DETERMINANTS OF PROFITABILITY AMONG SMALL SCALE CASSAVA PROCESSORS IN SOUTH WESTERN NIGERIA

Ehinmowo O.O., Afolabi J.A., Fatuase A.I., Researchers
Federal University of Technology, Akure, Nigeria
E-mail: firstwalefat@yahoo.com

ABSTRACT

This study empirically analyzed the determinants of profitability among small scale cassava processors in Southwest, Nigeria. Three States were considered for the study which was Ogun, Oyo and Ondo. A multistage sampling technique was employed to randomly select 373 respondents. The data collected were analyzed using descriptive statistics and multiple regression models. The findings revealed that the cassava processing business was profitable in the study area given the value of gross margin (~~N~~45,485,680.00; ~~N~~33,476,280.00 and ~~N~~64,517,720.00) and net profit (~~N~~45,231,752.00; ~~N~~33,254,740.00 and ~~N~~64,177,111.00) for the three States (Ondo, Oyo and Ogun). The result of regression model indicated that education, year of experience, access to extension services, household size, cost of raw materials and types of cassava purchased were the factors that significantly determined profitability in the study area. The main challenges encountered by the processors were identified as inadequate capital, environmental hazard, cost of fuel, storage facilities and market problems.

KEY WORDS

Cassava processors; Cassava products; Gross margin; Net profit.

Nigeria is the highest cassava producer in the world; its production is a third more than that of Brazil and almost doubles the production in Thailand and Indonesia (Federal Ministry of Agriculture and Natural Resources, FMANR, 2000). Cassava production in Nigeria in 2004 jumped from 20 million tons to about 38 million tons (Food and Agriculture Organization, FAO, 2005), which ranks cassava production higher in volume than yam, sorghum and rice. FAO estimates show that cassava production in Nigeria exceeded 33 million tons, compared to Thailand's 20 million tons (FAO, 2005).

Cassava is one of the most important crops in Nigeria. It is the most widely cultivated crop in the Southern part of the country in terms of area devoted to it and the number of farmers growing it (Spencer, 1997). Cassava is important not only as a food crop but even more so as a major source of income for rural households. As a cash crop, cassava generates cash income for the largest number of households in comparison with other staples, thus contributing positively to poverty alleviation (Spencer, 1997). Cassava processing activities are widespread in the rural areas being the most formal processed crop in the Southern and Middle Belt areas of the country and small – scale cassava processing equipment are by far more widespread in the country than for any other agricultural produce (Oni, 2005). Processing cassava root tuber into dry form reduces its moisture content and converts it to a more durable and stable product with less volume which makes it more transportable. Processing is also necessary to eliminate or reduce the level of cyanide in cassava and improve the palatability of the products.

Cassava roots are processed by a variety of methods into different products, according to local customs and preferences (Hahn, 1989). Compared with fresh cassava, the processed products have increased shelf life, are easier to transport and market and are more palatable. Fresh cassava roots cannot be stored for long because they rot within 3 – 4 days after harvest (Oduro *et al.*, 2000). They are bulky, with about 70% moisture content. Processing can increase the efficiency of land use by releasing land after harvest for other crops or for fallow to sustain soil productivity, also reduces food losses and stabilizes seasonal fluctuation in supply of the crop (Nweke, 1999). Therefore, this study determined the profitability of cassava processing in the study area, examined the socio – economic

characteristics of cassava processors, factors influencing profitability of cassava processing and constraints militating against cassava processing in the study area.

METHODOLOGY

The study was carried out in South West, Nigeria. The Southwest zone is one of the six geo-political zones in Nigeria and it comprises six States. It has a land mass of 76,852 square Kilometers and population of 25.2 million (National population Commission, NPC, 2006). Primary data were obtained for this study with the aid of well-structured questionnaire administered on cassava processors. Multistage sampling technique was employed for this study. The study purposively selected three (3) States (Ondo, Ogun and Oyo) from the study area because of the preponderance of cassava processors in the locations. Three (3) Local Government Areas (LGAs) were randomly selected based on their involvement in cassava processing as made available by each State Agricultural Development Programme (ADP). The study went further by randomly selecting three (3) communities from each LGA while twenty cassava processors were randomly selected from each community, making a total sample size of 540 respondents but 373 respondents were valid and employed for this study. Descriptive statistics and double log regression model were used to analyze the data obtained. Gross Margin and Net Farm Income were used to assess the profitability of cassava products enterprise in the study area. The Gross Margin (GM) of an enterprise is the difference between the total value of production (TVP) and the total variable cost of production (TVC), that is,

$$GM = TVP - TVC \dots\dots\dots(1) \text{ and } NFI = TR - TC \dots\dots\dots(2)$$

Condition: If $GM > 0$, then the farm enterprise is profitable; If $GM < 0$, then the farm enterprise is not profitable.

The Net Farm Income (NFI) represents the difference between total revenue (TR) and total cost (TC).

The Double log function is specified as:

$$\text{Log } Y_i = b_0 + b_1 \text{Log } X_1 + b_2 \text{Log } X_2 + b_3 \text{Log } X_3 + b_4 \text{Log } X_4 + b_5 \text{Log } X_5 + b_6 \text{Log } X_6 + b_7 \text{Log } X_7 + b_8 \text{Log } X_8 + b_9 \text{Log } X_9 + b_{10} \text{Log } X_{10} + U_i$$

Y_i = NFI (TR – TC of the respondent i th); Log = natural log; U_i = error term; b_0 = intercept term; X_i = vectors of explanatory variables which are: X_1 = gender (1=male and 0 otherwise) X_2 = education (measure in category), X_3 = years of experience, X_4 =household size; X_5 =Marital status (measure in category), X_6 = access to extension service (1=yes and 0 otherwise), X_7 =cost of labour, X_8 = cost of raw materials, X_9 = cost of processing equipment, X_{10} = cost of energy consumed, type of cassava bought (1=improved cassava varieties and 0 otherwise).

RESULTS AND DISCUSSION

Enterprise budgeting analysis. This section discusses the overall profit (Net profit) of cassava processing in the study area as shown in Table 1. The cost elements comprised total variable cost and total fixed cost while the revenue presents the sales accruing from cassava products. Ogun State (75,207,689) incurred highest cost of production in processing cassava into products, followed by Oyo State and then Ondo State with the value of 44,183,280 and 36,275,480 respectively. It was further revealed that total variable cost took 99.3%, 99.5% and 99.5% of total cost in Ondo, Oyo and Ogun States respectively. Also, the Net profits for Ondo, Oyo and Ogun States were ₦45, 231,752, ₦33, 254,740 and ₦64, 177,111 respectively, indicating that cassava processing was a profitable business in the study area. The gross margin in the three States was greater than zero which further confirms the profitability of the enterprise in the study area. The analysis of ratio also

revealed that Benefit Cost Ratio (BCR) in Ondo (2.24), Oyo (1.75) and Ogun (1.85) was above one, emphasizing the profitability of the business. Cassava processor in Ondo State will realize ₦2.24 on each naira expended while Oyo and Ogun State would realize ₦1.75 and ₦1.85 as revenue respectively on each ₦1 invested in the business.

Table 1 - Budgetary analysis for Cassava Processing in South – West, Nigeria

Estimated variables	Amount in naira (₦)		
	Ondo	Oyo	Ogun
Total variable cost (TVC)	36,275,480	44,183,280	74,867,080
Total fixed cost (TFC)	253,928	221,540	340,609
Total cost (TC)	36,529,408	44,404,820	75,207,689
Total Revenue (TR)	81,761,160	77,659,560	139,384,800
Net Profit (NP)	45,231,752	33,254,740	64,177,111
Gross Margin (GM)	45,485,680	33,476,280	64,517,720
Benefit Cost Ratio (BCR)	2.24	1.75	1.85

Source: Computed from field Survey, 2013.

Forms of processed cassava by Respondents. Table 2 revealed that, the respondents processed cassava into various products, these are; Gari, Starch, Fufu, lafu and Pupuru as well as processed cassava into two or three products. From the pool, 49 percent of the respondents processed cassava into gari, 0.3 percent Starch, 14.5 percent Fufu, 5.6 percent Lafu and 3.5 percent Pupuru. Also, the processors processed cassava into gari and starch, gari and fufu, gari and lafu, gari and pupuru, starch and lafu, fufu and lafu, gari, starch and lafu, gari, fufu and lafu and gari, starch, fufu and lafu. Oyo and Ogun States processed cassava into lafu with the exception of Ondo State. Also, Ondo State processed cassava into pupuru with the exception of Oyo and Ogun States. This implies that cassava is a unique crop when fully utilized. Each State is known for its own peculiarity in terms of cassava product. Majority of the processors (49 percent) processed cassava into gari. This is seen as a way of generating more income as means of alleviating poverty.

Table 2 - Forms of processed cassava by Respondents

Types of processed cassava	Ondo	Oyo	Ogun	Pool
	Frequency / %	Frequency / %	Frequency / %	Frequency / %
Gari	87 / 65.2	60 / 57.1	36 / 26.7	183 / 49.0
Starch	- / -	- / -	1 / 0.7	1 / 0.3
Fufu	5 / 3.8	35 / 33.3	15 / 11.3	54 / 14.5
Lafu	- / -	3 / 2.9	18 / 13.3	21 / 5.6
Pupuru	13 / 9.8	- / -	- / -	13 / 3.5
Gari and Starch	1 / 0.8	- / -	- / -	1 / 0.3
Gari and Fufu	1 / 0.8	2 / 1.9	12 / 8.9	15 / 4.0
Gari and lafu	- / -	1 / 1.0	41 / 30.3	44 / 11.8
Gari and Pupuru	26 / 19.6	- / -	- / -	24 / 6.5
Starch and lafu	- / -	- / -	- / -	1 / 0.3
Fufu and lafu	- / -	1 / 2.0	3 / 2.2	5 / 1.3
Gari, starch and lafu	- / -	- / -	6 / 4.4	6 / 1.6
Gari, fufu and lafu	- / -	2 / 1.9	3 / 2.2	3 / 0.8
Gari, starch, fufu & lafu	- / -	- / -	- / -	2 / 0.5
TOTAL	133 / 100	105 / 100	135 / 100	373 / 100

Source: Computed from Field Survey, 2013.

Factors determining profitability of cassava processing in Southwest, Nigeria. The results of coefficient of determination for cassava processors in Ondo, Oyo and Ogun were 0.7355, 0.6841 and 0.7456 respectively. It implies that 73.55%, 68.41% and 74.56% of the variability on the net profit of cassava processors in Ondo, Oyo and Ogun States respectively, are explained by the explanatory variables. All the F-values in the three State were significant at 5% level of probability indicating that all the explanatory variables jointly exerted significant influence on the level of net profit in the study area. In Ondo State, level of education, processing experience, access to extension services had positive coefficients and

significantly influenced their profitability in the area. This means that increase in any of their value will increase the profit of cassava processing. Cost of processing equipment had a negative coefficient but significantly determine profitability, indicating that an increase in the cost of equipment will lead to a decrease in the profit accrue from processing cassava. Level of education, household size, type of cassava purchased were positive and significantly determined profit in Oyo State. It implies that increase in any of their value will as well increase profit in the study area. Cost of labour and cost of raw materials used were significant but negative in determining profit, indicating that any increase in their values will decrease the level of profitability in the area. In Ogun State, the factors that were positively and statistically determined profitability are level of education, processing experience, cost of raw material used, cost of processing equipment and type of cassava purchased. This also implies that any increase in their value will increase profit in the area while cost of labour was significant but negative in determining the profitability of cassava processing, indicating that an increase in the cost of labour will reduce the level of profit in the area.

Table 3 - Result of profitability function analysis

Explanatory variables	Ondo (n=133)	Oyo (n=105)	Ogun (n=135)
	Coefficients(t-value)	Coefficients(t-value)	Coefficients(t-value)
Constant	8.676 (1.43)	2.368(0.86)	3.046(1.65)
Gender	1.330(1.54)	0.671(0.94)	1.671(0.98)
Education	0.105*(2.26)	0.969*(2.00)	0.039*(2.55)
Experience	0.060*(1.97)	0.587(0.95)	0.018*(3.14)
Marital status	0.461(1.81)	1.531(1.22)	1.321(0.99)
Extension services	0.096*(2.59)	0.498(0.63)	0.208(0.62)
Household size	0.638(1.35)	0.520*(3.40)	0.076(1.18)
Labour	-0.015(0.02)	-1.303*(2.30)	-0.350*(2.12)
Raw materials used	-0.131(0.27)	-0.844*(2.77)	0.243*(1.92)
Processing equipment	-0.009*(1.94)	0.298(1.67)	0.567*(3.00)
Energy consumed	-0.066(0.58)	-0.061(0.90)	-0.083(1.33)
Type of cassava purchased	0.149(0.17)	2.747*(1.98)	1.844*(2.65)
R ²	73.55	68.41	74.56
F-value	52.80*	49.12*	54.21*

* means significant at 5% level of probability.

Constraints to cassava processing. Constraints in this context imply the problems and challenges prohibiting cassava processors from realizing expected profit in the course of processing cassava into products.

Table 4 - Constraints to cassava processing in Southwest, Nigeria

Constraints	Ondo (n =133)		Oyo (n =105)		Ogun (n =135)		Average %	Rank
	Freq.	%	Freq.	%	Freq.	%		
Inadequate capital/credit	121	91.0	98	93.3	119	88.1	90.8	1 st
Transportation cost	78	58.6	57	54.3	42	31.1	48.0	7 th
Shortage of labour	49	36.8	67	63.8	23	17.0	39.2	10 th
Environmental hazard	105	79.0	102	97.1	126	93.3	89.8	2 nd
Cost of cassava tubers	61	45.9	53	50.5	52	38.5	45.0	8 th
Lack of modern equipment	55	41.4	75	71.4	67	49.6	54.1	6 th
Storage facilities	98	73.7	82	78.1	101	74.8	75.5	4 th
Market problem	71	53.4	79	75.2	99	73.3	67.3	5 th
Theft	31	23.3	47	44.8	63	46.7	38.3	11 th
Cost of fuel	113	85.0	94	89.5	122	90.4	88.3	3 rd
Rodents/pests/diseases infestations	39	29.3	51	48.6	66	48.9	42.3	9 th

Note: multiple responses allowed; Source: Computed from field survey, 2013.

Table 3 showed the main constraints highlighted by the processors and they are inadequate capital, high cost of transportation, shortage and high cost of labour, environmental hazards, high cost of cassava tubers, unaffordable and lack of modern

equipment, lack of efficient storage facilities, market problem vis-à-vis unstable prices of cassava and cassava products, theft, high cost of fuel, and incidence of rodents, pests and diseases. The average percentages of each constraint across the States were computed and ranked in the Table. It was shown that over 50% of the respondents interviewed said that inadequate capital (90.8%), environmental hazard (89.8%), cost of fuel (88.3%), storage facilities (75.5%), market problem (67.3%) and lack of modern equipment (54.1%) were the major challenges that needed to be addressed in order to increase the profits and as well make the enterprise more attractive and conducive for processors. While the remaining problems were chose by less than 50% of the respondents across the three States.

SUMMARY AND CONCLUSION

The study was carried out in Southwest Nigeria and the respondents for this study were selected from Ondo, Oyo and Ogun States. A total of 373 sample sizes were employed for the analysis of this study. Descriptive statistics and Ordinary Least Square (Double log function) were used to analyze the data collected for the study. The total revenue accrued from cassava processing from Ondo, Oyo and Ogun States are ₦81,761,160.00; ₦77,659,560.00 and ₦139,384,800.00 respectively. The percentage of total cost on the total revenue was about 45% in Ondo State, 57.2% in Oyo State and 54% in Ogun State and it can therefore be deduced that less than 50% of total revenue is going to cost of production. The study also found out that cassava processing was profitable in the three States. The net profit of Ondo, Oyo and Ogun States was ₦45,231,752.00; ₦33,254,740.00 and ₦64,177,111.00 with a gross margin of ₦45,485,680.00; ₦33,476,280.00 and ₦64,517,720.00 respectively. The findings further revealed that Ondo State (2.24) had the highest BCR followed by Ogun State (1.85) and then Oyo State (1.75). The values of BCR in each State validate the viability of the enterprise in the Southwest Nigeria since they are all greater than one. The result of Ordinary Least Square showed that level of education, cassava processing experience, access to extension services, number of households, cost of labour, cost of raw materials, cost of processing equipment, and type of cassava purchased were the factors that statistically and significantly determined the profitability of the cassava processing across the three States. The main constraints pinpoint by the respondents that need urgent attentions for a better profit making in cassava processing are inadequate capital (90.8%), environmental hazard (89.8%), cost of fuel (88.3%), storage facilities (75.5%) and market problem (67.3%). Others were lack of modern equipment, infestation of rodents/pests/diseases, theft, transportation cost, cost of cassava tubers and cost of labour.

In conclusion, cassava processing is a viable and profitable enterprise that will boost food production vis-à-vis reduce the syndrome of poverty in the study area, if properly managed and make the environment conducive for the processors. It is also one of the enterprises that has potential of adding value to our gross domestic product (GDP) in this country and as well create employment opportunities for the teeming population.

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