

Economics of Sweet Potato Marketing In Zing Local Government Area of Taraba State, Nigeria

Gani, B.S.¹, Rukwe, D. T.² and Elizabeth, Y.J.²

¹Department of Agricultural Economics and Extension, Taraba State University, Jalingo, Nigeria

²National Agricultural Extension and Research Liaison Services, Ahmadu Bello University Zaria, Nigeria

*Corresponding author:

Rukwe, D. T

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Abstract: This study was conducted on economics of sweet potato marketing in Zing Local Government Area, Taraba State, Nigeria. The specific objectives were to: identify the socio economic characteristics of sweet potato marketers in the study area, estimate the marketing margin and marketing efficiency of sweet potato marketing in the study area, identify the factors affecting sweet potato marketing in the area and determine the constraints faced by the traders in marketing the crop. Data for this study were collected using structured questionnaire. Purposive and simple random sampling techniques were used to select respondents for the study. The data collected were analysed using descriptive and inferential statistics. The socio-economic characteristics result showed that about 77.6% of the sweet potato marketers were male, 91.8% of the respondents were young people whose ages ranged between 28 to 57 years with 63.3% married marketers. The result revealed that 83.7% of the sweet potato marketers had formal education, 83.7% marketers did not belong to any cooperative organization, 79.59 % of marketers had no access to credit to finance their sweet potato marketing activities and 42.9% had 6-10years' experience in sweet potato trading. The result shows that the gross marketing margin and net marketing margin were N6,921.28 and N6,571.28 respectively with marketing efficiency of 0.59koko. The logit regression result revealed that out of the 10 independent variables included in the model, 8 variables were statistically significant at 1% ($p < 0.01$), 5% ($p < 0.05$) and 10% ($p < 0.10$) respectively representing 80% of the variables. The result reveals that, inadequate capital, low profit, inadequate and poor storage facilities, price fluctuation and lack of standard measure were some of the problem identified as problems militating against Sweet Potato marketing in the study area. Sweet potato marketing is a profitable business with attractive net return and investment in Zing LGA of Taraba State. It was recommended that government as well as non-governmental agencies should empower the marketers through the provision of micro credit facilities to encourage more people to go into sweet potato marketing.

Keywords: Sweet potato, Marketing and Zing.

INTRODUCTION

In view of the serious challenges of feeding a world population that reached 6.1 billion in mid-2000 and is likely to approach 9.3 billion in 2050 it has become relevant to pay more attention to food production issues (Matthew and Fatimoh, 2016). About 215 million (43%) Sub-Saharan African population is chronically undernourished and unless strong action is taken this may increase to around 315 million by the year 2010 (World Food Programme, (1995) as cited by (Matthew and Fatimoh, 2016). If food production is to keep pace with rapid population growth and demand for food, a new and creative approach to agricultural development must be developed. In a country where millions of people are not adequately fed, Nigeria's unexploited food resources must be unearthed and utilized. The rural farmers constitute the backbone of the Nigerian agricultural sector producing about 80

percent of the total national agricultural output (Fayinka, 2004) by using traditional methods under rain-fed conditions. It is important to emphasize that despite the potential benefits stemming from the expansion of the agricultural sector through various government efforts, its overall productivity remains low and the poor performance of agriculture is most clearly evidenced by the low standards of living of these small-scale rural farmers (Dogon-daji, 2005). Sweet potatoes offer a particularly significant potential for increasing food production and income in Nigeria. Like other agricultural crops, sweet potato has a role to play in the developing economies.

Sweet potato (*Ipomoea batatas*) is a creeper of the convolvulacea family. It originated from Central America and is widely cultivated as important staple food in most parts of the world. Presently, Nigeria is the

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largest producer of sweet potato in Africa with annual output of 3.46 million metric tons, and globally the second largest producer after China (FAO, 2006 and Ndukwu *et al.*, 2010). Sweet potato is grown for both human and livestock consumption, and it is the only crop among the root and tuber crops that has a positive per capita annual rate of increase in production in sub Saharan Africa. It is the only member of the genus, *Ipomoea* whose roots are edible and one of the world's most important food crops due to its high yield and nutritive value.

Sweet potatoes offer significant potential for increasing food production and income in Nigeria. It has a high yield potential that may be realized within a relatively short growing season and adaptability to a wide ecological range of 0 to 2000 meters above sea level (Ahmad *et al.*, 2014). Sweet potato is consumed without much processing in most parts of the tropics. It is either eaten boiled, roasted or fried. The roots can also be slightly fermented in water for 2-3 days to reduce the sweetness, then sun dried and milled, mixed with either yam or cassava flour for human consumption. The leaves and tender shoots of sweet potato are used as vegetables. The leaf contains, on dry matter basis, about 8% starch, 4% sugar, 27% protein and vitamins, and therefore are very nutritious. It also contains about 56 mg carotene per 100gm dry matter. The leaves are usually eaten boiled or incorporated into soup and stew (Mathew and Fatinola, 2008).

Industrially, sweet potato flour can be used to substitute wheat in bread making or marine flour in balanced feeds. Baby foods have been formulated using sweet potato while some bakeries blend 15-30% of sweet potato flour for making bread and 20-30% for pastries. It is also used in the brewing of alcoholic drinks and as sweeteners in non-alcoholic drinks (Ohajianya *et al.*, 2014). In spite of these important aspects, less research has been done on sweet potato than on the other root crops.

Despite the demographic pressure on land, there has been an increase in the production of sweet potato in Nigeria. Sweet potato production rose from 2.516 million metric tons in 2006 to 3.4 million metric tons in 2007 (Akoroda, 2009; Srinvas, 2009). These increase were attributed to improved technological inputs, International and National research efforts. Tewe *et al.*, (2003) asserted that an increased sweet potato production that is not matched by adequate promotion and marketing to absorb surplus from increased yield has been detrimental to the sustainability of sweet potato production in Nigeria.

Sweet potato is seasonal and does not store for a long time. Poor storability of sweet potato is mainly due to sprouting, dehydration and attack by pathogenic organism (Ukpabi, 2004). These storage problems and others have led to losses by marketers in the course of

performing their marketing functions. In most cases, poor storability and seasonality lead to market variation in quantity and quality of roots and its associated price swing (Low *et al.*, 2009). The rising consumer price for sweet potato may be an indication of market inefficiency. Marketing in developing countries like Nigeria is beset with a lot of problems, which constitute a bottleneck to the flow of goods and services. Such problems include seasonal variations, transportation of harvested produce, storage, processing, grading and communication (Ikechi *et al.*, 2006). More importantly, adequate attention has not been paid to the marketing dynamics of potato with a view to updating our knowledge and hence increases our understanding of the marketing efficiency of this crop in the study area in particular and Taraba State in general. In this regard, this present study is an attempt toward analyzing the economics of marketing of this crop in Zing Local Government Area, Taraba State

Objective of the Study

The overall objective of this study was to carry out economics of sweet potato marketing in Zing Local Government Area, Taraba State, Nigeria. The specific objectives are to:

- Identify the socio economic characteristics of sweet potato marketers in the study area;
- Estimate the marketing margin and marketing efficiency of sweet potato marketing in the study area;
- Determine the factors affecting sweet potato marketing in the area and
- Identify the constraints faced by the traders in marketing the crop.

METHODOLOGY

The Study area

Zing Local Government Area is one of the 16 LGAs in Taraba State. It is bounded by Yororo LGA in the south, in the North-East and West respectively by Adamawa State. The area lies between longitude 10° and 11°E and latitude 9° and 10°N of the equator with estimated population of about 115,384 (NPC, 2006). The area falls within the transitional belt of savanna in north eastern Nigeria. It has good climatic conditions and rich in agricultural opportunities with the temperature ranging from 28 to 34°C, the mean annual rainfall of the area is 1500 mm. Due to the fertile soil and good climate allowed for the growth of staple crops such as maize, sorghum, millet, cassava, g/nut, cowpea and sweet potato, the vegetable of the area also provide good pasture for rearing of animal.

The study area is endowed with abundant natural resources including, streams, natural grassland and economic trees.

Method of Data Collection

The data for this study were collected from both primary and secondary sources. The primary data were collected using structured questionnaire while secondary data were obtained from textbooks journals seminar conference proceedings and internet.

Sampling Procedure and Sample Size

Sweet potato marketers constituted the population or sampling frame from where a sample was drawn. Purposive and simple random sampling techniques were employed to select respondents. In the first stage, two (2) markets commonly known for sweet potato marketing were purposively selected from the LGA. Secondly, a list of sweet potato marketers in each market was obtained. Finally 50 sweet potato marketers were randomly selected in a ratio proportional to the size of the population of sweet potato marketers in those markets.

$$GMM = GMI - TVC \dots\dots\dots(1)$$

$$NMI = GMM - TFC \dots\dots\dots(2)$$

Where,

GMM = Gross marketing margin (N)

GMI = Gross marketing income (N)

TVC = Total variable cost (N)

NMI = Net marketing income (N)

TFC = Total fixed cost (N)

$$ME = \frac{GMM}{TMC} \dots\dots\dots(3)$$

Where,

ME = Marketing Efficiency index

GMM = Gross marketing margin in naira/50kg of sweet potato

Method of Data Analysis

Descriptive statistics such as frequency, percentage and mean were used to analyze objectives i and iv of the study, Gross margin was employed to address objective ii and logit regression was addressed objective iv.

Gross marketing margin

The gross marketing margin is the difference between gross marketing income and the total variable cost of marketing. It was used to estimate the profitability level of sweet potato marketing in the area while the net marketing income is the difference between the gross margin and the total cost of marketing less the sum of fixed variable cost. The gross margin model states as follows:

Marketing Efficiency Analysis

The shepherd's index was used to determine the marketing efficiency for traders in Sweet Potato in the study area. The shepherd's index was developed by shepherd's (1965) is as follows;

TMC = Total marketing cost in naira/50kg of sweet potato. The higher the efficiency ratio, the higher the marketing efficiency and vice versa.

Logit Regression Model

It is applied when the dependent variable (sweet potato marketing) is a dummy (binary variable). It is based on the cumulative logistic regression model.

The general model specification for the logit regression is as follows:

$$Li = \ln \frac{Ai}{1-Ai} = Zi = \beta_0 + A_i X_i + \dots\dots\dots + AnX_n + e \dots\dots\dots(4)$$

$$Li = \ln \frac{1}{1-Ai} = Zi = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \dots\dots\dots + b_{11}X_{11} + e \dots\dots\dots(5)$$

Where, $i = 1, \dots\dots\dots n$

n = no. of variables

z_i = logit or log of odds (dummy)

A_i = high involvement in sweet potato marketing =1

1- A_i = low involvement in sweet potato marketing =0

X_1 = Age (yrs)

X_2 = Marital status (Yes = 1, No = 0)

X_3 = Gender (Male = 1, Female = 0)

X_4 = Marketing Experience (yrs)

X_5 = Educational Level (Formal = 1, Non-formal = 0)

X_6 = Transport Cost (KSh)

X_7 = Labour Cost (KSh)

X_8 = membership of cooperative (yes =1, no = 0)

X_9 = Access to credit (yes =1, no = 0)

X_{10} = Poor Infrastructure (yes =1, no = 0).

RESULTS AND DISCUSSION

4.1 Socio-Economic Characteristics of Sweet potato Marketers

The result showed that about 77.6% of the sweet potato marketers were male while 22.4% were females. This could be attributable to the high cultural belief attached to the restriction of women to involvement in activities that could expose them to the general public. This opposed the finding with Fadipe *et al.*, (2015) that majority of cocoyam wholesalers and retailers were females. Table 1 shows that majority of the sampled Sweet Potato marketers (46.9%) fell within the age group of 38 - 47 years. Overall, 91.8% of the respondents were young people whose ages ranged between 28 to 57 years while 8.2% of them were people whose ages ranged between 18 to 27 years. The result indicated that they were still in their active productive years and, hence, enjoyed high participation in Sweet potato marketing and high level of market efficiency. This implies that the marketers are strong, agile, and active and can participate adequately in marketing activities. This agrees with the findings of Muhammed (2011) who opined that the average age of all sampled traders was 40 years and standard deviation was 11.33years. This also agrees with the findings of Bassey *et al.*, (2013) who conducted a study on rice and posited that rice marketers were at their youthful age, a situation which can promote market efficiency. The significance of marital status on agricultural production and marketing can be explained in terms of the supply of agricultural family labour. It is expected that family labour would be more available where the household heads are married. The study revealed that 63.3% of the marketers were married while 36.7% were single. This implies that about 63.3% of the marketers interviewed in the study area had family responsibilities, which shows that majority were married and had children which would help in readily available family labour supply to accomplish various market operations. This finding is also in line with those of Solomon (2008) and Banmeke (2003), which indicate that large household sizes assist more in agricultural activities. The level of education determines the level of opportunities

available to improve livelihood strategies, enhance food security, and reduce the level of poverty. It affects the level of exposure to new ideas and managerial capacity in marketing and the perception of the household members on how to adopt and integrate innovations into the household's survival strategies. The result revealed that 83.7% of the sweet potato marketers had formal education while 16.3% had no formal education. This indicates that the marketers can read and write. This finding is in line with Amaza (2009), who found that literate marketer had increased marketing efficiency. This result is also in consonance with the findings of Akpokodje *et al.*, (2003) that majority of sweet potato farmers in Nigeria could read and write. About 83.7% marketers did not belong to any cooperative organization. This implies that the perceived benefits derivable from membership of cooperative societies are inaccessible to this lot of sweet potato marketers and, hence, decreased efficiency in the effective management of resources. This finding is in line with Odebiyi (2010) that cooperative groups ensure that their members derive benefits from such groups in such a way that they could not have derived individually. Membership of a cooperative society creates an avenue for farmers to pool their risks, in addition to providing access to resources and information that will improve their production practices, thus highlighting the importance of some social capital in improving productivity (Shehu *et al.*, 2010). The results indicated that the majority 79.59 % of marketers had no access to credit to finance their sweet potato marketing activities. This means that the main source of income for the traders was personal savings. This low access to credit could be attributed to the fact that government seldom grants financial credit to large numbers of marketers. This agrees with the findings of Bassey *et al.*, (2013) and Abah *et al.*, (2015) who found that majority of marketers depends on personal or family funding for their business and, hence, do not borrow from any commercial banks. Furthermore, 42.9% had 6-10years' experience in sweet potato trading. This finding is in agreement with that of Muhammed (2011), who found that considerable number of soya beans marketers had about 6-12years of marketing experience.

Table 1; Socio-economic Characteristics of Sweet Potato Marketers

Variables	Frequency	Percentage
Gender		
Male	38	77.6

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Female	11	22.4
Total	49	100
Age		
18 – 27	4	8.2
28 – 37	17	34.7
38 – 47	23	46.9
48 – 57	5	10.2
Total	49	100
Marital status		
Single	18	36.7
Married	31	63.3
Widow/widower	0	0
Total	49	100
Educational level		
Non-formal education	8	16.3
Primary education	18	36.7
Secondary education	21	42.9
Tertiary education	2	4.1
Total	49	100
Membership of cooperative		
Yes	8	16.3
No	41	83.7
Total	49	100
Access to credit		
Yes	10	20.41
No	39	79.59
Total	49	100
Marketing experience		
1 – 5	8	16.3
6 – 10	21	42.9
11 – 15	17	34.7
>15	3	6.1
Total	49	100

Source: Field Survey, 2018

Marketing Margin and Marketing Efficiency Analysis

The result of the marketing margin and marketing efficiency analysis is as given in table 2. The result shows that the gross marketing margin and net marketing margin were ₦6,921.28 and ₦6,571.28 with marketing efficiency of 0.59koko. This result is slightly below the finding is also above the finding of Ocholi *et al.*, (2017) who found that the marketing efficiency of sweet potato in Benue State for wholesalers and retailers to be 0.85koko and 0.94koko respectively.

Table 2: Marketing Margin and Marketing Efficiency of Sweet potato Marketers

Parameters	Value (₦)
Acquisition costs of sweet potato	9,300
Transport cost	530.38
Taxes and gate fee(s)	100
Labour costs	530
Storage costs	762.24
Sanitation fees	156.10
Total variable costs	11, 378.72
Store/shade rent	200
Utilities (water, light)	150
Total fixed costs	350
Total costs	11,728.72
Gross income	18,300.00
Gross marketing margin	6,921.28
Net marketing Income	6,571.28
Marketing Efficiency	0.59

Source: Field Survey, 2018.

Factors Affecting Sweet Potato Marketing

In determining factors influencing Sweet potato marketing in the study area, the logit regression model comprising 10 independent variables was used as specified in the methodology. Table 3 reveals that out of the 10 independent variables included in the model, 8 variables were statistically significant at 1% ($p < 0.01$), 5% ($p < 0.05$) and 10% ($p < 0.10$) levels respectively representing 80% of the variables. These variables were age (X_1), gender (X_3), marketing experience (X_4), transport cost (X_6), labour costs (X_7), membership of cooperative (X_8), access to credit (X_9) and poor infrastructure (X_{10}). The positive coefficient of the age (X_1) variable means that increases in age would lead to increases in the probability of Sweet potato marketing by 12.41%. The positive coefficient of the gender (X_3) variable means that increases in male-headed households would lead to increases in the probability of Sweet potato marketing by 12.3%. The variable had an intercept dummy of 0.123 meaning that male marketers had higher intensity of autonomous Sweet potato marketing than their female counterparts and vice versa in the study area. In other words, the autonomous intensity of Sweet potato marketing was, on the average, higher by 0.123 among the male marketers than their female counterparts and vice versa. The positive coefficient of the marketing experience (X_4) variable means that increases in the marketing experience of respondents would lead to increases in the probability of their Sweet potato marketing by 17.62%. The variable had an intercept dummy of 0.1762 meaning that more experienced Sweet potato marketers had higher autonomous Sweet potato marketing intensity than their less experienced counterparts in the study area. It means that experienced Sweet potato marketers had, on the average, higher autonomous Sweet potato marketing intensity by 0.1762 than their less experienced counterparts in the study area. This is in conformity with *a priori* expectation. The negative coefficient of the transport cost variable (X_6) means that increases in transport cost of Sweet potato marketers would lead to decreases in the probability of Sweet potato marketing by 26.20%. The variable had an intercept dummy of -0.2620 meaning that increases in transportation costs reduce the probability of effective Sweet potato marketing by 26.20%. The negative coefficient of the labour cost variable (X_7) means that

increases in labour cost of Sweet potato marketers would lead to decreases in the probability of Sweet potato marketing by 21.30%. The variable had an intercept dummy of -0.2130 meaning that increases in labour costs reduce the probability of effective Sweet potato marketing by 21.30%. The positive coefficient of the cooperative membership (X_8) variable means that increases in cooperative membership of respondents would lead to increases in the probability of their Sweet potato marketing operations by 11.03%. The variable had an intercept dummy of 1.1031 meaning that Sweet potato marketers who belonged to cooperative societies had higher autonomous Sweet potato marketing intensity than their counterparts who didn't in the study area. It means that Sweet potato marketers who belonged to cooperative societies had, on the average, higher autonomous Sweet potato marketing intensity by 0.011 than their counterparts who didn't in the study area. It also means that the autonomous Sweet potato marketing intensity among this category of Sweet potato marketers would increase from 0.011 to 9.45 in the study area. The positive coefficient of the credit access (X_9) variable means that increases in the credit access of respondents would lead to increases in the probability of their Sweet potato marketing by 12%. The variable had an intercept dummy of 0.1201 meaning that Sweet potato marketers who had access to credit facilities had higher autonomous Sweet potato marketing intensity than their counterparts who hadn't in the study area. It means that Sweet potato marketers who had access to credit had, on the average, higher autonomous intensity of Sweet potato marketing by 0.1201 than their counterparts who hadn't in the study area. It also means that the autonomous sweet potato marketing intensity among sweet potato marketers would increase from 0.1201 to 9.56 in the study area. The negative coefficient of the infrastructure (X_{10}) variable means that decreases in improvements in the infrastructure of respondents would lead to decreases in the probability of their sweet potato marketing by 39%. The variable had an intercept dummy of -0.3900 meaning that Sweet potato marketers who had good infrastructural facilities had higher autonomous Sweet potato marketing intensity than their counterparts who hadn't in the study area. It means that Sweet potato marketers, who did not have good infrastructural facilities, on the average, lower autonomous Sweet potato marketing intensity by -0.3900 than their counterparts who had in the study area.

Table 3: Logit Result of Factors Affecting Sweet Potato Marketing

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	9.441177	0.205080	45.984267	0.0000
Age (X1)	0.124058	0.462074	0.269399	0.0120***
Marital status (X2)	0.404281	0.517189	0.781031	0.5614
Gender (X3)	0.123124	0.130394	0.946001	0.0520**
Marketing Experience (X4)	0.176171	0.122100	1.443048	0.0535**
Educational Level (X5)	0.139318	0.187125	0.743165	0.4121

Transport Cost (X6)	-0.262030	0.982202	-1.123156	0.0119***
Labour Cost (X7)	-0.213022	0.211022	-1.242067	0.1025*
Membership of cooperative (X8)	1.103167	0.435229	0.490410	0.0521**
Access to credit (X9)	0.120074	0.101108	1.188166	0.1024*
Poor Infrastructure (X10)	-0.390011	0.381042	-1.023538	0.0510**

Source: Field Survey, 2018

***, **, * denote significance @ 1%, 5% and 10% levels respectively.

Constraints of Sweet potato Marketing

Table 4 highlights the problems associated with Sweet Potato marketing in the study area. It was ranked in order of severity. The result reveals that, inadequate capital, low profit, inadequate and poor storage facilities, price fluctuation and lack of standard measure were some of the problems identified as militating against Sweet Potato marketing in the study area. Amongst all, the problems of inadequate capital, inadequate and poor storage facilities and low profit rank the first three major problems. The combined

effect of these problems on the marketing system could bring about a distortion in the structure, conduct and performance of the marketing process. Hence, these lead to the reduction in profit margin of the marketers and consequently, discourage the present and prospective marketers of the commodity in participating in the enterprise in the study area. This result is in agreement with the study of Girei *et al.*, (2014) on Assessment of Problems Affecting the Structure, Conduct and Performance of Cowpea Marketing in Yola North and Yola South Local Government Areas in Adamawa State, Nigeria who found that inadequate capital, pest infestation and low profit were the major problems affecting marketing in the area.

Table 4: Distribution of Respondents by Constraints in Sweet Potato Marketing

Constraints	Frequency	Percentage
Inadequate capital	45	91.84
Inadequate and poor storage facilities	44	89.80
Low profit	43	87.76
Price fluctuation	42	85.71
Lack of standard measures	41	83.67
Poor communication and market information	40	81.63
Inadequate infrastructure	39	79.59
Poor road network	36	73.47
Pest infestation	24	48.98

Source; Field Survey, 2018

CONCLUSION

Sweet potato marketing is a profitable business with attractive net return in Zing LGA of Taraba State. The research into the marketing of sweet potato in Zing LGA showed that the sweet potato market in the area is competitive with a relatively high level of inequality among the traders. Accordingly, these findings will serve as a bench-mark for grass-root agricultural planning in the State. It is expected that sweet potato marketers, Government agricultural agencies such as agricultural companies will effectively harness these findings amidst advances in agricultural technology with a view to boosting both potato production and marketing in the state in particular and the country in general. It is therefore, recommended that government as well as non-governmental agencies should empower the marketers through the provision of micro credit facilities to encourage more people to go into sweet potato marketing, Sweet potato marketers should form cooperative group in order to obtain loans from financial institutions to increase their capital base; loans will be easily acquired from these cooperatives without

bottlenecks and government should provide an enabling environment through the provision of needed infrastructural facilities especially modern storage facilities.

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