Socio-Economic Analysis of Non-Timber Forest Products in Ibaji Local Government Area, Kogi State, Nigeria

[1]Tee, T. Norbert and [2]Ajuma Ekwubile

[1]*(Department of Social and Environmental Forestry, University of Agriculture, Makurdi, Nigeria)*
[2]*(Department of Forest Production and Products, University of Agriculture, Makurdi, Nigeria).*

Abstract: *This study investigated the contributions of non-timber forest products (NTFPs) to the livelihoods of Ibaji people of Kogi State. Specifically, it identifies and prioritizes non-timber forest products in the area and further determines the uses and financial benefits of the top five NTFPs. A sample of 125 respondents was randomly selected from five council wards and interviewed using semi-structured questionnaire to elicit data. These were analyzed using descriptive statistics and budgetary tools. The study identified a list of 10 most commonly utilized NTFPs for income, food supply, health and other socio-economic purposes by the Ibaji people. The top five most preferred species were Elaeis guineensis, Irvingia gabonenis, Dacryodes edulis, Prosopis africana and Parkia biglobosa with percentage acceptability scores of 76.32%, 68.96%, 60.96%, 43.52% and 34 .40% respectively. The gross margin values were between N3,520.00 and N6,500.00 while the rate of return on investment was between 359% and 465%. This indicated very high returns to the people for every naira invested on NTFPs in the area. The study recommended the development and promotion of the prioritized NTFPs among the Ibaji people and increased efforts through appropriate policy instruments like ensuring improved harvesting regimes and value addition for continued supply and utilization of the NTFPs.*
Keywords: *NTFPs, socio-economic analysis, Ibaji people, rate of return on investment, gross margin.*

I. Introduction

There is no clear-cut definition of non-timber forest products (NTFPs). However, [1] defined NTFPs as "products of biological origin other than wood derived from forests, other wooded land and trees outside forests". They are the wide range of the flora and fauna species that are produced by the forests and woodlands for human consumption and development [2; 3; 4; 5]. NTFPs may be gathered from the wild, or produced in forest plantations, agro-forestry schemes and trees outside the forest. Any commodity obtained from the forest without necessarily harvesting the tree is considered as NTFP. [3, 6, and 7] have shown that NTFPs still play important biological and socio-economic roles in local food systems across the globe. A few examples of the different kinds of NTFPs include: mushrooms, huckleberries, ferns, tree boughs, transplants, cones, corms, game animals, forage, medicinal plants, peat, fuelwood, foliage, moss, rubber, cascara bark, ginseng, resins, fiber, fruits, nuts and dyes [2; 4].

Other terms synonymous to non-timber forest products include special forest products, non-wood forest product, minor forest product, alternative forest product and secondary forest product. These terms are useful because they help to highlight forest products that are of value to local people and communities, but that have often been overlooked, in preference for timber production and animal forage in the wake of forest management [8].

Interest in non-timber forest products (NTFPs) production and utilization is increasing rapidly, and numerous efforts are in place towards increasing awareness on the value and uses of these products, their management and market potentials [9]. Non-timber forest products are also known for their economic value to households in towns and villages as source of food and income generation. Some are sold locally while others enter international market. The realization of these immense contributions of NTFPs to the nation's economy has generated a new impetus at evaluating these roles in the economy of rural people [10]. Non-timber forest products contribute substantially to nutrition, either as part of the family diet or as a means of achieving households financial security. They can also improve health through the prevention and treatment of diseases [11]. The value and benefits of NTFPs can indeed provide incentive for forest communities to protect existing forests and restore degraded areas for the sustenance of those values. Thus, central to sustainable development of forest resources is their proper valuation.

Economic valuation of forest resources is the process of ascribing monetary value to its goods and services. Valuation enhances available knowledge about the broad range of benefits associated with forest resources. This usually provides decision makers with quality information for informed decisions on the choice of forest resources and land that meets the needs of the various interest groups [8]. Such information will also provide the basis for the development of political and economic strategies that will aid the sustainable

management of these resources [12]. Conversely, a poor knowledge of the true value of NTFPs may results to their poor management and utilization [5]. Consequently, the provision of adequate information and database on the value of NTFPs are required for informed policy decisions. To allay these challenges among the Ibaji People, this study investigates the contributions of NTFPs to their livelihoods. Specifically, the study identifies and prioritizes non-timber forest products in the area and further determines the uses and financial benefits of the top five prioritized species.

II.   Methodology

2.1 Description of the Study Area
This study was carried out in Ibaji Local Government Area (LGA) of Kogi State with headquarters at Onyedega. Ibaji LGA is situated between latitude 7° 00′ - 8° 50′ N and longitude 7° 30′ - 8° 00′ E. It has ten council wards with an estimated population of 127,572 people comprising 64,423 males and 63,149 females [13]. The council wards are grouped into three districts; Onyedega, Unale and Ujeh.

The vegetation of Ibaji LGA is Guinea savanna characterized by short grasses and trees that grow rapidly during rainy season. The land is a very fertile flood plain, suitable for agriculture and fishing. Most Ibaji people are therefore fishermen and they also produce rice, yam and cassava in large quantities. Others are also involved in NTFPs production (collection) and marketing.

2.2. Study Population, Sample size and Sampling Technique
The NTFPs collectors, marketers and consumers constitute the population for this study. Samples were drawn randomly from 50% of the 10 council wards of the LGA for the study. Thus, 5 council wards; Ejule, Onyedega, Akpanyo, Iyano and Ujeh were randomly selected for the study and 25 respondents each were also selected randomly from each of the council wards. In all, 125 respondents were selected.

2.3 Data collection
Data for the study were collected using semi-structured questionnaire. This was designed to elicit information from respondents on the socio-economic importance of the top 10 most commonly utilized NTFPs in the area. The questionnaire was then administered on the 125 respondents sampled in the area. Information from personal observations and interviews with key informants was utilized to augment the primary data.

2.4 Data analysis
The top 10 most commonly utilized NTFPs in Ibaji LGA were determined using the model below.

$$\text{Percentage Score} = \frac{\text{Actual score by an NTFP}}{\text{Maximum score any NTFP can earn}} \times 100 \ldots\ldots\ldots\ldots 1$$

Scores each NTFP could earn from each respondent ranged from 1-5 marks; and respondents were asked to score 5 most preferred NTFPs based on their relative socio-economic importance. Thus, the first and most preferred species socio-economically were scored 5 and the fifth preferred 1.

Economic benefits of the top 5 prioritized NTFPs were analyzed using gross margin and rate of return on investment (RORI). Gross margin was defined as the difference between gross income and total variable cost. This model is expressed as;

GM = GI-TVC

Where GM = Gross margin, GI = Gross income, and TVC = Total Variable Cost.

Rate of return on investment (RORI) was determined using the following model:

$$\text{RORI} = \frac{\text{GI}-\text{TVC}}{\text{TVC}} \times \frac{100}{1} \ldots\ldots\ldots\ldots 2$$

Where GI = Gross income

TVC = Total variable cost,

The RORI is an important criterion in determining the choice of investment.

III.   Results and Discussion

3.1 Results

3.1.1 Prioritization of NTFPs in Ibaji LGA, Kogi State
TABLE 1 presents the prioritization result of NTFPs based on their socio-economic benefits to the people using a five point likert scale. The top five species most preferred in the area were *Elaeis guineensis* with the highest score of 76.32%, followed by *Irvingia gabonenis, Dacryodes edulis, Prosopis africana* and *Parkia biglobosa* which scored 68.96%, 60.96%, 43, 52% and 34 .40% respectively. The tenth and least preferred NTFP was Mushroom with a score of 1.92%.

3.1.2 Traditional uses of NTFPs in Ibaji LGA, Kogi State

In TABLE 2, the component parts of the top 10 most utilized NTFPs in the area and their respective uses are presented. The leaves, fruits, seeds, tree bark and roots, and branches were the most commonly utilized components of the plants species in the area.

Table 1: Respondent's prioritization of NTFPs in Ibaji L.G.A. by Council Wards (N = 125)

Name of products	NTFP score out of 125 by Council Wards (n = 25)					Total score (A+B+C+D+E)	% of Total score	Rank
	Ejule (A)	Akpanyo (B)	Onyedega (C)	Iyano (D)	Ujeh (E)			
Elaeis guineensis	100	97	91	94	95	477	76.32	1st
Irvingia gabonensis	92	83	86	82	88	431	68.96	2nd
Dacryodes edulis	85	74	68	70	84	381	60.96	3rd
Prosopis africana	47	55	5	65	48	272	43.52	4th
Parkia biglobosa	36	44	47	45	43	215	34.4	5th
Piper guineensis	5	7	5	5	5	27	4.32	6th
Chrystophyllum albidum	4	3	4	5	3	19	3.04	7th
Azadiracta indica	5	3	4	3	3	18	2.88	8th
Tectona grandis leaves	3	3	3	2	2	13	2.08	9th
Mushroom	2	3	2	2	3	12	1.92	10th

Note: First preferred species scores 5 points and the fifth preferred species scores 1 point.
Maximum score any species can earn is $5 \times 125 = 625$ from 125 respondents, and the least earnable score is 1.
N = Sample size in the study area, and 'n' is sample size per council ward.

Table 2: Some NTFPs prevalent in Ibaji LGA and their local uses

NTFPs Plant Species	Ibaji name	NTFP component	Local Uses
Elaeis guineensis	Ekpe	Fronds	Roofing, basketry, hand fans, brooms and mats
		Fruits	Palm oil production, licking the pulpy parts,
		Kernels	Oil production, medicinal purposes, eating both the fresh and dry kernels as snacks
Irvingia gabonensis	Ayigbele	Fruits/Seeds	Use for soup, medicine
Dacryodes edulis	Ahaminya	Fruits	Snacks
		Leaves	Medicine for hypertension
Prosopis africana	Okpiye	Seeds	Condiments, medicinal uses
		Bark	Use in traditional medicine
		Leaves	Use in traditional medicine, fish poison
Piper guineensis	Akpoko	Seeds	Pepper soup ingredient, spices
Parkia biglobosa	Ugba	Seeds	Spices, and condiments
		Bark	Use for traditional medicine
Thaumatoccocus danielli	Iwe	Leaves	Use as wrapping leaves
Azadiracta indica	Dongo yaro	Bark/Leaves	Use for traditional medicine
		Fruits	The pulpy part is edible
		Branches	Use as fuelwood
Tectona grandis	Teak	Leaves	Wrapping food substances
		Branches	Fuelwood, traditional medicine
Mushroom	Oru	Whole	Edible and serve as condiments

3.1.3 Cost and returns analysis of the top five prioritized NTFPs in Ibaji LGA.

The result of cost and returns analysis of the NTFPs presented in TABLE 3 shows that GM values range from NGN3520 to NGN6500, and the RORI is very high ranging from 359% to 465%. Out of the top five prioritized NTFPs Prosopis africana had the highest RORI of 465%, followed by Elaeis guineensis, Irvingia gabonensis, Dacryodes edulis, and Parkia biglobosa with 433%, 422%, 400% and 359% respectively. This means, the rate of capital investment recovery was fastest with Prosopis africana and slowest with Parkia biglobosa in that order. The positive GM values with high RORI values indicate that investing in NTFPs is profitable. The relatively low TVC values explain why both GM and RORI values are high.

Table 3: Economic Valuation of the Prioritized Products in Ibaji LGA, Kogi State

NTFPs	Variable Costs (₦)			TVC = A+B+C (₦)	GI (₦)	GM = GI - TVC (₦)	$RORI = GM \times \frac{100}{TVC}$
	A	B	C				
Elaeis guineensis	1200	150	150	1500	8000	6500	433
Irvingia gaboneensis	1000	50	100	1150	6000	4850	422
Dacryodes edulis	800	80	120	1000	5000	4000	400
Prosopis Africana	1000	50	100	1150	6500	5350	465
Parkia biglobosa	800	80	100	980	4500	3520	359

Note: A=Transportation, B = Storage, C= Commission, GM = Gross Margin
TVC = Total variable cost, GI = Gross income, RORI = Rate of return on investment
All measurements are on monthly basis.

IV.   Discussion

The top 10 NTFPs identified and prioritized in Ibaji LGA in effect harmonizes the diverse opinions and interests of the Ibaji people in the utilization of NTFPs in the area. It expresses the people's acceptability index and value judgment of the importance of NTFPs in the area. According to [5], prioritization is a managerial instrument that harmonizes diverse opinions, interests, and perspectives of a population into a more global outlook. Thus, the result of NTFPs prioritization in Ibaji LGA could be very useful in selecting NTFPs to be developed for enhanced livelihood and socio-economic wellbeing of the community members. Similarly, [14] applied this method in selecting indigenous spices for inclusion in agro-forestry programs in the semi-arid zone of Nigeria.

The top 10 prioritized NTFPs among the Ibaji people, in line with [2 & 12] were utilized mainly for income, food supply, health and other socio-economic purposes. The Ibaji people, by virtue of their location in a flood plain, are not easily accessible. They have difficulty integrating with other communities in terms of trade and distribution of socio-economic resources; consequently, they depend extensively on the NTFPs available within their immediate environment for their basic needs and livelihoods. The results showed that the people utilize NTFPs to improve health through the prevention and treatment of diseases. It also contribute substantially to nutrition either as part of the family diet or as a means of achieving households food security. This observation corroborates the report of [15] that for some households, NTFPs provide the sources of livelihood; food, medicines, fibers and cash income for rural households.

The analysis of the financial benefits of the topmost five prioritized NTFPs showed that they were highly profitable, and could supply income to households in the area to carter for their basic needs; school fees, health charges and household assets. Although these NTFPs were found very useful to Ibaji people, personal observation revealed that the NTFPs were found growing naturally on farmlands. Deliberate efforts are therefore required for the continuous supply and utilization of NTFPs in the area. Besides, [16] reported that the benefit derived from NTFPs by local people can enhance their income and therefore contribute directly to the goal of reducing poverty and hunger by providing cash incomes. Meanwhile [15] reported that the contribution of NTFPs to the nation's economy may be as important as that of timber. This should therefore provide a new impetus towards evaluating the roles NTFPs play in the rural economy of the nation.

V.   Conclusion

Prioritization is a useful managerial instrument for harmonizing the diverse opinions, interests, and perspectives of the Ibaji people on NTFPs management and utilization. Policy makers and other stakeholders should therefore focus their development and managerial efforts on the top 10 prioritized NTFPs for wider acceptability and benefits to Ibaji people. Cost and returns analysis of the top five prioritized species were highly profitable. These species should be promoted among the Ibaji people and efforts through appropriate policy instruments for improved harvesting regimes and value addition should be utilized to ensure the continued supply and utilization of these NTFPs.

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