Economic Efficiency and Profitability of Sweet Potato Marketing in Anambra State, Nigeria.

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Abstract— *The study examined the economic efficiency and profitability of sweet potato marketing in Anambra State, Nigeria. Specifically, it described profitability, economic efficiency and constraints to sweet potato marketing. Multistage sampling procedure which involved purposive and random sampling methods was used to select 240 marketers (120 wholesalers and 120 retailers). Data were collected from primary source using well structured questionnaire and were analyzed by means of descriptive statistics, enterprise budgeting and Sherpherd-Futell techniques. From the result, profitability indicators such as net marketing income, return on investment, net return on investment and coefficient of marketing efficiency of ₦ 8,775,807.4, 1.68, 0.68, 59.6 and ₦7, 892,837.4, 1.89, 0.89, 52.6 for wholesalers and retailers respectively proved the enterprise profitable at both levels. The implication of the net return on investment figures is that the wholesalers and retailers respectively return 0.68 kobo and 0.89 kobo for every 1 Naira invested in the business. Findings also indicated marketing efficiency levels of 59.6% for wholesalers and 52.6% for retailers implying that the retailers are more efficient in the marketing of sweet potato than the wholesalers. Findings on the constraints shows that seasonality of the product, high cost of transportation and rioting militated against sweet potato marketing on the wholesale whereas rioting and inadequate storage facility were perceived at the retail levels. Modern storage facilities and good road transport systems should be made available so that the volume of trade of marketers should increase for optimum profit*.

Keywords— Economic, Efficiency, Profitability, Sweet potato.

I. INTRODUCTION

Agriculture is Nigeria's most assured engine of development, a reliable key to industrialization, food security and a live wire to a well standardized country ensuring sustainability and poverty alleviation Nkamigbo, Ugwumba and Okeke (2019). Central Bank of Nigeria (CBN)(2014) opined that in Nigeria, the agricultural sector contributes about 42% of the gross domestic product (GDP) and provides employment to more than 70% of the people. Okeke and Nkamigbo (2013) and Isibor and Nkamigbo (2019) reported that agricultural sector is an engine room for sustaining growth of Nigeria economy and still remain the mainstay of our economy by providing food for the teeming population, create jobs as well as wealth, raw materials for industrial sector and foreign exchange earnings.

Sweet potato (*Lpomea batatas L*) is an herbaceous, warm-weather creeping plant that belongs to the family of Convolvulaceae and genus Ipomoea. It originated from South America where it was introduced to Europe between 153AD Sanusi and Adesogan (2014) and Udemezue (2019). The family is made up of 45 genera and 1000 species. Sweet potato grows throughout the world from latitude 400N to latitude 350S. It grows best at a temperature of between 24^{o}C with annual rainfall of 1000mm to 7000mm Mbanaso (2010) and Udemezue (2019). Sweet potato is regarded as world most important food crop due to its high yield. It is the fifth most important food crop after rice, wheat, maize and cassava in developing countries like Nigeria and the seventh most important food crop in the world in terms of production Sanusi, Lawal, Sanusi and Adesogan (2016) and Udemezue (2019). Nigeria is one of the largest producers of sweet potato in sub Saharan Africa with annual production estimated at 3.46 million tonnes per year and fourth largest producer in Africa while Egypt is Africa number one producer followed by Malawi. It was introduced into Nigeria in the late 1694-1698 through the early activities of the Portuguese and Spanish explores (Mbanaso (2010). Production of sweet potato was encouraged by the British colonial government during the Second World War as their tubers were needed to feed their armed forces in West Africa. Since then,

the importance of potato has been widely realized such that it is now as an important commodity in both local and international trade Ugonna, Jolaoso and Onwualu (2013).

Sweet potato is a major source of carbohydrate for millions of people especially in developing countries like Nigeria. It a great source of minerals like Manganese, Folate, Copper and Iron. The darker coloured variety is a great source of Carotenes (Precursor of Vitamin A), Vitamin C, B_2, B_6, E and biotin and also a source of dietary fibre, antioxidants which work in the body to prevent inflammatory problems like asthma, arthritis and regulate blood sugar level Sanusi *et al.*, (2016). They also noted that sweet potato can be used to fight against wide spread of vitamin A deficiency that result in blindness and even death of about 25000-500000 African children per year. Vitamin A deficiency is a particular problem with children under five and for pregnant and lactating women. Serious Vitamin A deficiency can weaken the immune system leaving them susceptible to diseases such as measles, malaria, and diarrhea and can also lead to blindness.

Sweet potato plays a great role in developing countries; it provides job opportunity to teeming population by raising their income. The demand for sweet potato is quite higher than the supply Ajakaije and Akande (1999) as cited by Adewumi and Adebayo (2008). This is as a result of its high nutritional value, cheap and inexpensive of the product compared to other root source of carbohydrates and vitamin. The leaf of potato can be use to feed animal either fresh or in the form of silage. The tubers can be consumed by man either boiled, roasted or fried. It can be dehydrated into chips, canned, cooked and frozen, creamed and used as pie fillings. It could also be dried and ground into flour to make biscuits, bread and other pastries. Sweet potato can be pounded together with yam to give a delicious meal Udemezue (2019) .

Baby food has being formulated using sweet potato while some bakeries blend 15-30% of sweet potato flour for making bread and 20-30% for pastries. It is used for brewing of alcoholic drinks and as sweetness in non-alcoholic drinks Agbo and Ene (1992). Sweet potatoes have medicinal value, the leaf decoction is used in folk remedies for asthma, bug bites, burns, catarrh, ciguatera stomach distress, tumor and whit lows. Sweet potato starch can be used in textile, glue, paint and cardboard industries. Industrial potentials of sweet potato have not been exploited due to mainly chronic lack of awareness to the abundance of industrial and commercial benefits.

It was reported by Sanusi *et al*, (2016) that sweet potato production has recorded good profit margin and is suitable for income generation. It has the potential for food security as well as serving as a cash crop. Sweet potato is becoming a thriving business in the State due to its economic, nutritious and commercial value and it is readily available in every market called sweet potato market. They further reported that sweet potato marketing has a large potential to enhance agribusiness development, generate income and employment opportunities that will lead to significant impact in the rural sector and non-producing areas. Sweet potato from the farm reaches the consumers through the marketing system. Nkamigbo and Isibor (2019) reported that marketing involves all processes in the movement of products that consumers need from the point of production to the point of purchase. Marketing is concerned with all stages of operation which facilitate the movement of commodities from the farm to the consumers. Marketing has economic value because it gives form, time and place utility (Asogwa and Okwoche (2012) Osondu, Nwadike, Ijeoma, *et al.*(2014) further explained that efficient marketing plays a crucial role in an economy. This role becomes more evident in areas where there is high rate of urbanization. The marketing system enables producers as well as middlemen to earn income with which they purchase other useful goods and services Ebe (2007) as cited by Nkamigbo, Ugwumba and Okeke (2019) .

Ejechi, Anyagbunam, Okoye and Eleodinmuo (2014) noted that there has been growing activities in the marketing of sweet potato due probably to increasing consumer/marketer's awareness of its economic, nutritional and medicinal values. Sweet potato is either sold as a whole, roasted or fried. The State has several daily markets both in the urban and rural areas where agricultural produce are sold especially sweet potato known as sweet potato market.

II. MATERIALS AND METHODS

The study was carried out in Anambra State, Nigeria. Several raw industrial materials and agro products are produced in various parts of the State. Some of the crops grown in the State include oil palm, maize, rice, yam, groundnut, cassava, sweet-potato, cucumber, watermelon, melon, green-beans (akidi), pigeon pea, soybean, livestock such as goats, sheep, poultry and cattle are also raised. It is an agrarian State and majority of the people are subsistence farmers. It is situated on a generally low elevation on the Eastern side of the River Niger sharing boundaries with Delta State to the west, Imo, Abia and Rivers State to the South, Enugu State to the East and Kogi State to the North. The State occupies an area of about 4844 Km^2. Geographically, the State lies within longitude 5^o55^1 and 6^o42^1N. The population of the State is 4,182,232 with 863 Sqkm density (NPC, 2016).

The State has several daily markets both in the rural urban areas where agricultural goods are sold especially sweet-potato known as sweet potato markets. Sweet potato is a thriving business in the State due to its nutritional, medicinal, industrial value, population and economic returns. It is either sold as a whole, fried or roasted.

The State consists of twenty one (21) Local Government Areas (LGAs) and four agricultural zones. The state is drained by five major River, Ezu River, Idemili River and Ulasi River. In addition to these, there are smaller perennial streams like the Oji, Nkisi and Obizi. In-land valley ponds and lake occur with the Agulu Lake draining a collection of towns in the State Nwalieji (2016). The state has two distinctly marked seasons: rainy and dry seasons. The rainy seasons occurs from the month of March through October. The dry season occupies the months of November to February. The annual rainfall ranges from 1400 mm in the North to 2500 mm in the South with temperature of 25^0C-35^0C.

2.1 Population and Sampling Procedure

The study population was made up of all sweet potato marketers in Anambra State, Nigeria. Multistage, purposive and random sampling methods were used to select 12 Local Government Areas, 12 daily sweet potato markets and 240 intermediaries (120 wholesalers and 120 retailers) for the study. The respondents were selected based on size of the markets. Details of the selection process are given as:

Stage 1: Three agricultural zones were randomly selected from the four agricultural zones of the State. These are Onitsha, Anambra and Aguata zones.

Stage 2: Four Local government areas were randomly selected from each of the three selected agricultural zones, totaling 12 LGAs. The LGAs selected were Ogbaru, Onitsha North, Onitsha South, Ihiala, Anambra North, Anambra West, Oyi, Ayamelum, Aguata, Nnewi North, Orumba North and Orumba South.

Stage 3: This involved purposive selection of one daily market with large number of intermediaries and consumers from each selected LGAs. The selection was based on opened dairy nature, large number of intermediaries and volume of produce handled per month as revealed by pre-test survey. A total of 12 markets were selected, the market were Afor Atani, Ose-Okwaodu, Ochanja, Nkwo-Okija, Eke-Otuocha, Nkwo-Otupu, Eke-igwe Nteje, Nkwo-Omor,, Nkwo-Igboukwu, Nkwo-edo Nnewi,Afor-Ufuma and Nkwo-Umunze.

Stage 4: Ten sweet potato markets, consisting of five wholesalers and five retailers were randomly selected from each of the selected twelve markets in stage iii, thus making a total of 240 respondents for the study as shown in Table 1.

TABLE 1
SAMPLING OF MARKETS AND RESPONDENTS

Agricultural zone	LGAs selected	Markets selected	Intermediaries selected
Onitsha	Onitsha North	Ose-Okwaodu	5 Wholesalers 5 Retailers
	Onitsha South	Ochanja-Market	5 Wholesalers 5 Retailers
	Ihiala	Nkwo-Okija	5 Wholesalers 5 Retailers
	Ogbaru	Afor Atani	5 Wholesalers 5 Retailers
Anambra	Anambra East	Eke-Otuocha	5 Wholesalers 5 Retailers
	Anambra West	Nkwo-Otupu	5 Wholesalers 5 Retailers
	Oyi	Eke-Igwe Nteje	5 Wholesalers 5 Retailers
	Ayamelum	Nkwo-Omor	5 Wholesalers 5 Retailers
Aguata	Aguata	Nkwo Igboukwu	5 Wholesalers 5 Retailers
	Nnewi North	Nkwo-edo Nnewi	5 Wholesalers 5 Retailers
	Orumba North	Nkwo-Umunze	5 Wholesalers 5 Retailers
	Nnewi South	Afor-Ukpor	5 Wholesalers 5 Retailers
Total	12 LGA	12 Markets	240 Respondents

Source : Field survey, 2021.

III. METHOD OF DATA ANALYSIS

The objectives of the study were realized using budgetary technique, Sherpherd-Futrel technique and relative index ranking. The budgeting technique was used to determine the profitability of sweet potato marketing. The budgeting technique is expressed as:

$$\text{NER/Profit} = P_{yi}Y_{yi}\sum(P_{XIJ}X_{ij} + F_{ij})$$

Where

$\sum$ = sum

$P_{yi}Y_i$= unit price of i^{th} respondents sales + Total revenue (TR) for i^{th} respondent.

$P_{xi}Y_i$ = Prices X qualities of i^{th} respondents variable inputs= total variable cost (TVC) for j^{th} respondent. The marketing efficiency of farmers' using social network to advance agribusiness was determined using Sherpherd-Futrell technique.

$$ME = \frac{TC}{TR} \times 100$$

Where:

ME= Coefficient of marketing efficiency,

TC= Total marketing cost incurred

TR= Total value of product sold

IV. RESULT AND DISCUSSION

4.1 Profitability of sweet potato marketing by the intermediaries

The enterprise budgeting analysis was used to estimate the monthly profitability of sweet potato marketing by the intermediaries as shown in Table 2. Result of the analysis, indicating total cost (TC), total revenue (TR), total variable cost (TVC), total fixed cost (TFC), gross margin (GM), net marketing income (NMI), mean net marketing income (MNMI) and net return on investment (NROI), is presented in Table 2. It could be seen from the Table that out of the total cost of ₦12, 974,192.6 spent by the wholesalers, purchases constituted 87.3% while the least expense was miscellaneous cost 1.03%. Similarly, the retailers spent 91, 06% of their total cost on purchase and 0.58% on miscellaneous cost as the least expense. By this, cost of purchasing marketing stock is the most important cost of business while the cost on miscellaneous is the least. This result is in tandem with Nkamigbo and Isibor (2019) who reported that the cost of stock/purchase constituted 94.2% and 89.76% of the total cost of marketing dry maize and watermelon respectively to become the most important cost to consider in starting the marketing enterprise.

On enterprise profitability, the wholesalers realized ₦21,750,000 after spending a total of variable cost of ₦12,795,168.4 and total cost ₦12,974,192.6. This transaction generated a gross margin of ₦8,954,831.6, net marketing income of ₦8,775,807.4 and net return on investment of 0.68. The retailers on the other hand realized ₦16,669,906.5 after spending a total variable cost of ₦8,675,540 and total cost of ₦8,777,069.1, with gross margin of ₦7,994,366.5, net marketing income of ₦7,892,837.4 and net return on investment 0.89. The implication of the net return on investment figures is that the wholesalers and retailers respectively return 0.68 kobo and 0.89 kobo for every 1 Naira invested in the business. Overall, the profitability indicators (gross margin, net marketing income and net return on investment values) showed that sweet potato marketing was a profitable at both wholesale and retail levels. Adewumi and Adebayo (2008) and Udemezue (2019) attested to the profitability of sweet potato marketing in Nigeria.

TABLE 2

ESTIMATED MONTHLY PROFITABILITY OF SWEET POTATO MARKETING BY THE INTERMEDIARIES

Variables	Wholesalers	% TC	Retailers	%
TOTAL REVENUE	21,750,000		16,669,906.5	
VARIABLE COST (VC)				
Purchases	11,174,655	87.3	7,900,356.5	91.06
Transportation	965.000	7.54	422000	4.86
Loading	317,753.4	2.4	177,000	2.04
Off-loading	205,200	1.60	95,153.5	1.09
Miscellaneous cost (Recharge card, Cement bag, Nylon bag)	132,560	1.03	51,030	0.58
TOTAL VARIABLE COST (TVC)	12,795,168.4		8,675,540	
FIXED COST (FC)				
Monthly shop rent	97,800	54.62	39000	38.41
Ground levy	31,000	17.31	41000	40.38
Depreciation on equipment (wheelbarrow, tarpaulin, knife, Table, Chair)	28,931.6	16.16	11835	11.65
LGA charges	11,292.6	6.30	5000	38.41
Interest on Loan	10,024.2	5.59	4694.1	4.62
TOTAL FIXED COST (TFC	179,024.2		101,529.1	
TOTAL COST TC= TVC+TFC	12,974,192.6		8,777,069.1	
Gross Margin	8954831.6		7,994,366.5	
Net Marketing Income NMI=GM-TFC	8775807.4		7,892,837.4	
Return on Investment TR/TC	1.68		1.89	
Net return on Investment NMI/TC	0.68		0.89	
Gross Ratio TC/TR	0.596		0.526	
Marketing Efficiency TC/TR x 100/1	59.6		52.6	

Source: Field survey, 2021

4.2 Marketing Efficiency of sweet potato.

The Shepherd-Futrel method was used to determine the co-efficient of marketing efficiency. The method expresses marketing efficiency as the ratio of total cost to total revenue expressed as percentage. The lower percentage, the better the marketing efficiency, since less proportion of the revenue will be expanded on total cost of marketing.

The model is slated as

$$ME = \frac{TC}{TR} \times \frac{100}{1}$$

Wholesalers $ME = \frac{TC}{TR} \times \frac{100}{1} = \frac{12974192.6}{21,750,000} \times \frac{100}{1} = 59.6\%$

Retailers $ME = \frac{TC}{TR} \times \frac{100}{1} = \frac{8777069.1}{16,669,906.5} \times \frac{100}{1} = 52.6\%$

Where:

ME = Marketing efficiency

TC = Total cost

TR = Total revenue

The result of the analyses revealed that none of the intermediaries attained efficiency of 100% in the marketing of sweet potato implying the existence of good level of inefficiencies among the intermediaries (wholesalers and retailers). The level of inefficiency was higher 59.6% among the wholesalers than the retailers implying that the retailers were more efficient in the marketing of sweet potato than the wholesalers. The retailers do not spend much on transportation and miscellaneous because they source their product from nearby market which resulted to reduced cost. Nkamigbo and Isibor (2019) confirmed that none of the intermediaries attained optimal efficiency of 100%.

TABLE 3
CONSTRAINTS TO SWEET POTATO MARKETING

Constraints	Wholesalers mean score	Rank	Retailers mean score	Rank
Rioting	3.10	3rd	3.11	1st
Breakage on Transit	2.80	5th	2.58	5th
Low market price	2.50	6th	2.74	4th
Seasonality of the product	3.36	1st	3.01	3rd
Inadequate storage facility	2.90	4th	3.05	2nd
High transport cost	3.20	2nd	2.50	6th

Source: field survey, 2021.

V. CONCLUSION AND RECOMMENDATION

The result established by profitability indicators (gross margin, net marketing income and net return on investment values) that sweet potato marketing was a profitable venture both at wholesale and retail levels. Also, the retailers are more efficient in the marketing of sweet potato than the wholesalers although inefficiencies existed among their activities due to marketing constraints. The level of profitability would improve if adequate measures are taken by government and marketers to address marketing constraints. It was recommended that modern storage facilities and good road transport systems should be made available so that the volume of trade of marketers should increase for optimum profit.

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