

Cost and Returns on Chewing Stick Processing in Southwest Nigeria

Olawumi, A.T^{1*}, Oluwalana, S. A², Momoh, S³ and Aduradola, A. M²

¹Department of Agricultural Production and Management Science, Tai Solarin University of Education, Ijagun, Ijebu-Ode, Ogun State, Nigeria

²Department of Forestry and Wildlife, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

³Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

This study examined chewing stick processing in Ogun and Oyo states of Nigeria. Primary data were obtained from a cross-sectional survey of 50 chewing stick processors. The respondents were selected using purposive sampling technique. Data was collected on respondents' socio-economic characteristics, resource use, costs, outputs, prices as well as the type of chewing stick processed. The data were analysed using descriptive statistics and budgetary analysis. Majority of the chewing stick processors (68.00%) are under the age of 45 years, with the female-folk accounting for 60.00%. Most of the chewing stick processors (67.00%) had not more than primary school education. About 96% of the processors have been in the business for over 5 years. A typical medium-scale processor annually handled an average of 720 bundles of chewing stick valued at ₦6,480,000 (\$4,050), and processed these at a cost of ₦6,105,350 (\$38,158.44) to earn an average of ₦388,000 (\$2,425) profit. The study concludes that chewing stick processing is a lucrative business that offers a source of livelihood for the respondents though it is presently import-dependent. Regional collaboration should be put in place for countries with comparative advantage in chewing stick cultivation to specialize in its production and export it to other countries thereby creating a virile international trade in it. The study recommends government intervention through domestication of chewing stick plants and provision of facilities such as roads, markets, stable electricity and appropriate machinery to enhance the scale of operation and efficiency.

Keywords: *Massularia acuminata*, non timber forest product, resource, chewing stick, gross margin, budgetary analysis, sustainable harvesting

Introduction

The resource base for chewing sticks has seriously declined as a result of considerable over exploitation as it is currently the case with the excessive harvesting of *Garcinia spp* in Liberia and Cote d'Ivoire (Holbech, 2000). In Nigeria, Okafor (1989) reports that *Randia acuminata* chewing sticks are still collected from primary and secondary forests within 3Km of villages, but the distance is increasing, which indicates that the resource is being depleted. Though, it is generally accepted that the harvesting of Non Wood Forest Products (NWFP) tends to maintain forest cover, particularly when compared to other alternative uses (Ruiz-Perex, *et al*, 2004). The effects on biodiversity are variable; NWFPs based on activities (such as chewing stick collection and processing) maintain a substantial amount of the species naturally occurring, although it certainly affects them, especially those most sensitive to human

presence or those that are collected in parallel with the commercial gathering of the main NWFPs (Peters, 1994, Freese, 1997). The promotion of commercial uses of NWFPs (such as chewing sticks) can be viewed as a double-edged sword, with potential and risks (Redford, 1992).

Despite being such an important NWFP, information on scale of use and the importance and value of medicinal plants (including chewing sticks) to users households, traders and other actors is sparse (Shackleton, *et al*, 2010). Only a few materials are available from Nigeria and Kenya (Osemeobo and Ujor, 1999) and Ethiopia (Deffar, 1998). There are few quantitative data that record the amounts of medicines consumed by user households on an annual basis, and even fewer that attempt to place economic value on this (Shackleton, *et al*, 2010).

There have been no adequate production and market studies, however, that had assessed the extent of production and marketing of chewing sticks in Nigeria as well as the people involved (collectors, processors, wholesalers/assemblers, retailers, and

*Corresponding author.

users etc.) or the income earned. This neglect coupled with inadequate research has contributed to the low pricing of the product and the abuse of the resource by exploiters often results in wastage and scarcity of the highly favors and valued species.

It must also be stressed that the development of a virile herbal toothpaste is consequent on the bioactivity of the constituents of chewing sticks against a wide range of oral pathogens; hence, the need for a research like this into the utilisation, marketing/distribution of selected chewing sticks in Nigeria to combat the dental pathogens on one hand and to boost the economy of the country through the development of a small and medium enterprises in herbal toothpaste cannot be over emphasized.

This study, therefore, attempts to X-ray a preliminary finding on the processing of *Massularia acuminata* in Southwest Nigeria with a view to providing a data base for further research on other NWFPs in the sub-region.

Methodology

Purposive sampling technique was employed for the selection of respondents in Ogun and Oyo states based on where the use and trade in chewing sticks are widely acknowledged (Isanwumi, 1978b). Four Local Government Areas (LGA) - Abeokuta South, Yewa South, Ijebu-Ode and Obafemi Owode) in Ogun State and six Local Government Areas - Egbeda, Kajola, Ibarapa Central, Ibadan North/East, Ogbomoso South and Saki East in Oyo state were purposively selected; representing 20 percent of the Local Government Areas in Ogun State and Oyo State respectively. In each of the LGAs, 5 chewing stick processors were randomly selected equally in both rural and urban settings to give a total of 50 respondents i.e. 20 and 30 respondents in Ogun and Oyo state respectively. The survey was carried out between January and August 2009 using a semi-structured questionnaires (with open and close-ended questions) administered through oral interviews of the non-literate respondents based on the questions in the questionnaires and direct administration on the literate respondents. The information gathered from the respondents includes demographic characteristics, source of product, major species processed/handled, method of processing, unit of sale, output, price per unit bundle of processed chewing sticks, scarcity of the product, revenue accruable per volume of trade, etc.

Data generated were analyzed using descriptive statistics (such as frequency distribution and computation of percentages) and Gross Margin (GM). The gross margin was calculated as follows:
Gross Margin (GM) = TR – TVC ----- (1)

Net Income (NI)

The net income was calculated using the formula:

$$NI = TR - TC \text{ ----- (2)}$$

$$TC = TFC + TVC \text{ ----- (3)}$$

Where:

TR = Total revenue per scale of operation (Naira)

TVC = Total variable cost per scale of operation (Naira)

TFC = Total Fixed Cost per scale of operation (Naira)

TC = Total Cost per scale of operation (Naira)

NI = Net Income (Naira)

Rate of Return (ROR)

Rate of return was calculated using the formula:

$$\frac{TR}{TC} \times 100 \text{ ----- (4)}$$

Rate of Returns on Investment (RORI)

The rate of returns on investment was also calculated to determine the rate of return to capital invested in the business according to the respective scale of operation to determine the profitability of investment in chewing sticks retailing using the mathematical formula below:

Rate of Return on Investment (RORI) was given as

$$\frac{TR - TC}{TC} \times 100 \text{ ----- (5)}$$

Where:

TR = Total Revenue (Naira)

TC = Total Cost (Naira)

Adapted from Popoola *et al*, (2005).

Cost associated with other fixed assets like machines, generators, knives, cutlasses, etc. were depreciated using the straight-line method.

Results and Discussions

Socio-economic characteristics of chewing stick processors

Table 1 presents the distribution of the sampled chewing stick processors by their socio-economic characteristics. As shown in Table 1, majority (68%) of the processors are between the age of 31 and 60 years. However, the processors in Ogun state were predominantly below the age of 45 years (93.3%) while their counterparts from Oyo states were predominantly older than 45 years (70%), with as much as 40% above 60 years of age. This shows that while the current populations of processors in the study area are within their most active years, the population of processors in Oyo states tends to be ageing. With reference to gender, results on Table 1 shows that both sexes were actively involved in chewing stick production, with the female-folks constituting the majority (73.3%) of the processors in

Ogun state, while the male-folks constitute the majority (60%) of the processors in Oyo state.

The chewing stick processors were mostly married (84%), with the majority (78%) having more than five members in their households. Most (76%) of the processors have also been in the business for more than 10 years (Table 1). This proves that most of them have made chewing stick processing their permanent source of livelihood.

As shown in Table 1, only about one-third (34%) of the processors depended solely on chewing stick processing as their means of livelihood. The majority (66%) were engaged in other sub-sidiary occupations such as artisanship and craft work (34%) and farming (20%). This result agrees with evidence in Blay (2004) which shows that non-timber forest products exploration is targeted at providing supplementary income to households that rely mainly on agriculture or other income sources.

Table 1. Demographic characteristics of chewing stick processors.

Description	Ogun State		Oyo State		Total	
	Freq.	%	Freq.	%	Freq.	%
<i>Age (Years)</i>						
16-30	10	33.3	0	0.0	10	20.0
31-45	18	60.0	6	30.0	24	48.0
46-60	2	6.7	6	30.0	8	16.0
Above 60	0	0.0	8	40.0	8	16.0
Total	30	100	20	100	50	100
<i>Gender</i>						
Male	8	26.7	12	60.0	20	40.0
Female	22	73.3	8	40.0	30	60.0
Total	30	100	20	100	50	100
<i>Marital Status</i>						
Single	4	13.0	0	0.0	4	8.0
Married	26	86.7	16	80.0	42	84.0
Widow	0	0.0	4	20.0	4	8.0
Total	30	100	20	100	50	100
<i>Household Size</i>						
1-5	6	20.0	5	25.0	11	22.0
6-10	15	50.0	9	45.0	24	48.0
Above 10	9	30.0	6	30.0	15	30.0
Total	30	100	20	100	50	100
<i>Years of Experience</i>						
1-5	2	6.7	0	0.0	2	4.0
6-10	10	33.0	0	0.0	10	20.0
11-15	4	13.3	10	50	14	28.0
16-20	2	6.7	0	0.0	2	4.0
Above 20	12	40.0	10	50.0	22	44.0
Total	30	100	20	100	50	100
<i>Subsidiary Occupation</i>						
No other Occupation	10	33.3	7	35.0	17	34.0
Artisanship & Craft	12	40.0	5	25.0	17	34.0
Contract Appointment	2	6.7	1	5.0	3	6.0
Farming	4	13.3	6	30.0	10	20.0
Petty Trading	2	6.7	1	5.0	3	6.0
Total	30	100	20	100	50	100

Costs and returns to processing of chewing stick

The costs and returns to chewing sticks processors in the study area is presented in Table 2, 3 and 4. It shows that chewing stick processing is a high income generating business as the present Gross Margin are ₦96,000.00, ₦384,000.00 and ₦710,400.00 for a representative small-scale, medium-scale and large-

scale processors handling 30, 120 and 192 Coaches of chewing sticks per annum respectively. Similarly, the present level of Net Income/Economic Profit per annum are ₦13,125.00, ₦297, 250.00 and ₦627, 425.00 for small-scale, medium-scale and large-scale processors handling 30, 120 and 192 Coaches of chewing sticks per annum respectively. On the whole variable costs constituted the highest proportion of

the total cost of production for all scale of operation with as much as 99.94 percent for the large-scale while the lowest (99.64%) is observed for the small-scale of operation. The cost of purchase is the highest cost item constituting as much as 96.46 percent of total cost of production in the medium scale of operation. The highest fixed cost (0.36%) is observed in the small scale while the lowest (0.06%) is observed in the large scale of operation; the higher proportion of fixed costs in the small scale of operation is an indication that it has acquired lots of overhead items but it is currently underutilizing the machineries like simple cutting machine and facilities like cutlasses, knives and wooden platforms i.e. the facilities may have depreciated and less efficient in production. It is important to note that simple machines and facilities are utilized in the processing of chewing sticks in the study area and hence only small amount of capital is required to acquire them and they can serve for an average of ten years in active operation business. The ability of the processors to meet the variable costs needs of the business is very crucial to the successful chewing stick processing in the study area.

Further analysis of the variable costs shows that the cost of purchasing chewing stick is the highest

across the scales of operation constituting as much as 96.42% of the total variable cost in the large scale of operation. This shows that it is an import-dependent industry as presently all commercial-scale chewing stick (*Massularia acuminata*) processed and marketed in Nigeria is said to be imported from neighboring countries and the reason for the exorbitant cost of purchase and hence its attendant effect on the net income and the gross income accruable to the processors who are simply price takers since there are no local production at the moment. Both the rate of return and the rate of return on investment were found to increase with the scale of operation i.e. 105.92, 106.14, 107.30 percent and 5.92, 6.14, 7.29 percent respectively implying a very good return on money invested in the business as the scale of operation increases i.e. rate of return on money invested in the business increases with the increases in the scale of operation from small-scale to large-scale of operation; though a proportional increase in the rate of return on every money invested in business is observed. The need for better access to larger amount of investment capital to scale up operation in order to enjoy the higher returns on investment by the chewing sticks processors becomes inevitable.

Table 2. Average costs and returns of a representative large scale (192 Coaches) chewing stick (*Massularia acuminata*) processor in the study area per annum.

Item	Amount (₦) Per Annum	% of TVC	% of TC
<i>Total Revenue (TR)</i>	10,368,000		
<i>Variable Cost</i>			
Cost of chewing stick purchase	9,312,000	96.42	96.37
Cost of Transportation	192,000	1.99	1.99
Labor-loading/unloading	38,400	0.40	0.40
Labor-cutting/carving/splitting	115,200	1.19	1.19
<i>Total Variable Cost (TVC)</i>	9,657,600		99.94
<i>Fixed Cost</i>			
Rent/Overhead	2500		
Fixed cost depreciated			
Cutting Machine	2500		
Knife	200		
Cutlass	375		
Generator	-		
<i>Total Fixed Cost (TFC)</i>	5,575.00		0.058
<i>Total Cost (TC)</i>	9,663,175.00		
Total Cash Income	704,825.00		
Less Cost of Management	77,400.00		
(Based on Minimum Wage of N6,450/Month)			
Net Income/Economic Profit	627,425.00		
Gross Margin	710,400.00		
Rate of Return (ROR)	107.30		
Rate of Return on Investment (RORI)%	7.29		
Net Income/Month	52,285.42		
Net Income/week	13,071.35		

Table 3. Average costs and returns of a representative medium-scale (120 coaches) chewing stick (*Massularia acuminata*) processor in the study area per annum.

Item	Amount (₦) Per Annum	% of TVC	% of TC
<i>Total Revenue (TR)</i>	6,480,000		
<i>Variable Cost</i>			
Cost of chewing stick purchase	5,880,000	96.46	96.30
Cost of Transportation	120,000	1.97	1.97
Labor- loading/Unloading	24,000	0.39	0.39
Labor - cutting/Carving/splitting	72,000	1.18	1.18
<i>Total Variable Cost (TVC)</i>	6,096,000		99.85
<i>Fixed Cost</i>			
Rent/Overhead	2000		
Fixed cost depreciated			
Cutting Machine	2000		
Knife	400		
Cutlass	450		
Generator	4500		
<i>Total Fixed Cost (TFC)</i>	9,450.00		0.16
<i>Total Cost (TC)</i>	6,105,350.00		
Total Cash Income	374,650.00		
Less Cost of Management (Based on Minimum Wage of N6,450/Month)	77,400.00		
Net Income/Economic Profit	297,250.00		
Gross Margin	384,000.00		
Rate of Return (ROR)	106.14		
Rate of Return on Investment (RORI)%	6.14		
Net Income/Month	24,770.83		
Net Income/Week	6,192.71		

Table 4. Average costs and returns of a representative small-scale (30 coaches) chewing stick (*Massularia acuminata*) processor in the study area per annum

Item	Amount (₦) Per Annum	% of TVC	% of TC
<i>Total Revenue (TR)</i>	1,620,000		
<i>Variable Cost</i>			
Cost of chewing stick purchase	1,470,000	96.46	96.11
Cost of Transportation	30,000	1.97	1.96
Labor-loading/unloading	6,000	0.39	0.39
Labor - cutting/carving/splitting	18000	1.18	1.18
<i>Total Variable Cost (TVC)</i>	1,524,000		99.64
<i>Fixed Cost</i>			
Rent/Overhead	2000		
Fixed cost depreciated			
Cutting Machine	3000		
Knife	100		
Cutlass	375		
Generator	-		
<i>Total Fixed Cost (TFC)</i>	5,475.00		0.36
<i>Total Cost (TC)</i>	1,529,475.00		
Total Cash Income	90,525.00		
Less Cost of Management (Based on Minimum Wage of N6,450/Month)	77,400.00		
Net Income/Economic Profit	13,125.00		
Gross Margin	96,000		
Rate of Return (ROR)	105.92		
Rate of Return on Investment (RORI)%	5.92		
Net Income/Month	1,093.00		
Net Income/Week	273.44		

Conclusion

The study concludes that commercial-scale chewing stick (*Massularia acuminata*) processed and marketed in Nigeria presently is an import-dependent industry characterized by exorbitant cost of purchase and, hence, its attendant reduction in the net income and the gross income accruable to the processors. Globally, this result implies that there is the need for respective nations of the world to take issue of sustainable natural resource use serious and put in place structures, rules and regulations in place that will forestall all forms of over-exploitation economic resources like chewing stick. In addition, regional collaboration could be put in place for countries with comparative advantage in chewing stick cultivation can specialize in its production and export the same to other countries thereby creating a virile international trade in it where standardized measures of quality and pricing will be put in place.

The following recommendations are made: Domestication and commercial production of major chewing stick species as well as provision of processing facilities for processors at subsidized rate.

References

- Deffar, G (1998). Non wood forest products in Ethiopia', EC-FAO Partnership Programme (1998-2000). Tropical Forestry Budget Line B7- 6201/97-15/VIII/FOR Retrieved from: www.fao.org/docrep/003/X6690E/X6690E00.htm.
- Frease, C. (Eds.) (1997). Harvesting wild species- implication for biodiversity conservation. John Hopkins University Press, Baltimore.
- Holbech, L (2000). Dental hygiene and livelihood: A case of chewing sticks in Ghana. Retrieved from: www.cifor.org/ntfpcd/NTFP-Africa-R.PDF.
- Okafor, J.C (1989). Edible indigenous woody plants in the rural economy of the Nigerian Forest Zone. In Okali D.U.U (Eds.): The Nigerian Rainforest Ecosystem: Wood Forest Products in Ethiopia', EC-FAO Partnership Program me (1998-2000).Tropical Forestry Budget Line B7- 6201/97-15/VIII/FOR Project Proceedings of MAB Workshop on Nigerian Rainforest Ecosystem, University of Ibadan, Nigeria.
- Osemeobo, G. J & Ujor, G (1999). Non wood forest products in Nigeria. EC-FAO Partnership Program me (1998-2000) - Project GCP/INT/679/EC Data Collection and Analysis for Sustainable Forest Management in ACP Countries- Linking National and International Efforts" FAO Rome.
- Peters, C.M (1994). Sustainable harvest of non timber plant resources in tropical moist forest: An ecological primer, biodiversity support program, Washington, D.C.
- Redford, K. H. (1992). The empty forest" *Bio Science*, 42:412-422.
- Ruiz-Perez, M & Arnold, J.E.M (eds) (1996). Current issues in non timber forest products research, CIFOR, Bogor.
- Shakleton, S, Cocks, M, Dold, T, Kaschula, S, Mbata, K, Guni, M.K & Graham Von Maltiz (2010). Non wood forest products: Description, use and management; (In Chidumayo, E.N and Gumbo, D.J., Eds.): The dry forests and wood lands of Africa: Managing for products and services, Centre for International Forestry Research, Earth Scan Publishers, U.K, Chap.5: 93-129.