infections and 1.2 million AIDS-related deaths, representing 69.12%, 72.0%, and 70.59%, respectively. South and South-East Asia, the closest region in terms of HIV/AIDS infection to sub-Saharan Africa, has 4.0 million (11.76%) people living with HIV/AIDS, 280,000 (11.20%), new infections and 250,000 (14.71%) AIDS-related deaths (UNAIDS, 2012).

In Nigeria, an estimated 3.0 percent of the population are living with HIV and AIDS (National Agency for the Control of AIDS, 2015). Approximately 220,000 people died of AIDS in Nigeria in 2009 (UNAIDS, 2012). With AIDS claiming so many lives, Nigeria's life expectancy has declined significantly. In 1991 the average life expectancy was 54 years for women and 53 years for men (WHO/UNAIDS/UNICEF, 2010). In 2013, these figures had fallen to 48 for women and 46 for men (UNGASS, 2014). The first case of HIV and AIDS in Nigeria was identified in 1986, thereby establishing the presence of the disease in the country (Adeyi, 2006). Since then, the prevalence rate has been increasing in Nigeria. From 1.6 percent in 1991, it increased to

a peak of 5.8 percent in 2001, dropped to 5.0 percent in 2003, 4.4 percent in 2005 (NACA, 2006). This was followed by a rise to 4.6 percent in 2008, 4.1 percent in 2010 and 3.0% in 2014 (NACA, 2015).

Although HIV affects people of all ages, UNGASS (2010) report on Nigeria shows that the estimated number of people living with HIV fell within age rang of 15-49 years had a median prevalence rate of 3.6%. Adults aged 15 years and above living with HIV had a median prevalence rate of 3.6%. Adults aged 15 years and above were 1.7 million, while children below the age of 15 years were 360,000. The high sexual activity of the age bracket 15-49 years is perhaps the most important explanation of the high prevalence rate of HIV in this group.

2.0 Objectives of the Study: The broad objective of this study was to analyse cost implications of HIV/AIDS Scurge on farming households in the North Central Nigeria. The specific objectives of the study were:

i. describe the socio-economic characteristics of the respondents.

ii. determine cost implications of HIV/AIDS on farming households in the study area.

3.0 Methodology

This Study was conducted in the North Central Nigeria. The population of this study comprises all the households in North Central Nigeria. However, due to constraints of time, finance and other resources, 408 respondents were selected as sample size. A multi stage sampling procedure was used for this study. The first stage involved purposive selection of Benue, Nasarawa and Plateau States based on their high prevalence rates of HIV/AIDS infection (5.6% for Benue, 8.1% for Nasarawa and 2.3% for Plateau). The high agricultural activities from the area also informed the choice as

majority of the population are farmers producing the same types of crops under the same agricultural systems. Finally, the people of the area share common socio-economic and socio-cultural characteristics.

The second stage was also a purposive selection of the three agricultural zones from each of the selected States. This was done to give a State-wide coverage of the study. From each agricultural zone, one Local Government Area was randomly selected for the study, since the disease is prevalent in all the Local Government Areas. This was based on information from the Ministries of Health (MoH), the Agency for the Control of AIDS (SACAs) and the Agricultural Development Projects (ADPs) of the three States.

The third stage was proportional allocation of 15% (0.15%) across board of the wards in each of the selected Local Government Areas in all the States. This was done to avoid bianess in the selection of the wards. Lastly, a sampling frame was obtained from the States Agencies for the Control of AIDS (SACAs). Using a proportional allocation of 10% across board, a sample size of 408 respondents was selected for the study.

4.1 Socio-economic Characteristics of Respondents

Table 1 shows that male-headed households were dominant in Benue State (78.1%) and Nasarawa State (76%), while female-headed households dominated slightly in Plateau State (52.1%). The pooled result for the three States showed that male-headed households dominated (68.6%), while female- headed households made up 31.4%. This result agrees with Anonguku *et al.* (2010) and Nyiatagher (2015) who stated that males are usually the household heads and take major decisions of the household. Males are known to have more control over household assets like livestock and land and can explore more ways of prevention and treatment of HIV and AIDS within the household. With female-headed households increasing as a result of the scourge, especially in Plateau state, this responsibility is now being shifted to women who may not be able to manage the household resources well in the fight against the disease.

Table 1 further that majority of them were within the age bracket of 21-69 years with a pooled percentage of 94.8%. Those below 21 years and above 60 years constituted 1.2% and 3.9%, respectively. The same trend was observed in the three States. This implies that majority of the respondents are within the economically active age bracket of 20-60years and can effectively use their energies and mental endowments for increased agricultural production. However, this age bracket is also the most vulnerable to HIV/AIDS as the group is more sexually active and that the disease is transmitted mostly through sexual intercourse (UNAIDS, 2010)

Table 1 also above shows that 74.3% of those in Benue State were married compared to 54.8% in Nasarawa and 57% in Plateau States, respectively. The pooled result showed that 64% were married while 36% were single. Married farmers are more responsible and can take measures to safe guard the health of their families against HIV/AIDS

compared to single persons. It was also found that the main occupations of the respondents were farming, civil service and business. Full time farmers constituted 53% in Benue State 47.1% in Nasarawa State and 52.1% in Plateau State. Civil Service (or office work) was the next major occupation with 24% for Benue State, 44.2% for Nasarawa State and 26.4% for Plateau State. Pooled result showed that 51.2% were full-time farmers, 29.9% were office workers while 18.9% had business as their main occupation. This participation in agricultural production by office workers and businessmen can result to increased agricultural output in North Central Nigeria which has the potential to feed the nation.

Increased income from agricultural production can be used by households to improve the quality of their meals as they can afford more protein-based meals, which can help in improving the body's immunity against HIV and AIDS. Households can also use the additional income to meet the cost of prevention and treatment of the disease without resorting to other coping strategies.

Land ownership is mainly, through inheritance with 61.2% for Benue State, 75% for Nasarawa State and 69.6% for Plateau State. When pooled, land ownership through inheritance constituted 66.9%, followed by hiring (23.3%), outright purchase (7.1%), pledged (1.7%) and communal (0.9%) as contained in Table 2. Land ownership through inheritance can result to fragmentation as well as family and communal conflicts (Biam *et al.,* 2008). Outright purchase of land is not popular in North-Central Nigeria as land owners do not have absolute right over the land to sell it. Such powers are vested in the community; this implies that income from agricultural activities may not be enough to adequately meet the cost of prevention and treatment of HIV and AIDS.

On education majority of the respondents as revealed in the result had secondary

education in Benue State (76%) and Nasarawa State (57.7%). Primary school qualification followed in magnitude, with Benue having 14.2%, Nasarawa 34.6% and Plateau 33.1%. Overall, 58.1% had secondary education, 25% had primary education and 6.1% had tertiary education. Collectively they constituted 89.2% of the respondents. This result shows that farmers are adequately educated to take necessary measures for prevention and control of HIV/AIDS in the study area.Household sizes of 6-10 members were dominant in Benue (71.6%) and Nasarawa (65.4%) with Plateau State having more families of 2.5 members. Pooled result shows that 59.8% had 6-10 members, 18.4% had 2.5 members, 12% had 11-15 members, and 7.1% had 16-20 members while 2.7% had family members of 21 and above with a mean household size of 9 persons as shown in the result. This implies that family labour could be readily available for agricultural production in the study area. This in turn can guarantee increased income and lead to improved standard of living. This agrees with the findings of Ejembi and Ejembi (2005) who found what @ where?

The pooled analysis on farming experiences in Table 2 showed that 28.4% of the respondents had experience of 6-10 years, 20.1% had experience of 11-15 years, 23.8% had experience of 1 6-20 years and 22.1% had been farming for more than 20 years. Only 5.6% had been farming for 1-5 years. This clearly shows that 94.4% of the respondents have farming experience of more than five years which place them in a good position to integrate preventive and control measures against HIV/AIDS and agricultural production.

Farm size varied from 1 hectare in the more densely populated peri-urban areas to more than 10 hectares within the rural environment. Result of the pooled sample in Table 2 showed that 87.5% of the respondents had farm sizes ranging from 1.0-6.0

hectares with a mean farm size of 3.75ha. Only 1.7% had farm sizes above ten hectares. This shows that they are small-holder farmers that may find it difficult to realize adequate money to help them in the prevention and control of HIV/AIDS in their households.

On the basis of farm income, majority of the respondents earned N200, 000 and below (65 %) when pooled with a mean farm income of N173,390. Benue State had a combined score of 57.9%, Nasarawa 76.9% and Plateau 67.7%. Yet a few of the respondents earned above N400, 000 with Benue having 6.6%, Nasarawa 5.8% and Plateau 10.7% as contained in Table 2 The low level of farm income places these farmers in a difficult position in the prevention and control of HIV and AIDS.

Similarly, the off-farm income distribution of the respondents in Table 2 showed that majority earned not more than N100,000 annually. The pooled sample showed that 65.69% were in this category while 17.65% earned from 101,000-200,000 with a mean off-farm income of N133,760. This implies that the farmers do not have much confidence in off-farm income to rely on in case of farm failures and to meet the cost of HIV and AIDS.

4.0 Results and Discussion

Table 1: Distribution of respondents based on Socio-economic Characteristics (n=408)

Variable	Benue n = 183	Nasarawa n = 104	Plateau n = 121	Pooled n = 408
Sex				
Male	143 (78.1)	79 (76)	58 (47.9)	280 (68.6)
Female	40 (21.9)	25 (24)	63 (52.1)	128 (31.4)
Age (years)				
1-20	00 (0.0)	34(32.69)	1 (0.8)	5 (1.2)
21-40	108 (59.0)	39 (37.5)	61 (50.4)	238 (58.3)
41-60	72 (39.3)	31 (29.8)	46 (38.0)	149 (36.5)
Above 60	3 (1.6)	00 (0.0)	13 (10.7)	16 (3.9)
Mean	39.02	29.92	42.24	39.13
Marital Status				
Married	136 (74.3)	57 (54.8)	69(57.0)	261 (64.0)
Single	47 (25.7)	60 (45.6)	52 (43.0)	147 (36.0)
Main Occupation				
Farming	97 (53.0)	49 (47.1)	63(52.1)	209 (51.2)
Civil Service	44 (24.0)	46 (44.2)	32(26.4)	122 (29.9)
Business	42 (23.0)	9 (8.7)	26(21.5)	77 (18.9)
Land Ownership				
Inheritance	112 (61.2)	78 (75.0)	83(68.6)	273 (66.9)
Hired	63 (34.4)	9 (8.7)	23 (19.0)	95 (23.3)
Purchased	7 (3.8)	12(11.5)	10 (8. 3)	29 (7.1)
Pledged	1 (0.5)	3 (2.9)	3 (2.5)	7 (1.7)
Communal	0 (0.0)	2 (1.9)	2 (1.6)	4 (0.9)
Education				
Non formal	4(2.2)	7(6.7)	83 (27.3)	44 (108)
Primary	26 (14.2)	36 (34.6)	40 (33.1)	102 (25.0)
Secondary	139 (76.0)	60 (57.7)	38 (31.4)	237 (58.1)
Tertiary	14 (7.7)	1 (1.0)	10 (8.3)	25 (6.1)
Household Size				
2-5	18 (9.8)	9 (8.7)	48 (39.7)	75 (18.4)
6-10	131(71.6)	68 (65.4)	45 (37.2)	244 (59.8)
11-15	15(8.2)	15 (14.4)	19 (15.7)	49 (12.0)
16-20	11(6.0)	9 (8.7)	9 (7.4)	29 (7.1)
Above 20	8 (4.4)	3 (2.9)	0 (0.0)	11 (2.7)
Mean	9	10	8	9
Farming Experience (years)				
1-5	5(2.7)	6 (5.8)	12 (9.9)	23 (5.6)
6-10	39(21. 3)	51 (49.0)	28 (23.2)	116 (28.4)
11-15	42(23.0)	19 (18.0)	19 (15.7)	82 (20.1)
16-20	64(35.0)	16 (15.4)	17 (14.2)	97 (23.8)
Above 20	33 (18.0)	12 (11.5)	45 (37.2)	90 (22.1)
Variable	Benue **n = 183**	**Nasarawa n = 104**	**Plateau n = 121**	**Pooled n = 408**
Farm Size (Ha)				
0-1-2.0	20(10.9)	36 (34.6)	48 (39.7)	104 (25.5)
2.1-4.0	81 (44. 3)	26 (25.0.)	29 (24.0)	136 (33. 3)
4.1-6.0	63(34.4)	33 (31.7)	21 (15.7)	117 (28.7)
6.1-8.0	16(8.7)	6 (5.8)	9 (7.4)	31 (7.6)
8.1-10.0	3 (1.6)	1 (1.0)	9 (7.4)	13 (3.2)
Above 10.0	0 (0.0)	2 (1.9)	5(4.1)	7(1.7)
Mean	3.96	3.45	3.68	3.75
Farm Income (N'000)				
1-100	50(27. 32)	52 (50.0)	51 (42.15)	153 (37.5)
101-200	56 (30.60)	28 (26.9)	31 (25.62)	115 (28.19)
200-300	38(20.8)	15 (14.4)	12 (9.9)	65 (15.9)
301-400	27(14.8)	3 (2.9)	14 (11.6)	44 (10.8)
401-500	12 (6.6)	6 (5.8)	13 (10.7)	31 (7.6)
Mean	193.02	138.0	173.64	173.29
Off-Farm Income (N'000)				
1-100	101(55.19)	72 (50.0)	51 (42.15)	153 (37.5)
101-200	31 (16.94)	19 (18.27)	22 (18.18)	72 (17.65)
201-300	18(9.84)	10 (9.62)	12 (9.92)	40 (9.8)
301-400	12(6.6)	4 (3.85)	6 (4.96)	20 (4.9)
401-500	3 (1.64)	2 (1.92)	3 (2.48)	8 (1.96)
Mean	120.20	105.64	131.35	133.76

Source: Field survey (2022)

4.2 Cost of illness (HIV/AIDS) to the households in North-central Nigeria

The total cost of illness comprises the direct costs (prevention and treatment costs) and the indirect costs (the value of work days or hours lost by the patient and caregivers during the period of sickness and convalescence). Table 2 presents the summary of the mean cost of HIV/AIDS per household in a year. Under the direct cost, the prevention cost of HIV/AIDS borne by a household in a year was found to be N6,250 in Plateau State. These figures represented 3.83%, 5.53% and 6.24% of the total cost of the disease respectively. The treatment cost was N25,117.9 for Benue State, N26,036.10 for Nasarawa State and N18,200.2 for Plateau State. This represented 15.38% of the total cost in Benue State, 26.17% in Nasarawa State and 19.58% in Plateau State. Thus the total direct cost was N31,367.9 in Benue, N31,53.1 in Nasarawa and N24,000.2 in Plateau State, representing 19.2%, 31.7% and 25.81% of the total cost of the disease in Benue, Nasarawa and Plateau States respectively (Table 2).

The total direct cost was a small proportion of the total cost of the disease and this was observed in the three States under the study. Indirect cost represented 75.51% of the total cost of the scourge when the three States were pooled together. This agrees with Russell (2005) who stated that income losses caused by illness, particularly serious and prolonged illness, are often a more significant cause of impoverishment than direct costs. Even as anti-retroviral drugs and other services are free of charge to majority of the patients, some informal charges, time, transport costs and other related expenditures by households are considerable. This is in conformity with Abel-Smith and Rawal (1992).

Table 2: Average Cost of HIV/AIDS Per Household Per Year

Cost of illness	Benue (n=183)	Nasarawa (n=104)	Plateau (n=121)	Pooled (n=408)
Direct cost				
Treatment(₦)	25,117.9 (15.38)	26,036.1 (26.17)	18,200.2 (19.58)	23,118.7 (19.50)
Prevention cost(₦)	6,250.0 (3.83)	5,500.0 (5.53)	5,800.0 (6.24)	5,850.0 (4.93)
Total Direct cost	31,367.9 (19.21)	31,536.1 (31.70)	24.000.2 (25.81)	28,968.07 (24.43)
Indirect Costs				
Workdays/time lost(₦)	131,911.89 (80.79)	67,946.32 (68.30)	68,970.00 (74.19)	89.609.40 (75.51)
Total Cost(₦)	163,279.79 (100)	99,482.42 (100)	92,970.2 (100)	118,578.1 (100)
Average household size	9	10	8	9
Per capita cost of illness (₦)	17,942.83	10,362.75	12,074.05	13,474.78

Source: Field survey (2022)
Figures in brackets are percentages of the total cost

5.0 Conclusion and Recommendations

5.1 Conclusion

The study concludes that HIV and AIDS constitute a heavy financial and economic burden on households through catastrophic health expenditures and adversely reduce farm productivity.

5.2 Recommendations

Based on the findings of this study, it was recommended that Social security programmes like National Health Insurance Scheme (NHIS) should be introduced to poor households to help their smooth consumption in the face of HIV/AIDS.

References

Abel-Smith, B. and Rawal, P. (1992). Can the poor afford 'free' health services? A case study of Tanzania. *Health Policy Planning*. (4): 329-41

Adeyi, O. (2006). AIDS in Nigeria: A nation on the threshold. Chapter 2: *The Epidemiology of HIV/AIDS in Nigeria.* Harvard Center for Population and Development Studies.

Anonguku. I., Anoguku L.M. and Lawan, A.U. (2010). Socio economic characteristics of farmers and level of livestock pilferages in Benue State. *Nigerian Journal of Agricultural Economics Mgt. and Development. 1(1):189 – 194*

Biam, C.K., Weye, E.A. and Soma, J.T. (2008). Socio-cultural determinants and implication of women's rights to agricultural land in Makurdi Local Government Area of Benue State. Proceedings of the 1st National Conference of the Society for Gender in Agriculture and Rural Development (SOGARD), May 2008, University of Agriculture Makurdi. Pp 194-199.

Daudu, S., Okwu, O.J., and Shaibu, W. (2006). The effects of HIV/AIDS scourge on farm families in Makurdi Local Government Area of Benue State, Nigeria. *Journal of Human Ecology, 19(1): 41-44*

Ejembi, E.P. and Ejembi, S.A. (2005). The status of the Nigerian family: Implications for agricultural development. *The family Journal.* Benue State University, 2: 30-38

NACA (2006). National Agency for the Control of AIDS. National HIV/AIDS prevalence Survey. 25pp

NACA, (2015). Full meaning of NACA here Global AIDS Response Country Progress Report Nigeria (GARP) 2015 Abuja, Nigeria

Nyiatagher, Z.T. (2015). Economic implications of malaria on households in North-Central Nigeria. Unpublished Ph.D thesis, Department of Agricultural Economics, University of Agriculture Makurdi, Nigeria. 170 Pp

Russell, S. (2005). Illuminating cases: understanding the economic burden of illness through Case study of household research. Oxford University Press in association with the London School of Hygiene and Tropical Medicine. http://heapol.oxfordjournals.org/ Accessed on October 25, 2016 Not in textUNAIDS, (2012). Full meaning of UNAIDS here Global fact sheet World AIDS Day 2012 *http//www.unaids.org retrieved 23/03/2013*

UNGASS (2014) .United Nation General Assembly Session on HIV/AIDS. Declaration of Commitment on HIV/AIDS. "*Global Crisis, Global Action*". June 25-27

WHO/UNAIDS/UNICEF (2010) Full meanings of WHO/UNAIDS/UNICEF here Towards universal access: scaling up priority HIV/AIDS intervention in the health sector. WHOSIS (2008). WHOSIS World Health Organization Statistical Information System*http//www.who.int/whosis/en/retrieved10/08/2010*