



ANALYSES OF PRODUCTION COST AND MARKETING OUTLETS FOR SWEETPOTATO FARMERS IN EBONYI STATE NIGERIA

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Abstract

Despite the growing importance and known potential of sweet potato as food, animal feed and raw material; there is dearth of records of its production and marketing in Nigeria's food system. The study sought to investigate production cost and marketing outlets of sweet potato among farmers in Ebonyi State. Primary data were collected from 400 small-scale sweet potato farmers in the area using a multi-stage sampling technique. The instruments used for data collection were interview schedule and focus group discussion (FGD). Data collected through these methods were analysed using descriptive statistics. FGD was analysed by transcribing responses of the discussants. Findings revealed that land preparation (per ha) constitute the highest cost of production among all the cost items with average cost of ₦25,912.30, also, average total cost of producing one hectare of sweet potato in the study area was ₦71,011.24, while the average sale of harvested produce was ₦249,363.87. This implies an average profit of ₦178,352.1 realized. The result shows that sweet potato production was profitable by generating ₦3.5 for every ₦1.00 spent. Village market was found to be the major marketing outlet in the study area. There is need therefore, for farmers to put more effort in enhanced cultivation by utilizing more land for sweet potato production. There also need for land reform policies to make more land available to sweet potato farmers for increased output and profit.

Keywords: Land, Revenue, Village Markets, Sweet potato

Introduction

Ebonyi State is located in South-East Nigeria, and is predominantly agrarian. The farmers in the area grow intensively staple food crops which range from cereals to root crops. Rice, maize, yam, cassava, sweet potato and cocoyam are most commonly grown. Sweet potato (*Ipomea batatas*) is one of the major staple food crop grown in Ebonyi State. It serves as a major source of income to rural dwellers especially in areas like Ikwo, Ishielu, Ezza-South, Ohaukwu, Onicha and Ivo Local Government Areas (LGA) of the state where the production levels are very high (Nwaigwe *et al.*, 2011). It plays a primary role in food security in other States of South East Nigeria like Enugu, Anambra, Abia, and Imo. Sweet potato offers a particularly significant potential for increasing food production and income, thereby, reducing poverty and improving food security in Nigeria (Girei *et al.*, 2019). Sweet potato can adapt to different ecological conditions and requires few inputs for its cultivation (Egbe *et al.*, 2012). It is an important food and vegetable crop in most developing countries where it was ranked fifth economically after rice, wheat, maize and cassava (Tottappily and Loebenstein, 2009).

Sweet potato is grown mainly for the fresh market. The roots are sold in the surrounding markets around the

study area, which need to be improved upon for high price and subsequent high income (Vincent *et al.*, 2018). Sweet potatoes offer a high yield potential that may be realized within a relatively short growing season and adaptability to a wide ecological range of 0 to 2000m above sea level (Ahmad *et al.*, 2014). Ocholi (2017) indicated that meeting the food and nutritional need of the ever increasing population in Nigeria has been a huge task for every successful government. How well this objective is achieved is used to judge the performance of every successful government. In its effort to meet this objective, government of Nigeria in 2002 commissioned the National Special Programme on Food Security (SPFS) in partnership with the Food and Agriculture Organization (FAO). As a complement of this programme, presidential initiative on cassava, rice and oil palm was set up and three commodity development and marketing companies established. Among them, the Arable Crops Development and Marketing Company (ACDMC), has the mandate to ensure increased cultivation and marketing of root and tuber crops including sweet potato (Idachaba, 2004). The inclusion of sweet potato on the mandate of the ACDMC in addition to other food crops was considered appropriate, because it has been reported that sweet potato has a long history as a food security crop in

Nigeria. For example, Tewe *et al.* (2003) reported that sweet potato is capable of meeting the consumption need of the house hold and generating income to enable them buy other food crops.

According to Bergh *et al.* (2012), sweet potato in Nigeria is usually sold wholesale in rural markets in baskets or sacks that weigh between 20 and 70kg. Urban traders sometimes contract local farmers to produce roots. Traders buy the sweet potato in bulk and transport them in vehicles weighing less than 10mt to urban markets (Tewe *et al.*, 2003). In Ebonyi State, sweet potato are usually transported in trucks, trailers or pickups and marketed in fresh form. Traders (farmers or middlemen), who buy sweet potato from various dispersed farms during staggered sweet potato harvests; bring the roots to rural village markets to sell on local market days. Sweet potato farmers in Ebonyi State often sell directly to customers, which include; urban traders who come from large markets in Enugu, Port-Harcourt, Onitsha, Nnewi, Owerri and Aba, and commission agents who are generally women. Commission agent brokers transact between farmgate middlemen or rural assemblers and retailers and charge a flat rate per bag of sweet potato (Andrade, 2009).

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 organisms (Ukpabi, 2004). These storage problems among others have led to damages 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 affected with a lot of problems, which constitute a traffic jam 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). These problems notwithstanding, sweet potato production has been found to be profitable (Ogbonna *et al.*, 2007).

Despite the growing importance and known potential such as food, animal feed and raw material; records of sweet potato production and marketing in Nigeria's food system are scanty. There is urgent need to improve and document sweet potato production, processing and marketing activities and factors militating against them in order to increase output due to rising population and urbanization. This is to meet the food/nutrient requirement of children, lactating mothers and adults, especially at this time when different policies for food scarcity are being promulgated by the Federal government of Nigeria. It was against this backdrop that this study sought to examine the production cost and marketing outlets of sweet potato produced by farmers in the study area.

Methodology

Ebonyi State is located in the South-East geo-political zone of Nigeria with its capital at Abakaliki. It lies between latitudes 5°40' and 6°45' North and longitudes 7°30' and 8°46' East of the Greenwich meridian (Awoke and Okorji, 2004). It occupies a land area of about 5,935 square kilometres with a population of about 1.7 million people with thirteen LGAs. The basic occupation of the people is farming. Ebonyi State is a major national rice market and processing centre. Other crops cultivated in the State include: cassava, rice, yam, sweet potato, oil palm, pepper, okra, and groundnut. Animals including: poultry, goats, and sheep, are also produced in the State. Given its geology, the State has great potentials for solid minerals. Traditional industries and works of art include: blacksmithing at Ezza, mat making (at Ishielu and oshiri), and superb pottery products of ishiagu. Others are carved doors and stools, walking sticks, traditional flutes, wooden mortars and pestles. The State has a mean temperature of 30°C during the hottest period of the year (February to April) and a mean temperature of 21°C during the coldest period (December to January). Its mean annual rainfall is between 1,500mm to 1,800mm (Awoke and Okorji, 2004). Structured interview schedule and focus group discussion (FGD) were used as instruments of data collection. The study used a multistage sampling technique. All the three agricultural zones of the State namely: Ebonyi North, Ebonyi South and Ebonyi Central were used for the study. In the second stage, two LGAs in each zone were purposively selected based on the intensity of sweet potato production. Afikpo-South and Onicha LGAs were selected in Ebonyi South, Ohaukwu and Abakaliki LGAs for Ebonyi North and Ikwo and Ishielu LGAs for Ebonyi Central. In the third stage, two council wards were purposively selected from each LGA because of researchers' intention to select council wards with farmers that produces sweet potato on relatively same scale. In Ikwo LGA, Enyibichiri and Noyo Alike Council Wards were selected, while in Ishielu LGA, Nkalagu and Ntezi Council Wards were selected. In Afikpo-South LGA, Oso and Owutu Council Wards were selected, while in Onicha LGA, Abaomege and Ukawu wards were selected. In Ohaukwu LGA, Ngbo and Ezzangbo wards were selected, while in Abakaliki LGA, Amagu Unuhu and Amachi Ndiebo wards were selected. Simple random sampling technique was used to select respondents who are sweet potato farmers in the study area. Consequently, 28 respondents each was systematically selected in four council wards giving a total of one hundred and twelve (112) respondents in Ebonyi Central zone, because of its higher population. Twenty seven (27) respondents were selected in eight council wards in Ebonyi-North and Ebonyi-South each, giving a total of two hundred and sixteen (216) respondents in the zones. Thus, bringing total respondents administered with interview schedule to three hundred and twenty eight (328). One FGD was conducted in each of the twelve selected council wards giving a total of 12 FGDs. Each group was made up of six discussants giving a total number of participants to seventy two (72). In analysing data generated for the study, descriptive statistics were used to explain cost of

production inputs for sweet potato and marketing outlets for sweet potato, cost and return analysis was used for profitability, while FGD was analysed by transcribing responses of discussants.

Results and Discussion

The result in Table 1 shows the socio-economic characteristics of the respondents in the study area. From the data obtained, about 46.07% were males, while 53.93% were females. This implies that gender distribution among farmers in Ebonyi State is dominated by females in sweet potato production. This is in agreement with the findings of Okwusi *et al.* (2005) which showed that females dominate in the production, processing and utilization of sweet potato in Southeast zone of Nigeria. The study also revealed that about 5.24% of the respondents were within the age range of 18-30 years, while 30.89%, 47.12%, 15.18% and 1.57% were within the age ranges of 31-40, 41-50, 51-60 and more than 60 respectively. This implies that young people of active age dominated the activities in sweet potato production in the study area. This finding agrees with Olagunju *et al.* (2013) who noted that majority of sweet potato farmers in Osun State were in the active productive years. Results showed that 8.35% of the respondents were single, 78.1% married, 2.09% divorced and 11.52% widowed. This implies that majority of the sweet potato farmers in the state were married. The table further shows that households that had between 1-5 persons are made up 35.60% of the respondents, 16-10 persons (50.79%), 11-15 persons

(12.04%) and 16-20 persons (1.57%). This means that the farmers had relatively large-sized households since they believe that getting married with more children is an alternative source of labour *in-lieu* of hired labour. Educational status of respondents indicated that 24.61% of the respondents had no form of formal education, 22.51% attained primary level of education, while 32.98% and 19.90% attained secondary and tertiary levels respectively. This implies that majority of the farmers were literate. The high proportion of literate people among the farming population implies that majority of them are in a better position to access and process innovations on sweet potato production. About 20.42% of the respondents cultivated less than 1ha of land, while many (47.12%) cultivated between 1-3ha. Others (26.70%, 5.76%) cultivated between 4-6ha and more than 7ha respectively. This implies that majority of the sweet potato farmers are small scale farmers. This finding is in agreement with the findings of Aniedu (2006) and Mbanaso (2010), who noted that small-scale farmers dominate the activities of sweet potato production in the South-East zone of Nigeria. The result also corroborates the findings of Omoare (2014) who stated that sweet potato farmers in Osun and Kwara States operated mostly on a small scale. Farmers' estimated annual income indicated that 10.47% of the respondents had an estimated annual income of less than ₦100,000, 15.18% earned between ₦100,000-₦200,000 per annum, while 53.40% had an estimated annual income of ₦201,000-₦300,000 and 20.94% from ₦301,000-₦400,000 per annum.

Table 1: Socio-economic characteristics of the respondents

Variable	Frequency N= 382	Percentages (100)	Mean
Sex			
Male	176	46.07	
Female	206	53.93	
Total	382	100	
Age			
18-30	20	5.24	43.1
31-40	118	30.89	
41-50	180	47.12	
51-60	58	15.18	
60&above	6	1.57	
Total	382	100	
Marital Status			
single	32	8.38	
Married	298	78.1	
Divorced	8	2.09	
widowed	44	11.52	
Total	382	100	
Household size			
1-5	136	35.60	
6-10	194	50.79	7
11-15	46	12.04	
16-20	6	1.57	
Total	382	100	
Level of Education			
No formal education	94	24.61	
Primary education	86	22.51	
Secondary education	126	32.98	
Tertiary education	76	19.90	
Total	382	100	
Annual Income			
Less than ₦100,000	40	10.47	
₦100,000-₦200,000	58	15.18	
₦201,000-₦300,000	204	53.40	
₦301,000-₦400,000	80	20.94	
Total	382	100	

Source: Field Survey, 2019

Cost of land preparation (₦/ha)

The result from Table 2 showed that 7.3% of the respondents spent less than ₦20,000 per hectare on land preparation, 28.5% between ₦20,000-₦25,000, 60.7% from ₦26,000-₦30,000, while 3.54% spent above ₦30,000. The average cost of land preparation was ₦25,912.30/ha. This implies that higher (60.7%) population of the respondents incurred between ₦26,000-₦30,000 on land preparation indicating that majority used hired labour to do their land preparation compared to 7.3% that spent less than ₦20,000 per hectare. This group of farmers may have been using family labour for land preparation. This result is in line with the findings of Omoare (2014) who found out that 60.6% of the respondents spent between ₦21,000-₦26,000 per hectare on land preparation in Osun and Kwara states of Nigeria.

Cost of labour (per ha)

Result in Table 2 revealed that 3.1% of the respondents spent less than ₦15,000 on hired labour, 7.1% from ₦15,000-₦20,000, more than half (58.4%) of the respondents incurred between ₦21,000-₦25,000, while

31.4% spent above ₦25,000. The services rendered by the hired labour hands include: planting of vines, weeding, which is usually manual, but alternatively chemical (spraying with herbicides) and harvesting. The average cost of labour is ₦22,988.22. This implies that majority (89.8%) of the respondents in the study area spent between ₦21,000-₦25,000 and above in various labour activities involved in sweet potato production, while only 10.2% spent between ₦15,000-₦20,000 and less. This shows that majority of the respondents in the study area used hired labour and this translates to the size of their farmlands.

Cost of seeds (per ha)

Result from Table 2 showed that 6.0% of the respondents spent less than ₦5000 per hectare in the purchase of vines for planting, 18.1% between ₦5,000-₦10,000, 31.4% between ₦11,000-₦16,000, while 44.5% spent above ₦16,000. The larger the farm size, the higher the amount of vines purchased. The mean cost of planting materials was ₦13,017.01. Vine is the most common planting material in the study area. Basically, vines (sweet potato planting materials) are not

commonly sold because farmers do part of sweet potato planting by the river side which will serve as their nursery for next year planting or some of the remains of the previous harvest. Sweet potato roots from previous harvests sprouts immediately after the first rain making planting materials available for the farmers. Sometimes, vines are scarce or not adequate for the farmers use especially during the dry season, hence farmers need to buy more vines to complement the available ones. Occasionally, vines are sold to farmers when there is an introduction of a new variety such as orange fleshed variety that is rich in vitamin A through their fellow farmers and farmers union.

Cost of fertilizer (per ha)

Result from Table 2 revealed that only 7.1% of the respondents spent less than ₦8000 per hectare on the purchase of fertilizer for use on their farms. Majority (76.4%) spent between ₦8000-₦10,000, while 16.5% spent above ₦10,000. Fertilizer is used in replenishing the soil lost nutrient which may be due to bush burning, erosion, overgrazing and continuous cropping. However, enhanced output and bountiful harvest cannot be underrated if the farmers apply the fertilizer correctly and timely. Those respondents who spent less than ₦8000 on fertiliser on their farms are the group of farmers that cultivate mostly on virgin lands or practice shifting cultivation, and as such, their farmlands are expected to be very fertile for sweet potato production, hence they do not need to spend a lot of money on fertilizer purchase and application.

Harvested Crop (tonnes/ha)

Result from Table 2 revealed that only 6% of the respondents had less than 5 tonnes of sweet potato at harvest, majority (70.7%) between 5-7 tonnes, while

23.3% had 7 tonnes. The average harvest was 6.2 tonnes. This result is consistent to the findings of Onunka and Nwokocha (2010) that under farmers condition, yields ranging from 7-25 tonnes per hectare had been recorded while 30-40 tonnes per hectare had been recorded in agricultural research stations depending on the variety. The yield of sweet potato in the study area also influenced the income positively because they make their livelihood from the cultivation of sweet potato, but better yields will be obtained if the small scale farmers are exposed to the improved agronomic practices of the use of fertilizer, use of improved varieties of sweet potato, appropriate plant spacing, and access to irrigation facilities recommended by extension workers will help increase their income and standard of living.

Revenue of Sweet potato (₦/ha)

The result from Table 2 revealed that 4.2% of the respondents generated revenue of less than ₦90,000 from the sale of sweet potato per hectare, 10.5% realized between ₦90,000-₦200,000, more than half (66.5%) between ₦201,000-₦300,000, 15.7% between ₦301,000-₦400,000 per hectare, while 3.1% above ₦400,000. This implies that sweet potato production is a profitable venture since more than half of the respondents sampled realised more than ₦200,000 from the sale of one hectare of sweet potato and average farm size for respondents in the study area is 3 hectares of land which means that most of the respondents realised up to ₦600,000 from the sale of sweet potato yearly. This will go a long way to increase the income generation of sweet potato farmers thereby, enhancing their standard of living.

Table 2: Distributions based on Cost/Quantity of production inputs and returns for sweet potato (N=382)

Production Cost	Frequency	Percentage	Mean
A. Cost of land preparation (₦/ha)			
Less than 20000	28	7.3	
20000-25000	109	28.5	
26000-30000	232	60.7	25,912.30
Above 30000	13	3.54	
B. Cost of labour (₦/ha)			
Less than 15000	12	3.1	
15000-20000	27	7.1	
21000-25000	223	58.4	22,988.22
Above 25000	120	31.4	
C. Cost of seeds (₦)			
Less than 5000	23	6.0	
5000-10000	69	18.1	
11000-16000	120	31.4	13,017.01
Above 16000	170	44.5	
Quantity of seeds planted			
Less than 15000 vines	16	4.2	
15000- 20000 vines	106	27.8	
21000- 25000 vines	141	36.9	21,761.78
Above 25000 vines	119	31.1	
D. Cost of fertiliser (₦/ha)			
Less than 8000	27	7.1	
8000-10000	292	76.4	9,094.24
Above 10000	63	16.5	
Harvested Crop (tonnes/ha)			
Less than 5	23	6	
5-7	270	70.7	6.2
Above 7	89	23.3	
E. Revenue (₦/ha)			
Less than 90000	16	4.2	
90000-200000	40	10.5	
201000-300000	254	66.5	
301000-400000	60	15.7	249,363.87
Above 400000	12	3.1	
Total Cost	A+B+C+D		71,011.77
Profit	E-TC		
BCR	E/TC		3.5:1.00

Source: Field Survey 2019

Production is not yet complete until product gets to the final consumers through the market. The result from Figure 1 revealed that 49.2% of the respondents sold their sweet potato in the village market, these village markets are markets within the locality of the LGAs in the study area. Selling their sweet potato in the village market was beneficial to farmers because they do not incur expenses in transporting their sweet potato to urban areas. This group of respondents that take their sweet potato to the village market to sell do so in order to get their income quickly because a lot of potential retailers and consumers always come to the village market on market days to patronise these farmers. Some of the markets mentioned where these farmers sell their sweet potato are Nkwo Nkalagu, Nwakpu, Nwaelem, Noyo, Odomoke, Ekeaba, Kpiri-Kpiri, and Iboko among others. Only 1.04% of the respondents sell at farm gate. This is beneficial to the sweet potato farmers because the cost of transporting the bulky fresh sweet potato roots to the market is eliminated, but it greatly limits value added by the respondents. Sweet potatoes bought in the farm are usually lower in price and this

affects the farmers' income negatively. Sometimes after selling at the farm gate, the farmer may not make enough profit and he/she is always at the mercy of the buyers. Also, only 1.6% of the respondents sell their sweet potato in street markets. Street markets is a temporary public market, normally set up outdoors on certain days of the week, often, but not always, in a street. Sometimes they can be found in a car park or in a market square. The price in street market is more expensive, the farmers can make more income by selling in the street for those buyers that could not buy on market days, but the income is not regular. About 9.4% of the respondents sold their sweet potato at the urban markets. Urban markets are those markets that are situated in urban areas, where you can find value added products and imported items like household equipment, toiletries, fabrics and many other things you cannot find in village markets. In urban markets, the price of sweet potato is higher, but the farmers have to pay more for transportation to urban areas to sell their produce, that is why some farmers will prefer to sell in village markets to save them the stress and cost of transportation, because

sweet potato is bulky and as such incur more cost transporting it to urban areas. About 38.7% of the respondents sell both in the village, urban and street markets. The number of farmers that sell at the urban markets is low compared to those selling at the village markets and combined outlets. This could be as a result of high transportation fares paid by the farmers in bringing the bulky products to the urban markets which affects their income and profit. This result is supported with focus group discussion from some LGA.

In focus group discussion in Enyibichiri Council Ward, an elderly male respondent of about 60 years of age stated thus:

'We do not have problem of marketing our sweet potato here because we have been known by every State in South-East and even in South-South region of Nigeria for the production of sweet potato in large quantity. If you had been here on our market day, you would have seen things with your eyes, we sell at Nwakpu market, Noyo market and Nwaelem market, and they are all village markets. Buyers come from Rivers, Imo, Abia, Enugu to Noyo market to buy sweet potato. They come with big trucks every market day which is an interval of four days.'

In a similar response, a 52-year-old female respondent in Nkalagu Council Ward stated thus:

People come from Enugu, Port-Harcourt, Onitsha,

Nnewi, Aba to buy our sweet potato, we make a lot of money in the sale of our produce, we sell it here in our village market at Nkwo Nkalagu and Orié Nkalagu, as you are going now, just stop by the market at that Enugu-Abakaliki express way to see the quantity of sweet potato we have there, thank GOD today is our market day. We cultivate sweet potato very well here. We do not have off-season for sweet potato, we cultivate all-round the year, there is no time you look for sweet potato here in our village market and you will not see it. I would have given you some sweet potato if not that my children have taken all of them to market for sale. Sweet potato is profitable here, most especially at the beginning of the year when it is a little bit scarce.

This finding is in agreement with Omoare (2014) who found out that most (92.5%) of the sweet potato farmers sold their sweet potato in the village market. It is also in line with the findings of Ezeano (2006) who noted that majority of the sweet potato farmers sold their products at the village markets. Unlike cereal crops (rice, wheat and maize), sweet potato is not a globally traded commodity and its prices are usually determined by local supply and demand (Fawole, 2007). The implication of this is that in as much as value is not added to fresh sweet potato, its marketing will still be limited to local markets, monetary returns to farmers will be lower, while sweet potato marketers in urban areas will earn higher returns.

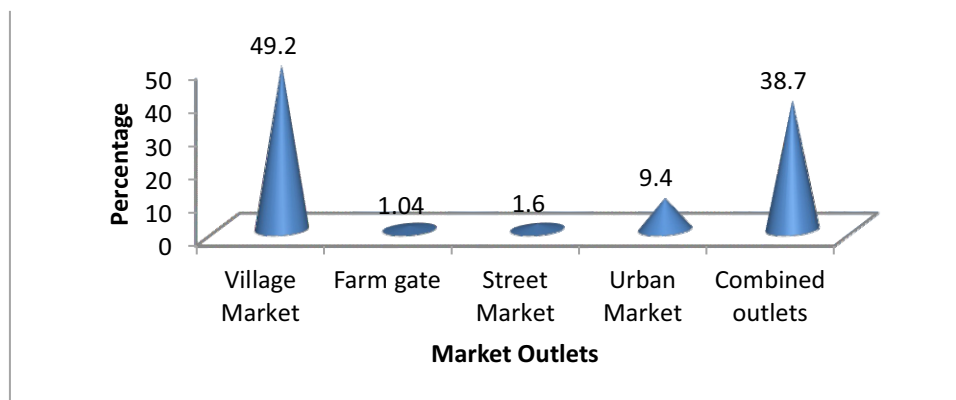


Fig. 1: Distribution of respondents based on the marketing outlets

Source: Field Survey, 2019

Conclusion

The study revealed that sweet potato is a commonly grown and marketed crop among all farmers in the study area which serve as source of food and income generation. The study also showed that sweet potato is a profitable enterprise by generating ₦3.5 for every ₦1.00 spent. Also from the result of the study, it was established that among all the marketing outlets used by sweet potato farmers in Ebonyi State to dispose their produce, village markets constitute a major channel for the sale of sweet potato. Therefore, there is need for farmers to put more effort to put more land into cultivation with sweet, because of the high profit emanating from its production. There is also need for

land reform policies to make more land available to sweet potato farmers for increased production.

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