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Analysis of Profitability and Determinants of Profit in Raphia Palm Wine Tapping and Marketing in Nigeria

B. Adakaren[1*], S.A.N.D. Chidebelu[2], C.J. Arene[2] and O.J. Ekhator[1]

[1]Nigerian Institute for Oil Palm Research (NIFOR), Benin City, Edo State, Nigeria

[2]Department of Agric. Econs., University of Nigeria, Nsukka, Nigeria

***Corresponding Author's E-mail: soblessed4real@yahoo.com**
Phone: 07033334838

Abstract

Raphia palm (RP) exploitation and utilization have yielded direct and immediate micro level benefits to economically disadvantaged rural communities in Nigeria. Over the years, the level of the importance of RP as a resource to the rural communities was not fully appreciated. The study thus examined the level and determinants of profit in Raphia palm wine (RPW) tapping and marketing in Nigeria using Niger Delta Area (NDA) of the country as a case study. Multi-stage random sampling technique was used to select the respondents for the study while primary data was used to source information from the respondents using pre-tested, structured questionnaire. Data were analysed by means of gross margin, efficiency ratio, profitability ratio, operational efficiency and regression analysis. The results obtained from the study showed that RPW tapping and marketing in Nigeria had a gross margin, total variable cost, profit ratio and efficiency ratio of ₦81 286.5, ₦34 990, ₦232.3 and 3.323, respectively, for the tappers and ₦36 616.92, ₦132 619.74, ₦28 and 1.276 for the marketers, respectively. Therefore, both tapping and marketing of RPW in the country were profitable and can be used to reduce poverty level of participants' through job creation and economic empowerment of the rural populace. Further analysis of the data showed that input and output prices influenced the profit level of the tappers and marketers.

Key words: Raphia palm, Raphia palm wine, efficiency, profit, exploitation, Nigeria

INTRODUCTION

Palm wine tapping is a traditional occupation of many farmers living in the coastal region of West Africa, particularly in the Niger Delta part of Nigeria (Ndon, 2003). Palm wine tapping has been practised for centuries in these regions and has been handed down from one generation to another. Palm wine from Raphia *hookeri* is mostly consumed fresh, but can be distilled to make strong alcoholic liquor which can also be used as bakers' yeast (Ogbonna, 2000; Akachuku, 2001). Palm wine is drunk in different parts of Africa, Asia and South America (Ndon, 2003; WHO, 2004; Egwim, Amanabo, Yahaya and Bello, 2013). Although palm wine is produced largely from the rural areas, considerable quantities are consumed in the cities. In some cases, it takes several hours or days for the wine to get to the consumers in the urban areas; by which time the wine must have lost its fresh sugary taste. This has led to the development of bottled Raphia palm wine (RPW). This process involves the collection of fresh RPW from the field and immediately taking it to the bottling unit where it is promptly filtered using a 100 mesh nylon gauze and then passed through a muslin material to ensure the removal of all dirt from the wine. The filtered fresh palm wine is then introduced into clean bottles leaving a small space towards the mouth. Each bottle containing fresh palm wine is sealed with a bottle cork using a specialized

machine. The palm wine bottles are pasteurized at 70°c for 40 minutes in a water bath, after which the bottles are cooled and labelled. Bottled palm wine preserved by pasteurization at 70°c for 40 minutes without addition of chemicals possess the three characteristics of good palm wine (fresh, sugary taste, whitish colouration and vigorous effervescence) and possesses a shelf life of up to 12 calendar months. In Cameroon, RPW provided employment for three quarters of the male population in some villages (Falconer, 1990; Perez, Ndoye and Eyebe, 1999) and monthly incomes of 20 000-35 000 CFA France (US$71-124) for small producers. There is an increasing market for the Raphia palm wine arising from a growing demand for it, based on information on the markets, market prices and consumer demand for Raphia palm wine (Adakaren and Chidebelu, 2017). Thus the Raphia palm wine has the potential to generate income for the producers and marketers. Although it is not clear when palm wine was first traded in West Africa, the WHO (2004) reported that Palm wine has always been consumed by millions of people worldwide. The Organization further reported that due to the increasing demand for palm wine in industrialized countries, the developing countries from where this rare wine is chiefly produced are unable to meet this demand resulting in a great potential market for the Raphia palm wine and a huge profit to be assessed by the producing countries.

Markets for palm wine on the Freetown Peninsula have existed at least since the 19th century with trade continuing during the civil war in Sierra Leone (1991-2001). Thousands of tonnes of RPW are produced and traded yearly in Nigeria but the trades are not documented. Presently, Nigeria is not recognised among international producers/marketers of any Raphia products in the Food and Agricultural Books of Commerce and Production. The wine is mainly used and traded locally in regions where they are produced and contributes significantly to rural employment and income (Mann and Wendl, 2009). In an attempt to appraise performance of institutions (tappers and marketers) involved in RPW marketing in Nigeria, the study attempted to investigate the level and determinants of profitability in RPW tapping and marketing in the country.

RESEARCH METHODOLOGY

Study Area

The study area is Niger-Delta Area (NDA) of Nigeria. It is bordered to the south by the Atlantic Ocean and to the east by Cameroon. It occupies a surface area of about 112,110 square kilometres (NDDC, 1999; NPC, 2006). It represents about 12 per-cent of Nigeria's total surface area. The region comprises nine of Nigeria's constituent states (Table 1). The NDA consists of saline mangrove swamps which stretch through the coastal states with 504,800 hectares in the NDA and 95,000 hectares in Cross River State (NDDC, 1999; FOS, 2004). The size of the mangrove forest rank it as the largest in Africa and as the third largest in the world (FOS, 2004; NDHDR, 2006).

Sampling Technique

Multistage random sampling technique was used in selecting respondents for the study. This was to ensure that the selection of respondents was unbiased. In stage I, Bayelsa, Delta and Rivers States were randomly selected from the nine States that constitute the NDA in Nigeria. Stage II, comprised a random selection of two LGAs from each State. Stage III involved random selection of two markets from each of the selected LGAs. In stage IV, a random selection of 10 respondents each of tappers and retailers was made from each market (Table 2). Therefore, the total number of respondents from each market was 20, while the total sample size was 240 respondents.

Data Collection

Primary data were used for the study. Two sets of structured and pre-tested questionnaire were administered to the respondents using trained enumerators to obtain primary data that were used to realise the objectives of the research.

Analytical Technique

Gross margin analysis was used to determine the profit margin of the Raphia tappers/marketers and it was specified as follows:

GM = TR – TVC

where:

GM = gross margin

TR = total revenue

TVC = total variable cost

Total revenue was calculated as quantity of Raphia palm wine in litres multiplied by the price of output (Raphia palm wine) which was assumed to be constant. Total cost was a function of output (assuming short-run production stage where fixed cost was negligible), Total cost becomes the total variable cost (TVC). Because variable costs increased with the level of output, hence, for the study, total variable cost was equal to other additional costs such as transportation, cost of roots and herbs used, market levies and labour cost/manday

Measure of Market performance by Efficiency

Measures of market performance, efficiency ratio,

profitability and operational efficiency were specified as follows:
Efficiency ratio (ER) = TR/TC
Profitability ratio (PR) = Π/TC
However, if ER > 1 and PR > 1, then, the Raphia palm wine industry was operationally efficient and vice versa.

Determinants of Profitability (profit function)

Implicitly, the profit function was represented as follows:
$\Pi = f(X_1, X_2, X_3, X_4, X_5, X_6,) + e$
Where:
Π = marketing profit (₦) derived as TMR – TMC, (TMR was the total marketing revenue (or returns) from sales and TMC was the total marketing cost).
X_1 = output price (₦);
X_2 = Transportation cost (₦);
X_3 = Labour cost (₦);
X_4 = purchase price of Raphia palm wine (₦);
X_5 = cost of other inputs (₦);
X_6 = Variety of stand (hybrid=1,wild=0)
X_7 = Number of palm stand
X_8 = Amount of market Tax/levy paid/charged (₦);
X_9 = Government intervention (levies) (₦); and
e = Error term.
A Student's t-test of differences between means was used to see if a significant difference existed among the means of revenue, costs, and profit for the tappers, wholesalers and retailers.

RESULTS AND DISCUSSION

Profitability of RPW producers and marketers in Nigeria

The results of the gross margin analysis showing the profitability of RPW tappers and marketers in the study area are presented in Table 3. RPW tapping and marketing in the study area generally had a gross margin, total variable cost, return per naira invested/profit ratio and efficiency ratios of ₦81,286.5, ₦34,990, ₦232.3 and 3.323, respectively, for the tappers and ₦36,616.92, ₦13,2619.74, ₦28 and 1.276 for the marketers. The gross margin and return per naira invested for the tappers were higher than those of the retailers because of the greater quantity of RPW they handled (sold). This observation is in line with Impey's (2000) argument that marketing cost decreases with increase in the quantity of commodity handled. Nevertheless, both tapping and marketing of RPW in the study area were profitable. The size and positive values of the profits obtained confirmed the fact that RPW tappers and marketers were able to cover their operating expenses with a significant level of profit obtained from the study area. The implication of this finding is that RPW tapping and marketing has the potential of improving the standard of living of the participants such that unemployment problem could be alleviated and income increased.

Determinants of profit in RPW tapping and marketing in Nigeria

The profit of the Raphia palm wine tappers was regressed against number of palm stands, variety of the palm stands, labour cost, transport cost, volume of output and selling price of the wine. Results showed that the output of RPW and selling price of the wine had a direct relationship ((1.108484 and 0.0172368, respectively) with the tappers level of profit. The coefficients of number of Raphia palm stands, variety of the palm stands, labour cost and transport cost of RPW were all negative implying an inverse relationship with the profit level of the tappers. However, further analysis of the result showed that the coefficients of Raphia palm stands, labour cost, and RPW output, were significant at 10%, 1% and 5% probability levels, respectively. This result thus showed that output and input prices indeed influenced the profitability of RPW.

On the other hand, the profit of the Raphia palm wine marketers was regressed against their monthly income, labour cost, cost of other inputs, purchase price of Raphia palm wine, transportation cost, government intervention and road network. Analysis of the data showed that labour cost, cost of other inputs, purchase price of palm wine, transportation cost, government intervention and road network all had inverse effects on the level of the marketers profit with coefficients of -0.0028984, -0.0165499, -3.04488, -0.2823852, -0.0001324 and -0.0001407, respectively. The coefficient of income was however high and positive (52.39524) indicating that the higher the income of the Raphia palm wine marketers, the higher their profit level in conformity with *a priori* expectations. Furthermore, all the regressed variables were significant at 1% level except for government intervention and road net work which were not significant at any level. Like in the case of the RPW tappers, the above result showed that output and input prices influenced RPW marketers' profit level.

CONCLUSION

The study showed that RPW tapping and marketing in the NDA of Nigeria were profitable with tappers earning higher profit than the marketers due to application of economies of scale with regard to their size of operation as compared to that of the marketers. Furthermore, the study indicated that input and output prices influenced the profits of both RPW tappers and marketers in Nigeria.

RECOMENDATIONS

Raphia palm wine is a special beverage due to the huge potential it has for increasing income and reducing poverty of the producing communities and so should be accorded more research interest in order to promote its production and marketing at both local and international markets. Furthermore, institutions and bodies responsible for data generation and storage would do well if they include Raphia palm wine (production, consumption, export and import data (if any)) as one of their interest commodities. Lastly, with the recent breakthrough in science on bottling of fresh palm wine, government and philanthropic organizations can help to mass produce the necessary equipments needed to bottle fresh palm wine and sell them at subsidized prices to tappers and marketers as well as organise workshops to educate them on the applications.

Table 1. States Composed of the Niger Delta Area, Land Area and Population

State	Land Area (Square Kilometres)	Population (NPC, 2006)
Abia	4,877	2 833 999
Akwa Ibom	6 806	3 920 208
Bayelsa	6 806	3 920 208
Cross River	21 930	2 888 966
Delta	17 163	4 098 391
Edo	19 698	3 218 332
Imo	5 165	3 934 899
Ondo	15 086	3 441 014
Rivers	10 378	5 185 420
Total	**112 110**	**31 224 587**

Source: National Population Commission (NPC) (2006). Result based on 2005 census

Table 2. Summary of Sampled Areas and Sample Size

State	L.G.A	Market	Tappers	Retailers	Respondents (sample)
Bayelsa	Ogbia	Ogbia	10	10	20
		Otoke	10	10	20
	Yenagoa	Swali	10	10	20
		Opolo	10	10	20
Delta	Ughelli North	Ughelli	10	10	20
		Agbarho	10	10	20
	Ughelli South	Okwegbe	10	10	20
		Otu-Jeremi	10	10	20
Rivers	Etchie	Eketa	10	10	20
		Egwi	10	10	20
	Khara	Bori	10	10	20
		Kaa	10	10	20
Total	**6**	**12**	**120**	**120**	**240**

Source: Computed from field data, 2012

Table 3. Profitability of RPW Production and Marketing in NDA of Nigeria

	Tappers		Retailers	
Item	**Total**	**Mean**	**Total**	**Mean**
Revenue	13,953, 180	116, 276.5	20,308,400.00	169,236.67
Total variable cost (TVC)	4,198, 800	34, 990	15,914,369.06	132,619.74
Gross margin (GM)	9,754, 380	81, 286.5	4,394,030.94	36,616.92
Net return (NR)	9,754, 380	81, 286.5	4,394,030.94	36,616.92
Return per naira invested=Profit Ratio (NR/TVC)	2.323%	2.323%	0.28%	0.28%
Efficiency ratio (Revenue/TVC)	3.323	3.323	1.276	1.276

Source: Computed from field data, 2012.

Table 4. Determinants of RPW Tappers' Profit

Variable	Coefficient	STDEV	t-value	P>ltl
Number of Raphia palm stands	-0.2459832	0.1402466	-1.75	0.082
Variety of stand	0.0412816	0.0524612	-0.79	0.433
Labour	-0.0386736	0.0123721	-3.13	0.002
Transport fare	-0.1031962	0.0950265	-1.09	0.280
Output	1.108484	0.4090809	2.71	0.008
Selling price	0.0172368	0.3416171	-0.05	0.960
Constant	2.495837	0.8021825	3.11	0.002
Number of observations = 120		Prob > F = 0.0000; Root MSE = 0.12277		
R^2 = 0.3345,		Adjusted R^2 = 0.2992		

Source: Computed from field data, 2012

Table 5. Determinants of RPW Marketers' Profit

Variable	Coefficient	STDEV	t-value	P>ltl
Income	52.39524	2.170462	-24.14	0.000
Labour cost	-0.0028984	0.0002994	-9.68	0.000
Cost of other inputs	-0.0165499	0.0038854	-4.26	0.000
Purchase price	-3.04488	0.1801394	-16.90	0.000
Transport fare	-o.2823852	0.0091027	-31.02	0.000
Government intervention	-0.0001324	0.0027949	-0.05	0.962
Road network	-0.0001407	0.0012622	-0.11	0.911
Constant	-16.42234	0.6493041	-25.29	0.000
Number of observations= 120		Prob > F = 0.0000; Root MSE = 0.00727		
R^2 = 0.9952,		Adjusted R^2 = 0.9949		

Source: Computed from field data, 2012

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