



COMPARATIVE ANALYSIS OF COST AND RETURN ON THE MARKETING OF BIO-FORTIFIED VITAMIN-A GARRI AND ORDINARY GARRI IN SOUTHWESTERN, NIGERIA.

ABSTRACT

Garri is a fermented and roasted granular product from cassava which is a major staple food for both rural and urban dwellers. Garri is found to be a national food with urban market presence.

Despite the important of garri to national food, there have been lack of information on its profitability to the producers. How productive is the marketing

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Introduction

Background of the Study

Cassava (*Manihot esculenta Crantz*) is a staple food crop grown by poor farmers on marginal lands, particularly in Africa, Asia and Latin America (International Institute of Tropical Agriculture-IITA, 2014). Cassava has many products one of which is garri. Garri, a fermented and toasted granular product from cassava was before now considered a poor man's food until recently. It is now elevated to an urban convenience food. It is cheap and ready source of vitamin energy. Garri is produced following harvesting of cassava, peeling, grating, dewatering, fermentation (optional), sieving, frying and bagging. This process will give white or creamy white garri while addition of palm oil prior to dewatering will add yellow colour to garri. Yellow garri is preferred and can cost twice as much, making it less available to poorer households (Phillips *et al.*, 2015). The advent of genetically modified food (GM-food) had been a thing of worry to people especially the illiterate and the educationally deprived



of Bio-fortified Vitamin A- Garry as compared to the ordinary Garry in the region under study? The study therefore seek to examine the socio-economic characteristics and costs and returns on the marketing of bio-fortified vitamin A garri and ordinary garri in Oyo state. One hundred (100) garri marketers were drawn using multistage sampling technique involving a list of garri marketers collected from International Institute of Tropical Agriculture (IITA) Ibadan and snow ball technique from eighteen locations across seven local government areas in Oyo state. The analytical tools used were descriptive statistics and gross margin analysis. The result shows that the productive ages of the respondents was found to be 53.0% for ages between 25-45years; about 85% processors and marketers were found to be female; the gross margin was found to be ₦680,508.00 while profit was found to be ₦540,803.00 and ₦8.54 per kilogram for white garri. The profit for bio-fortified Vitamin A garri was found to be ₦762, 374.00 and ₦23.95 per kilogram. The result also found that garri marketers operates in small scale. It is therefore concluded that females dominate the processing and marketing of garri industry, that Pro-Vitamin-A garri and ordinary garri marketing is profitable and can be used to increase the socio-economic status of garri marketers in the examined region.

Keyword: Comparative analysis, Cost and returns, Marketing, Bio-fortified, Garri.

masses who daily consume the bulk of this staple food. Thus the marketing of bio-fortified may not likely be accepted (Phillips *et al.*, 2016).

Abu *et al.*, (2016) identified that with the growing population in Nigeria and declining real incomes, garri has the potential to become a highly demanded household food. Despite the speculations about the growing demand for garri, however, the marketing structure of garri as a major source of food has not been ascertained (Abu *et al.*, 2016).

There has been great concern in recent years concerning the marketing of bio-fortified garri in Nigeria implications (Apata and Apata, 2013). Studies



conducted on the marketing of bio-fortified garri in selected markets in Ibadan metropolis indicate low adoption rate in time past and until now, the problem of adoption of the bio-fortified garri has been questioned on the basis of health issues and wholesomeness of its consumption as genetically modified foods are considered to have health implications (Apata and Apata, 2013). Ifediora (2013) and Ayaru, *et al.* (2013) used cost-return analysis on the profitability of garri marketing in terms of large and small scale industry. The result showed that net revenue for large scale garri marketing industry was higher than that of the small scale firms. Also cost per kilogram (kg) of garri was higher in small scale than large scale firms. Adejobi, (2019); Yusufu (2019); Yesufu *et al.*, (2017) and Ibrahim (2019), in their study of the economic analysis of garri found out that the garri marketing enterprise can be profitable. On the other hand, Olabode *et al.* (2020) argued that garri processing and marketing fails to satisfy the profit maximization objective of firms.

Research Problem

Evidence has shown that cassava production has increased from 2009 to 2013 (FMARD, 2014). However, post-harvest operations such as processing, packaging, marketing, storage, distribution and transportation have constrained sustainable cassava production in recent times (Winter, 2020). Cassava is extremely perishable commodity with a shelf life of less than 3 days after harvest. Harvested tubers must therefore be processed to curb post-harvest losses (Davies, 2009).

Vitamin A deficiency is a major issue, especially in Africa (Bokanga, 2000). Nigeria in particular sees a prevalence of Vitamin A deficiency in nearly one third of children under five years old (World Bank, 2012). Since cassava is a major food staple, yellow cassava shows great potential to alleviate Vitamin A deficiency in Africa. In 2008, the Federal Government of Nigeria issued a policy that required cereal producers, flour mills and other commonly consumed foods to be fortified with vitamin A but subsequently, it was observed that the stipulated quantity of Vitamin A was either insufficiently added or not added at all (IITA,2009). This made the IITA to go into ways of inculcating the vitamin A



into the cassava stem and in August, 2011, the bio-fortified vitamin A cassava was produced.

Recently, bio-fortified varieties of cassava that contain significant levels of provitamin A carotenoids (pVACs) have been developed by conventional plant breeding methods and released for use by the local populations. These bio-fortified varieties could be used to help tackle vitamin A deficiency (VAD) ([Abu et al., 2006](#)). These bio-fortified varieties produce a gari that is very similar in colour to gari made with added crude palm oil that also contains vitamin A ([Abu et al., 2006](#)).

The advent of genetically modified food (GM-food) had been a thing of worry to people especially the illiterate and the educationally deprived masses who daily consume the bulk of this staple food. Thus the marketing of bio-fortified may not likely be accepted ([Phillips et al., 2005](#)).

It is no doubt that work done on the marketing of garri has obviously been more on white garri, and few on the comparative analysis of profitability and the factors affecting the marketing of both types of garri. With growing demand and the accompanying supply response of white and bio-fortified garri in Nigeria, studies on comparative analysis of the marketing of bio-fortified and white garri will be an eye opener to solving many problems affecting the marketing margin of garri marketers in southwestern Nigerian. Hence, it became imperative to find out the socio-economic characteristics of the marketers of the bio-fortified and ordinary garri and the cost and returns on the marketing of bio-fortified Vitamin A garri and ordinary garri in the study area.

Objective of the Study

The following objectives were formulated to guide the conduct of the study:

- i. Identify the socioeconomic characteristics of Marketers of Bio-Fortified Vitamin A garri and ordinary garri in South Western Nigeria;
- ii. Examine the cost and returns on the marketing of bio-fortified and the ordinary garri in Oyo state, Southwestern Nigeria.



Research Questions

- i. What are the socioeconomic characteristics of Marketers of Bio-Fortified Vitamin A garri and ordinary garri in South Western Nigeria?
- ii. What are the cost and return on the marketing of bio-fortified and the ordinary garri in Oyo state, Southwestern Nigeria?

Acronyms: *IITA: International Institute of Tropical Agriculture; GM-food: Genetically Modified Food*

Literature Review

Agriculture has enormous potential to support improvements in nutrition (Emokaro 2020). Activities of research stations and most government policies in Nigeria are directed towards increasing the production and marketing of cassava based product such as gari. However, not much has been done to improve the marketing system of gari (Emokaro 2020; FAO/WHO 2014).

Development of bio-fortified Vitamin-A cassava.

The three varieties of yellow cassava, UMUCASS 36, UMUCASS 37, and UMUCASS 38, are the results of a 12-year contest in Nigeria funded by the International Institute of Tropical Agriculture (IITA) and Nigeria's National Root Crop Research Institute and International Center for Tropical Agriculture (CIAT). Breeding is ongoing and new innovations hope to achieve a β -carotene level of 15 micrograms/gram by 2015. (WRENmedia, 2012).

Drying of the tuber is one simple method of cassava preservation; however some methods of drying are more effective than others in terms of retaining β -carotene levels. Oven drying at 60°C was shown to maintain 72% of the β -carotene levels though the retention fell to 40% after four weeks in storage. Sun drying only resulted in a 38% retention of β -carotene levels, and after four weeks in storage, the levels fell to about 18% (Chavez et al., 2007) β -carotene retention can be improved by pretreatments such as blanching and osmotic dehydration. (Nascimento et al., 2007).

Gari is a granular food product produced by grating cassava roots into a mash, fermenting and de-watering the mash into a wet cake, and roasting the wet



material into gelatinized particles. Gari has a slightly sour taste and it could be white or cream depending on the variety of cassava used and the processing method adopted. The particle size of gari may vary from 0.6 to 1.1 mm depending on the method of production and the preferences of the targeted consumers.

Ifediora (2013), Furthermore Ayaru, et al. (2003, 1993) used cost-return analysis the profitability of gari marketing in terms of large and small scale industry. The result showed that net revenue for large scale gari marketing industry was higher than that of the small scale firms. Also cost per kilogram (kg) of gari was higher in small scale than large scale firms. Ouma et al., (2007) and Ibrahim (2009), in their study of the economic analysis of gari found out that the gari marketing enterprise can be profitable. It was also pointed out by various authors that gari marketing has been characterized by various constraints in least developed countries (LDCs), especially in sub-Saharan Africa (SSA). (Saingbe, 2020; Awoyinka, 2009; Okuneye et al., 2003; Olowa and Olowa, 2020).

Vanhuyse (2012) stated that the level of efficiency of the marketing system and its contribution to food security can be improved by analyzing the problem and proffering solutions to those problems militating against an efficient marketing system. Analysis on the performance of gari markets in Ibadan metropolis also revealed high transaction costs and weak marketing, resulting from high transportation cost, high marketing cost, low production facilities and high concentration of middle men (Abu et al., 2006), Kaine (2005), Wihemina, (2009)), opined that there had been a high and fluctuating consumer price in the marketing channel of gari arising from poor linkages in the distribution network and poor infrastructural facilities. Kaine (2005) also found in his study among many gari marketers in Delta state that most of the literate use both family and hired labour and marketers were youths and middle-aged, depended on gari processing and marketing as means of livelihood.

Many studies (Folayan and Bifarin, 2011; Wihemina, 2009; Mafimisebi 2007; Abolagi et al., 2007) noted that value addition through processing of gari improves returns on investment and that marketing of gari is profitable.



Chukwuji et al. (2007) and Farinde et al. (2007) similarly argued that the problem of spoilage of gari could be overcome through proper packaging and storage.

Studies assessing drivers for increases in gari marketing, also tend to agree that private and public participation and investment and upgrading of rural infrastructures will not only reduce costs of gari processing and marketing but also improve effectiveness and efficiency of gari production, processing and marketing in Nigeria (e.g., Eze et al. 2020; Walkenhorst, 2007; Adeniji, 2006; Manyong et al. 2005; Okoh, 1999; Awoyinka, 2009 and Ojo, 2009; Oladele, 2012).

Acceptability of Bio-fortified Gari

In 2011, environmental rights action group Friends of the Earth Nigeria (FoEN) demanded a halt to any research on genetically modified cassava in Nigeria. Suggesting the International Institute of Tropical Agriculture (IITA) research team in Nigeria—stop meddling with one of Nigeria's key food crops, arguing that IITA is undermining biodiversity. IITA ignored all health concerns brought to their attention, and proceeded with the launch of three controversial varieties (Ejolt, 2011).

It is normally risky to change the colour of a staple crop because colour preference can negatively affect consumer adoption rates (WRENmedia 2012). This is not the case with yellow cassava. Since local consumers often add palm oil to white cassava flour in their foods, they are normally accustomed to the golden colour. Therefore the yellow colour has been shown not to deter consumers. (WRENmedia 2012) On a taste panel comparing fufu produced with different types of cassava flour, the fufu containing yellow cassava flour was preferred (Omodamiro et al., 2008). The experiment also concluded that the yellowness of the fufu added to the appetites of the taste testers. (Omodamiro et al., 2008)

Gari is primarily produced and eaten in rural areas. (Bokanga 2000). Issues related to ethics and health safety were suggested as perhaps representing the largest concerns which could be a potential barrier to the acceptance of GM



cassava. The media can play an important role in disseminating information on health and safety issues as, in the past, the media have played a significant role in encouraging most people to avoid so called “contaminated” food products due to health concerns.

Regardless, once attention is brought to health risk concerns by the media people will start avoiding it. Additionally, media reports on GM can be negative as they tend to rely on unsubstantiated information without proper investigation (Mashood 2004). In particular, the information provided tends to come from various sources that are pushing an agenda that this is mostly reported without balanced views.

Marketing Margin

Adekanye (1988) in Adeuya (2014), defined marketing margin as the difference between what the farmer gets and what he sells. Marketing margin differs from one commodity to another as reported by Adeuya (2014). A marketing margin is similar to a profit margin in that it shows the relationship between the amount a company pays for a product and the amount its customers pay. However, while marketing margin is the difference between cost to the seller and the cost to the consumer, profit margin is the percentage of the final sale price that comes as profit for the seller.

Preferences for producing Gari due to better margins versus HQCF were also highlighted in another recent review. Processors can make approximately 50% profit from producing and selling Gari at N180 /kg (Vanhuyse, 2012). This gets significantly squeezed when processing costs for HQCF increase but selling prices remain around NGN3600/50kg (Adeuya, 2014).

Methodology

This research work was carried out in eighteen (18) farm locations across seven Local Government Areas (L.G.A) in Oyo State, Nigeria between January 26th and March 7th, 2021. Oyo State has a total of thirty three Local Government Areas (LGAs) and a population of 5,591,589 and total land area approximately 28,454 square kilometers (Oladeebo and Oluwaranti, 2012). The State is



located in Southwestern Nigeria, it is bounded in the South by Ogun State and in the North by Kwara State, in the West by the Republic of Benin while in the East, and it is bounded by Osun State. The topography is mainly plain to slightly gentle rolling lands. The annual rainfall ranges between 1500mm and 3000mm. The average daily temperature ranges between 25^{oc} (77^{of}) and 35^{oc} (95^{of}), almost throughout the year. The major garri markets in these areas were Maya market at Ibarapa east which is operated every five days. The market is about 80% processed garri market and patronized by all the garri processors marketers from all the surrounding farm settlements around Ibarapa East and Eruwa. In this market, customers and large scale marketers come from Lagos and surrounding cities to buy garri in large scale and transport them back to sell. This locations were being chosen based on the list of garri marketers collected from IITA Ibadan and because of the high concentration of garri marketers in the regions.

A total of one hundred (100) garri marketers were interviewed using multistage sampling technique. The first stage involved the purposive selection of 30 garri marketers from a list of garri marketers and processors collected from IITA Ibadan. This is because the garri marketers were registered with IITA Ibadan who introduced the bio-fortified garri into the local areas. The second stage involve snow ball technique method which was used to select at least 5 marketers from each farm settlements. The snow ball sample technique involve approaching the people on the list who directed the researcher to other garri marketers in the near-by farm settlements. The respondents were engaged in the marketing of both the white garri and bio-fortified garri. The data were thus obtained from Eighteen (18) locations across seven (7) LGAs of the state which are: Ibarapa East (Idi-Ata Ibule-Ilo, Okolo, Olori Village, New Eruwa, Old Eruwa, Lagaye, Aderomu Village and Maya Market); Ibarapa Central (Igbo-Ora); Ogbomoso Orire (Iluju); Iseyin (Iseyin Central Market, Otiri Farm, Adugbe, Ija-Odola); Egbeda LGA (Kulodi); Onireke LGA (Dugbe Market); Oyo North (Mokola Market). Closed ended questionnaire was used to obtain primary data from the respondents.



Information were collected on the socio-economic characteristics, such as the educational background of the respondent, age, marital status, sex, primary occupations, and sources of funds. Other variables on which data was collected were the input used, output, labour, processing methods and revenue. During interview, the questionnaire was constructed in the native language of the respondents to achieve the objectives of the study. Descriptive statistics such as frequencies, percentage, means and tables was used to determine mean of socio-economic characteristics of the garri marketers while the cost and return was analysed using gross margin analysis. The cost and return analysis was used to determine the profit made by the bio-fortified garri and the ordinary garri marketers.

The gross margin analysis is expressed thus:

$$GM = TR - TVC \dots\dots\dots (1)$$

Where GM = Gross Margin; TR = Total Revenue; and TVC = Total Variable Cost

Variable cost included cost of fresh tubers of cassava, firewood, labour and marketing cost while those associated with fixed costs include: frying pans, sieves, screw-jack, etc.

$$RRI = NR/TC \times 100 \dots\dots\dots (2)$$

Where: RRI = Rate of Return on Investment; NR = Net Return and TC = Total Costs

$$\text{Profitability index (PI)} \rightarrow PI = NR/TR \dots\dots\dots (3)$$

Where: PI= Profitability Index; NR =Net Return and TR Total Revenue

$$\text{Operating Expense Ratio (OR)} \rightarrow OR = TVC/TR \dots\dots\dots (4)$$

Where: OR= Operating Expense Ration; TVC= Total Variable Cost and TC= Total Revenue

$$\text{Rate of Return on Variable Cost (RRVC)} \rightarrow TR/TFC \times 100 \dots\dots\dots (5)$$

Where: TR= Total Revenue; TFC= Total Fixed Cost and TVC= Total Variable Cost

Measurements used in garri marketing as found in the study area

1 jalukere of cassava tuber load =900kg



900kg of cassava tuber =320kg of garri

1 congo of garri = 1.2kg

1 jedimole =7 congos

1 bag of garri =67 congos =80kg

1 jalukere of white cassava tubers is sold at N18, 000.

1 jalukere of bio-fortified cassava tubers is sold at N19, 500.

1kg of garri is sold at N100 for white garri.

1 kg of bio-fortified garri sold for N120.

Note: jalukere is the name for old pickup car (equivalent to Cabstar) used in selling cassava tubers.

The marketing margin was expressed in cash or in percentage of retail cost (Muhammad-Lawal, 2017; Fakayode, 2020). The formula adopted for this study was also used by Yesufu (2018):

Gross Marketing Margin	=Selling Price – Purchase Price
Marketing cost	=Total Fixed Cost + Total Variable Cost – Purchase Price
Net Marketing Margin	=Marketing margin – Marketing cost
Marketing Efficiency	=Net margin/ Marketing cost X 100
Selling price	=Quantity of garri marketed (Kg) X Price
Purchased price	=Prices of cassava tubers used

RESULT AND DISCUSSION

Table 1: Distribution of the respondents by their socio-economic characteristics

Variables	Frequency (No=100)	Percent (%)	Cumulative percentage (%)
Gender			
Male	15	15.0	15.0
Female	85	85.0	100.0
Total	100	100.0	
Age			
25-45	53	53.0	53.0
46-65	39	39.0	92.0



66-780	8	8.0	100.0
Total	100	100	
Marital status			
Married	79	79.0	79.0
Single	5	5.0	84.0
Divorced	6	6.0	90.0
Widowed	10	10.0	100.0
Total	100	100.0	
Household number			
1-4	65	65.0	65.0
5-8	34	34	99
10 and above	1	1.0	100.0
Total	100	100.0	
Year of formal education			
Primary1-6	19	19.0	19.0
JSSI-SS3	32	32.0	51.0
NCE	31	31.0	82.0
OND	10	10.0	92.0
HND	8	8.0	100.0
Total	100	100.0	
Starting capital			
1000-40000	75	75.0	75.0
41000-80000	20	20.0	95.0
81000-150000	5	5.0	100.0
Total	100	100.0	
The sources of business finance			
Personal savings	88	88	88
Cooperatives	10	10	98
Others	2	2	100.0
Total	100	100	

Source: Data analysis, 2021



Socio-economic characteristics of respondents

This involves the analysis of various socio-economic characteristics of the respondents which includes the age, sex, marital status, family size, level of education, sources of funds. Table 1 Showed that majority of the respondents (85%) were female while the remaining 15% of the respondent were male for both marketers of ordinary and bio-fortified garri. This shows that marketing of garri in the study area is predominantly a female dominated enterprise. Marketing of garri is generally accepted to be gender biased and largely attributed to female gender, however, the men were largely involved in manning the machineries in the enterprises which supports the study of Stein *et al.*, (2012). From table 1, it was shown that among respondents interviewed, the distribution show that about 53.0% of the respondents were in their production ages 25-45 years while the remaining 39.0% were between 45 and 65 years. According to Ibekwe (2012), these active population (25-45 years) have the mental capacity to cope with the challenges of the garri marketing and physical ability to do manual work decreased with age.

Table 1 showed that majority 79% of the respondents were married, while the remaining were either divorced or widowed for both the marketers/processor. The result also shown that household size 3-4 people was the highest with percentage frequency of 40%, 25% has 1-2 people as their household size, 20% has family size of 5-6 people while the remaining 15% has household size above 6 people. On the average the household size, in the study area was 4.61 with the smallest household size in the study area was 5 per house. Clearly, the respondents had large family sizes. All things being equal, the respondents will have access to family labour which can help in the enterprises (Ibekwe, 2012). Table 1, showed that 31% of the respondents attended National college of Education (NCE), 20% has 7-9 years of formal education, 12% for 10-12 years of formal education and 16% of the respondents has 1-3 years of formal education, however, 18% were observed to have completed ordinary national diploma (OND), and higher national diploma (HND) and B.Sc. or its equivalent for both the processors and marketers of garri in the region. The relatively high concentration of NCE (31%) and 61% of the respondents has at least 10 years of



formal education shows that most of the garri marketers are relatively educated and this implies that they could seek for and make use of information regarding market forces for increase productivity as well as modernization of their enterprises as found by Olabode (2020). Table 1 showed that 75% of the respondents started their business with about N1, 000-N40, 000, 20% had starting capital of about N41, 000-N80, 000 while the rest 5% of the garri marketers started their marketing business with about N81, 000-N150, 000. The result indicates that majority of the garri processors and marketers had low capital start up with cumulative frequently of 75% of the total 100 respondents starting with capitals between the ranges of N1, 000 to N40, 000. This result will invariables means that most of the processors and marketers of garri are in small scale enterprise and hence low standard of living as reported in the findings of Ibekwe (Ibekwe, 2012). Among 100 marketers examined, 88% financed them businesses though personal savings 10% borrowed money from cooperatives while only 2% source for fund through other means. The result shows that most of the garri markets do not have access to loans and grant making them marketing of Garri in small scale.

Cost and Returns on the Marketing of Bio-Fortified Vitamin A and Ordinary White Garri

Gross margin analysis was used to determine the profit made by the bio-fortified garri and the ordinary garri marketers and processors. From table 2, the gross margin analysis of the bio-fortified garri and ordinary garri showed the quantity of ordinary and bio-fortified garri produced as 63,355.20kg and 31,838.40kg respectively. This shows that the production of ordinary garri is still by far higher than the production of bio-fortified vitamin A garri in the region. The total revenue from the marketing of ordinary garri was ₦6, 335,520.00 while the total revenue from the marketing of Bio-fortified Garri is ₦3, 820,608.00. The total variable cost of marketing the ordinary garri was gotten to be ₦5, 655,012 while the marketing cost incurred in marketing of Bio-fortified garri was ₦2, 988,172.00



The depreciation cost incurred from the use of Basins, Congo, Ladle (palanke), Metallic plate (Jedimole), table and chairs, and broom/packers calculated with straight line method where the cost was divided by the useful life in months and assuming no salvage value, the depreciation on fixed input was ₦94, 294.96 for ordinary garri while for bio-fortified, it was ₦57, 431.35. The gross margin which is calculated as the difference between the total variable cost and the total revenue was found to be ₦4, 830,743.33 for ordinary garri and ₦1, 300,783.33 for Bio-fortified vitamin A garri.

The total cost incurred in the marketing of ordinary garri calculated as the addition of the total variable cost and total fixed cost was found to be ₦5, 794,717.00 for white garri and ₦3, 058,234.00 for bio-fortified garri. The Net Income (NI) calculated by subtracting the total fixed cost from the gross margin was found to be ₦540, 803.00 for ordinary garri and ₦762, 374.00 for bio-fortified vitamin A garri. The profit (π) for ordinary garri was found to be ₦540, 803.00 and ₦762, 374.00 for bio-fortified vitamin A garri. On the average, when the total profit made was divided by the quantity of garri marketed, it was found that for every 1kg of garri sold, ₦8.54 was made for ordinary garri and ₦23.95 for bio-fortified garri. In this study, the result showed that marketing of bio-fortified vitamin A garri is more profitable than the marketing of Ordinary garri as also found by Adeuya (2014).

The study also found the percentage total variable cost which was obtained by:
 $\%TVC = TC/TVC \times 100$ and

Percentage fixed cost also obtained by:

$$\%FC = TC/TFC \times 100$$

Were found to be 97.6% and 2.4% respectively. The result shows that the cost of processing is high relative to fixed cost incurred in processing and marketing.

Table 2: Table of Gross Margin Analysis for Marketing of Ordinary and Bio-Fortified Garri

Items	Ordinary garri			Bio-fortified vitamin-A garri		
	Qty (kg)	Price (₦)/kg	Total (₦)	Qty. (kg)	Price (₦)/kg	Total (₦)
A. REVENUE (NGN)	63,355.2	100.00	6,335,520	31838.4	120.00	3,820,608
B. VARIABLE COSTS						
			3,546,000			1,930,500



Cost of cassava used, Processing Cost, Cost of fire wood, Transportation Cost, Sacks and bags, nylons	1,833,365			919,435.00
Other cost	275,647.00			138,237.00
TVC	5,655,012			2,988,172
C. FIXED COST				
Depreciation on (Basin, congo, ladle, metallic plate, table rent and chairs and packer)	139,705.00			70,062.00
TFC	139,705.00			70,062.00
Total Cost	5,794,717			3,058,234
D. GROSS MARGIN (TR-TVC)				
Net Income (GM-TFC)	540,803.00			762,374.00
E. PROFITABILITY				
Rate Of Return On Investment (RRI) = $NR/TC \times 100$	9.0			25.0
Profitability index (PI) = (NR/TR)	0.085			0.199
Operating Expense Ratio (OR) = (TVC/TR)	0.89			0.78
Rate of Return on Variable Cost (RRVC) = $TR/TVC \times 100$	4534.93			5453.18
PROFIT (π)	540,803.00			762,374.00
Average Profit (π/Q) per Kilogram	8.54			23.95

Source: Data analysis, 2021.

Where: Qty= Quantity, Md= Manday, Kg=Kilogram, TFC= Total Fixed Cost, TR= Total Revenue, TVC= Total Variable Cost, GM= Gross Margin, Π = profit, NR= Net Return, TR= Total Return.

Conclusion

The females are the dominant marketers of both the ordinary and bio-fortified Vitamin A garri. The mean age of the garri marketers for both the ordinary and bio-fortified garri are high and garri marketers are all within their productive age. The garri marketers are relatively educated, have relatively high household size and have low capital startup. Bio-fortified vitamin A garri was also found to be more profitable compare to ordinary garri.

Recommendation

Based on the result obtained, it is therefore recommended that government should encourage garri marketers through provisions of credit to boost startup



capital and increase the scale of marketing operations. Production and marketing of bio-fortified garri should be encourage as it prove to be more profitable than the ordinary garri.

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