

Techno economics of baskets from rattan (*Eremospatha macrocarpa*) wood in Southern Island, Nigeria

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ABSTRACT

Analysing forest-based enterprises by understanding their technical know-how and economic significance is important for designing sustainable development strategies. In this current study, analytical findings on the technical know-how and economic signification of basket making from *Eremospatha macrocarpa* cane wood, in addition to data obtained from 60 weavers native of Andoni are reported here. The results showed that skills acquisition was highly manual-labour intensive but mastery was very exciting learning activities achieved within the scheduled eight weeks without fee as experienced by the third author. The rate of returns on investment was found to be 200.00%, and 366.67% against the total cost of ₦300/bundle of cane leaving behind ₦600, and ₦1100 as gross profit for the small basket (3), and hamper (2) made, respectively per bundle. The only incentive enjoyed by the basket weavers was found to be the presence of thriving local markets, especially the Ngo market where consumers were able to pay commensurate rewarding amounts per basket size. The motivational factors for engaging in basket weaving included: income generation which serves as a primary and secondary source of income; creation of social class; and domestic needs. No communal strategy exists for the conservation of raw materials but the respondents expressed willingness to support efforts that would allow their sustainable use of rattan cane especially *E. macrocarpa* for basket production.

Keywords: Basketry, traditional resource management, income generation, rattan, livelihood

INTRODUCTION

Basket is an essential tool for holding items including humans (Exodus, 2:3) and its manufacturing using varying natural materials (forest resources) is one of the key enterprises sustaining livelihoods in developing countries with little inputs (Sunderlin *et al.*, 2005). Over 60 plant materials have been globally identified for manufacturing baskets (Novellino and Ertug, 2005). In Africa, several species grow in different environments, and as such, a diversity of materials ranging from rattan fibre to palm leaves to reeds, to stem bark, to sisal fibres, to banana fibres have been employed for manufacturing baskets (African Heritage, 2010; Adedeji and Aiyeloja, 2016). In Nigeria, different species of basket manufacturing plants naturally occur and one of the uses of rattan cane wood, among others, is the manufacturing of

baskets/basket hampers, which are very popular among the Niger Delta indigenes (Lucas and Dahunsi, 2004).

Despite the multitude of economic challenges, Nigeria can still experience sustainable satisfactory growth through diversification, including tapping forests for commercial basket production and showcasing the significant positive impacts of the basket industry in her economy like China (Sun and Liu, 2022). Cash, savings, basket for family use, prestige/social importance accruing from the basket with little input investment (Sun and Liu, 2022) justify it as a worthwhile additional income earning operation. Nigeria is very rich in talents, skills, and resources to become the leading basket income earner in the world (Olubango, 2002). Niger Delta is one of the regions with abundant

resources that can be tapped for the massive production of baskets. In this region, rattan is culturally and economically important as its wood is often used in making baskets compared to palms' fronds utilisation in other regions of Nigeria. As identified during the preliminary survey, *Eremospatha macrocarpa* wood was affirmed as the popular material for making baskets in the Island Local Government Area (Andoni Local Government) of Rivers State, Niger Delta, Nigeria. While the Nigerian economy needs diversification of technical know-how, the attraction to the skill acquisition of forest resources by the youth is poor. Owing to these facts, current research focused on the techno-economics assessment of baskets manufactured mainly from *E. macrocarpa* wood in Andoni Local Government of Rivers State, Nigeria.

MATERIAL AND METHODS

Study area

This study was conducted at the 6 communities (Asarama, Ebukuma, Egendem, Ikuru, Ngo, and Otudon) of Andoni Local Government Area, Rivers State, Nigeria. The local government is situated at 4°27'30'' to 4°35'00'' N and 7°17'30'' to 7°32'30'' E (Fig. 1), occupying a spatial extent of 233 km². The people of the area speak one language "Obolo" with a projected population of 211,614 based on the 2006 census using the current Nigerian 2.61% growth rate. The landscape is dominated by large coverage of the Atlantic Ocean and is made up of islands separated by creeks and rivers (Ake, 2011). Fishing and marketing of fish resources are popular economic activities undertaken year-round and are more intense in the dry season (Enemugwem, 2009). Baskets are generally known as "Okwun" because of the oneness dialect in the study area.

Sampling technique and data collection

A purposive sampling method was used to select the six basket-weaving communities and sixty active basket weavers who make baskets only not for domestic uses in the study area. Pre-tested questionnaires were used to collect data

from the weavers in Asarama (n = 10), Ebukuma (n = 11), Egendem (n = 10), Ikuru (n = 7), Ngo (n = 12) and Otudon (n = 7).

Skill acquisition

The skills of basket production were acquired at Ebukuma by the third author. The raw material (*E. macrocarpa*, cane bundle) was purchased for ₦300.00 and processed with aid of a cutlass and knife into sizeable rods that form the rim and strips. The rods are thicker than strips, the rods formed the skeleton (rim) and the strips were used to weave around the rim in a rotating manner while in bending and sitting conditions as demonstrated by the third author (Figures 2-5). Two bundles were purchased for the production of small sizes (20 cm in base diameter, 20 cm in height, and 35 cm in open face diameter) of U shape and gift/Hamper baskets (30cm length, 10cm width, and 15 cm height) of trapezoid shape.

Profitability analyses of basket weaving

The small-size baskets of the above dimensions were the most popular and demanded, thus its production-consumption system was used for profitability analyses and the whole study. Three small baskets were made from a bundle of *E. macrocarpa* cane purchased at ₦300.00. From one cane bundle, three baskets were made and sold at ₦300.00 per basket. From the second bundle, 2 Hampers were made and sold at ₦700.00 per Hamper. The profitability of these types of baskets was subjected to a contingent valuation approach thus:

$$\text{Profit} = \text{TR} - \text{TC} \dots\dots\dots \text{Eq. 1}$$

Where;

TR = Total revenue

TC = Total cost (production cost)

The rate of returns on investment was used to determine the rate at which the money used for the production of baskets was realised.

$$\text{ROI} = \frac{\text{TR} - \text{TC}}{\text{TC}} \times 100 \dots\dots\dots \text{Eq. 2}$$

Where;

TR = Total revenue

TC = Total Cost



Fig. 3: Commencement the weaving by the third author



Fig. 4: Completion of the basket base and weaving/raising of the basket up



Fig. 5: Completion of the basket by the third author

RESULTS

Characteristics of basket weavers

In total, 60 baskets' weavers were characterised (Table 1). All of them are indigenes and they engaged in basket weaving as primary (30%) and secondary (70%) livelihood operations with the majority (65%) of them being males. The engagement of the young people was very low (8.4%) with most of them being married (75%) and having the largest family size of 3-5. The highest educational attainment was secondary school certificates with many of them (46.7%) having primary school certificates. The skills of basket weaving were acquired mainly (86.7%) at home/hometown, with parents (31.6%) playing leading roles while the highest numbers of them (36.7%) have never passed the skills to anyone. The period of the acquisition indicated that skills of basketry have sharply declined (Table 1).

Basketry skills acquisition and returns of investment (ROI) to labour from basket weaving

The first two authors had previously acquired the skills of basketry using natural materials, *Raphia hookeri* and *Elaeis guineensis* fronds. The skills of basketry using *E. macrocarpa* cane were acquired by the third author as

demonstrated in Figures 2-5, within 8-weeks scheduled periods and the information on parameters to estimate the returns of investment to labour is shown in Tables 2 and 3. *E. macrocarpa* wood was majorly from processors at a rate of ₦300 per bundle and 60% of them lodged complaints of delayed supply. The weaving activities (78.3%) and marketing periods (68.8%) were mostly on weekly basis, and the rate of weaving by 85% of them was 3-5 baskets per day (Table 2). The costs of cutlasses and knives were negligible. While one bundle of *E. macrocarpa* wood could produce 3 small-sized baskets yielding ROI of 200%, the same bundle could only produce 2 hampers yielding ROI of 366.67% (Table 3).

Incentives and motivational factors (IMFs) for engagement in basket production and the basket roles in the livelihood of the people

Information on the IMFs for engagement in basket production and the roles basket-making play in the livelihood of basket weavers is summarised in Tables 4-6. All acknowledged the presence of locally viable markets. Income generation and domestic needs accounted for why 53.3% engaged in basket weaving, and 46.7% claimed to engage in basket weaving because of social status/income

generation/domestic needs (Table 4). No association related to basket production existed thus all basket weaving was association free. The roles basket production played included the provision of primary and secondary sources of livelihood to 30% and 70% of weavers, respectively. In addition, the cost-free utilisation of baskets for domestic applications for all the weavers ensured monetary savings for the majority (73.3%) of the weavers (Table 5) though females exhibited higher savings power than males (Table 6).

Resources conservation and management strategies

Rattan wood taken from the wild has been natural a resource for basket production. The resource conservation and management strategies for basket production were presented in Table 7. All the basket weavers expressed no communal conservation strategies existed in all the sampled communities for the utilisation of rattan cane but they all expressed willingness to support efforts that would allow their sustainable use of rattan cane especially *E. macrocarpa* for basket production (Table 7).

Table 1: Characteristics of basket weavers (n = 60)

Parameters	Response	Frequency	Percentage (%)
Occupation	Primary	18	30.0
	Secondary	42	70.0
Gender	Male	39	65.0
	Female	21	35.0
Age	15-29	5	8.4
	30-49	27	45.0
	50 above	28	46.7
Marital status	Married	45	75.0
	Single	5	8.3
	Divorced	2	3.3
	widow	5	8.3
	Widower	3	5.0
Family size	1	7	11.7
	2	6	10.0
	3-5	33	55.0
	6-10	14	23.3
Highest educational qualification	Non formal	12	20.0
	Primary school cert.	28	46.7
	Secondary school cert.	20	33.3
Where the skill of basketry was learned	Home/hometown	52	86.7
	At school	8	13.3
From whom the skill was acquired	Parent	19	31.6
	Friends	12	20.0
	Apprenticeship	11	18.3
	Family	10	16.7
	Teacher	8	13.3
Number of people taught the skill of basketry	None	22	36.7
	1-3	12	20.0
	4-6	8	13.3
	7-9	7	11.7
	10 and above	11	18.3
When skill was learned	1970-1989	38	63.3
	1990-2009	18	30.0
	2010 till date	4	6.7

Table 2: Economics of raw material, Rattan cane (*E. macrocarpa*)

Parameters	Response	Frequency	Percentage (%)
Source of raw material	Purchase	34	56.7
	Free	26	43.3
	Total	60	100.0
Amount per measure	₦300 per bundle	34	56.7
	Free	26	43.3
	Total	60	100.0
Timely access to raw material	Yes	24	40.0
	No	36	60.0
	Total	60	100.0
Frequency of weaving	Daily	4	6.7
	Weekly	47	78.3
	Monthly	9	15.0
	Total	60	100.0
Weaving rates/day	1-2	1	1.7
	3-5	51	85.0
	5 above	8	13.3
	Total	60	100.0
Sales periods	Daily	4	6.6
	Weekly	43	68.6
	Monthly	13	21.7
	Total	60	100.0

Table 3: Returns of investments to labour from basket weaving

Materials	Cost (₦)	Type (and Unit) of basket	TR (₦)	Gross profit (₦)	ROI (%)
<i>E. macrocarpa</i>	300.00/bundle	Small-sized (3)	900.00	600.00	200.00
Knife	NA				
Cutlass	NA	Gift/Hamper (2)	1400.00	1100.00	366.67

Table 4: Incentive/motivational factors for engagement in basket weaving

Parameters	Response	Frequency	Percentage (%)
Viable local markets	Yes	60	100.00
Motivational factors	Income generation/domestic uses	32	53.3
	Social status/income generation	28	46.7
	/domestic uses		

Table 5: Summary of roles of basket production in the livelihood of people

Parameters	Response	Frequency	Percentage (%)
Belonging to any association of basket weaving	No	60	100.0
	Total	60	100.0
Basket as primary source of living	Yes	18	30.0
	No	42	70.0
	Total	60	100.0
Domestic uses of basket	Yes	60	100
	Total	60	100.0
Savings from basket	Yes	44	73.3
	No	16	26.7
	Total	60	100.0

Table 6: Test of association between savings status of basket weavers and gender

		Savings from basket weaving		Total	df	Chi-square
		No	Yes			χ^2
Gender	Male	Count	25	39	1	0.028*
		% within Gender	64.1%	100.0%		
	Female	Count	19	21		
		% within Gender	90.5%	100.0%		
Total		Count	44	60		
		% within Gender	73.3%	100.0%		

Table 7: Baskets resource conservation and management strategies

Parameters	Response	Frequency	Percentage (%)
Existence of communal conservation strategies	Yes	-	-
	No	60	100.0
Willingness to conserve the resource	Yes	60	100.0
	No	-	-

DISCUSSION

The livelihood activities of the respondents are based on extensive exploration of natural resources including forests. According to the current study, basket weaving was considered important largely for secondary and appreciably less-proportion primary household income-generating operations. The result showed that basket weaving played a big role in the rural family income generation of Andoni people. According to a number of studies, knowledge of the major occupation of the indigenous people of Andoni being fishing is highly associated with basket utilisation (Ejituwu, 1994; Enemugwem, 2009; Tasie and Wilcox, 2018). Mastery of basket weaving could be achieved without an approach of formal education as shown in this study. A study in the same area has mentioned primary school leavers (45%) as the most populous class of people who engaged in artisanal fishery enterprises, which is consistent with the current findings (Tasie and Wilcox, 2018). The unbalanced proportion in gender tilting higher towards males in basket weaving engagement showed that men have higher advantages in basketry than women (Inocian *et al.*, 2019). The trend in ages indicated that the basket weavers are old and thus, the future skills necessary for the local production of baskets are quite to be non-assured as very few people (6.7%) have learned the skills for over 2 decades (Table 1). The results further showed that the skills acquisitions were mainly informal and traditional from home, relatives, or older people in the hometown or communities. Authors such as Honda, (2007); Mcdowall, (2013); and

Mutungi, (2017) reported similar findings regarding the transmission of basketry skills in different climes.

The principles and practice of basketry acquired by the third author did not differ from the basketry experiences of the first two authors using *Raphia hookeri* and *Elaeis guineensis* fronds. Skills acquisition was highly manual-labour intensive but very exciting learning activities achieved to mastery within eight weeks without an apprenticeship fee. The master basket weaver was ready to teach but basket weaving requires more imitation and practice. The relative balanced in sourcing raw material from the forests and processors showed rattan cane harvesting as a source of income for those who may not be engaged in basket weaving. This highlights the importance of processors as primary actors involved in the rattan supply chain to basket weavers within the same community or area. The abundance of wild rattan cane seemed to be threatened as more than half (60%) of the weavers reported delayed access to raw material (Table 2). This threat may reduce the financial contribution of the resource to the immediate local economy. The results corroborated the findings of Sunderland *et al.* (2008) who suggested that proximity to the resource and market access greatly influenced the contribution that rattan made to rural livelihoods, both in terms of subsistence use and income generation. Weekly operations were the most active periods with the majority of them producing 3-5 baskets per day. This active weaving period may be linked to a viable daily

market at Ngo which attracts a weekly influx of marketing opportunities within the study area. The results of the rate of returns on investment indicated that for every ₦100 invested yielded ₦200 and over ₦350 for small size basket and hamper, respectively. Though hamper production was more profitable, it is usually demanded during festive periods. The hamper is a gift application that has broadened the basket market in the study area.

The availability of viable local markets especially the Ngo daily market situated at the local government headquarters that allow an influx of sellers and buyers has created sustainable marketing opportunities for baskets. The Ngo market being owned by the government has been the only incentive that all the basket weavers claimed to have enjoyed. The results of this study have affirmed basket weaving as a primary and secondary source of rural livelihood for Andoni people as well as creating social class and providing cost-free baskets for own family domestic uses. While basket production played many roles in the livelihood of the respondents, our findings showed a significant association between savings and gender with females having higher savings (Table 6). Several studies have reported similar findings on the roles of basket weaving in meeting both ends and reducing poverty levels (Ellis, 2000; Mbaiwa, 2004; Frey *et al.*, 2019). The removal of the raw natural resource unrestricted relying only on the coppicing potential of the stock represents a major threat that would allow the sustainable use of rattan cane for basket production (Sunderland *et al.*, 2008).

CONCLUSIONS

Baskets are generally known as *Okwun* by the people of Andoni and from all indications, the rattan wood is preferable. The study has shown basket making from *E. macrocarpa* is a viable rural profession providing essential items of trade and household consumption among the people of Andoni Local Government Area. Basket making from *E. macrocarpa* wood involves two actors, providing income for both the harvester/cane processors and the weavers. The results showed that skills acquisition was

highly manual-labour intensive but mastery was very exciting learning activities achieved within the scheduled eight weeks without fee as experienced by the third author. Basket-making impacts significant contributions to the livelihood of the Andoni people and therefore should be recognised by the young generation to be explored for self-employment. Efforts towards the cultivation of rattan in the form of agroforestry are advised.

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