



## ECONOMIC VALUE OF SOME FOREST PRODUCTS IN ABUA CENTRAL, RIVER STATE, NIGERIA

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### Abstract

This study was conducted to assess the economic value of forest products in five randomly selected communities; Otari, Omalem, Ogbema, Emilaghan, and Omelema. Abua Central, in River State. Semi-structured questionnaires were distributed in communities to obtain information on demographic characteristic, identify and categorize forest products of economic values, determine the profitability of identified products and to ascertain the forest management practices. Descriptive statistics and cost benefit analytical tools were used for data analysis. Majority of the respondents were females (56.52%) while (43.48%) were males. The ages of respondents ranged from 16 to 41 years and above. The respondents were all Christians and majority of the respondents had University education qualification (54.35%). Most of the respondent had business as their major occupation with 65.22%. A majority of the respondent practiced agroforestry (23.91%) and other management practices such as bush fallowing (21.74%), crop rotation (19.57%) and cover crops (2.17%). Forest products of economic value identified were categorized into fruit tree crops, vegetables and timber products. All the respondent stated that forest products were very important to their livelihood and thus the demand for forest products was very high in the study area. Cost benefits analytical tool indicated that the forest products in the study area were profitable. High percentage of respondents indicated that community leaders and individual citizens should be responsible for managing the forest in their communities. A majority of the respondent (66.67%) were not aware of forest laws, 32.61% are ignorant of factors limiting forest management. Measures should be put in place to ensure that forests are well managed for environmental,

aesthetic, social and economic benefits in order to fully harness the unrealized economic potential of forest products.

**Keywords:** Economic value, Forest products, Demographic Characteristics, Profitability, Forest Management

## Introduction

Forest is a large area of land covered with trees and bushes, either growing wild or cultivated, providing a variety of resources that are of benefit to human survival (Ikehi, 2015). The forests provide goods and services essential to human health and livelihood. Forest goods and services are of great importance to people and the ecosystem. Healthy forest ecosystems are ecological life support systems and provide habitat for wildlife, store carbon, conserve soil and promote biodiversity. Forest provides humans with wood, which are exported and used in all parts of the world for production and construction. Forest provides hydrological services to agriculture, moderates the quantity and quality of surface water available for irrigation and also controls sedimentation of irrigation infrastructure (Carmenza, *et al*, 2005). Forest provides employment to people such as forest guards and those involved in lumbering (Iwena, 2012). Forests provide a source of income for individuals as well as a source of generating revenue for government. Forest accounted for 0.50% of gross domestic product (GDP) in Nigeria in the year 2012 (National Bureau of Statistic (NBS), 2013). Despite the importance of forest to humans, studies have shown that continuous mismanagement and overexploitation of forest can lead to either degraded or complete loss of this natural resource (United Nations University Centre, 2014).

Forest resources are usually grouped into three categories; Timber Based Resources, Non-Timber-Based Resources of plant origin and Non-Timber Based Resources of animal origin. Timber Based Resources are the wood producing plants while the Non-Timbers Based, are plant and animal resources of value uniquely found within forest land (Mama and Osinem, 2007). Forest varies in composition and diversity and can contribute substantially to the economic development of any country. Forest produce variety of products and food for living organisms, protects the environment, and provides an array of benefits to human societies above and beyond their pivotal roles as habitat and environmental regulators in natural ecosystems. According to Marshal (2003), forests provide clean water and air, timber for wood products, wildlife habitats, stable soil, recreational opportunities, and beautifies the environment. Poor forest management can lead to

long-term economic losses; hence, current forest resource management schemes are particularly concerned about the thousands of acres of underproductive forestland cut over for quick cash each year, and then left idle. The unrealized economic potential of forests has prompted a concerted effort at national and local levels to ensure that forests are well managed for environmental, aesthetic, and economic reasons rather than left unproductive and inactive to ensure a continuous supply of the massive economic contributions forest continue to make to human livelihoods, economic development, and national incomes (Sunderlin, 2007).

Wide spread of poverty in rural communities of many under developed countries in Africa has generated a lot of concern at both international and local levels. Research efforts on the possible ways of reducing poverty in the rural communities have in a way not been efficient in most areas. According to FAO (2003), little is known of the extent to which forest resources can reduce poverty in the developing countries. In forest dependent communities, research has shown that the use of forest resources which is one of the closest means of livelihood for the rural poor has potential for reducing poverty. Therefore, this work is carried out in order to provide information on the economic values of some forest products in alleviating poverty in Abua central, Abua-Odual Local Government Area of Rivers State.

## **MATERIALS AND METHOD**

### **The Study Area**

This study was carried out in five communities of Abua central in Abua-Odual Local Government Area. Abua-Odual Local Government Area is located in the northern parts of Rivers State, sharing boundaries with Ahoada, and Bayelsa State. Abua-Odual has a land area of about 800km square, a majority of this land is occupied by forest areas. The major occupation of the people is farming and fishing. Abua-Odual Local Government Area is located at latitude: 4°49'47"N and longitude: 6°34'3"E and its daily temperature varies between 23°C and 29°C (Wikipedia maps, 2023) and has population of 282,410 (Nation Bureau of Statistics, 2010).

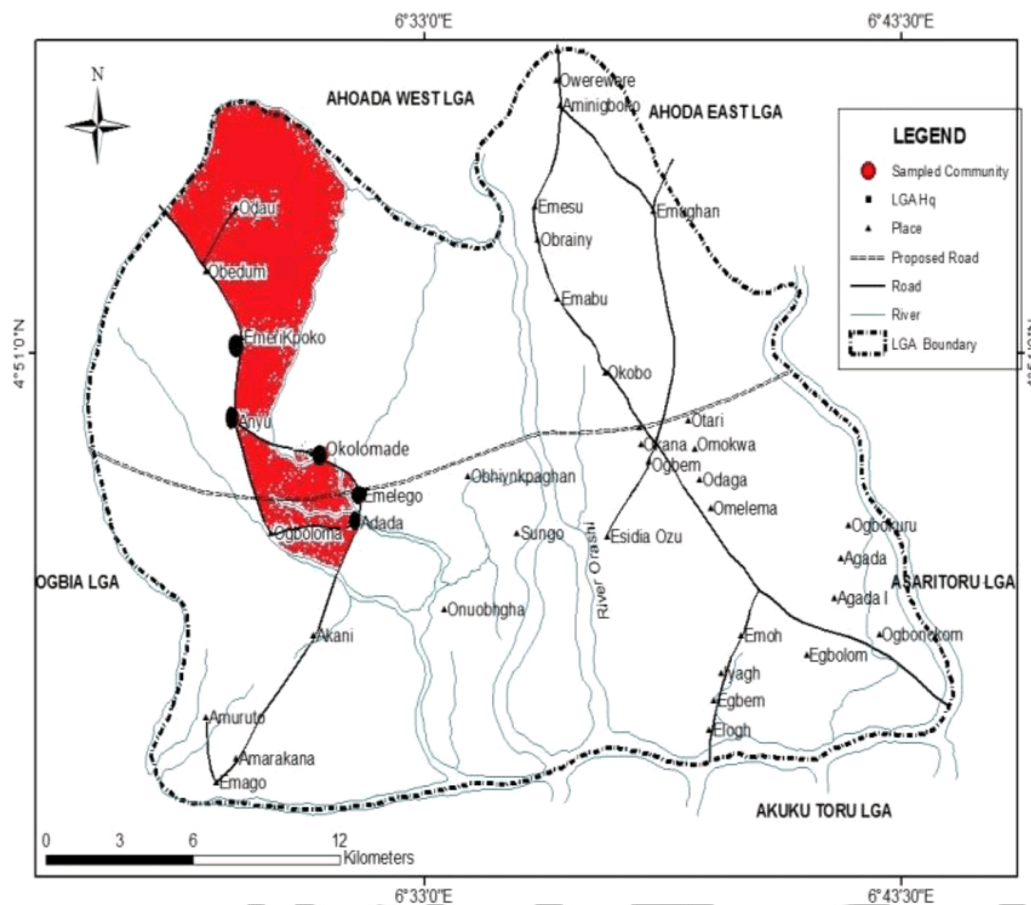


Fig 3.1: Map of Abua Odual showing some communities  
 Source: (Moro and Abah, 2019).

### Data Collection

Abua central is made up of nine communities. Five communities out of the nine communities were randomly selected. One hundred (100) questionnaires were distributed in each of the selected communities to obtain the information required. A total five hundred (500) questionnaires were distributed, Four hundred eighty (480) were returned. The questionnaires were structured to obtain information on demographic characteristics, forest products of economic value and the economic value of such products. The questionnaires were distributed to both male and female farmers, transporters, civil servants, students, hunters and fisher men ranging from the ages of 16 years to 65 years.

### Data analysis

Data collected were analyzed using descriptive and economic valuation analytical tool such as cost benefit analysis and profitability analysis. Cost benefit analysis is the economic working tool which is used for identifying and evaluating the cost and benefit from the society point of view.

The benefit cost ratio (B/CR) was determined by dividing the profit generated from each forest product by the cost incurred. If the B/CR is <1 it is not profitable but if B/CR is >1, then the business of forest products in the study area is profitable, if it is =1 then it is equal.

Cost/ Benefit analysis

NPV =  $\Sigma$  Present value of future benefits –  $\Sigma$  Present value of future cost

Where NPV is Net Present Value

$$\text{Benefit Cost Ratio} = \frac{\Sigma \text{ present value of future benefit}}{\Sigma \text{ present value of future cost}}$$

$$\text{Present Value Factor} = \left( \frac{1}{(1+r)^n} \right)$$

r = rate of discounting

n = number of years

present value of future benefits = future benefit X present value

+ NPV = Good Project,

> 1 B/C ratio = Good Project

## RESULTS AND DISCUSSIONS

### Demographic Characteristics of the Respondent

Result in Table 1 shows that 56.52% of respondents are female and 48.48% are male. The highest age bracket of respondent is 36 to 40 years (35.51%) while the least age bracket is between 16 to 21 years (2.07%). 60.87% of respondent are married. 58.70% of respondent have a family size 6 to 10 persons while 28.26% have a family size of 0 to 5 persons. Employment status observed was 71.74% of self-employed individuals and 10.87% unemployed. 65.22% are civil servant, 15.22% while farmers (4.35%) and Fishermen (2.17%) recorded the least in occupation. 43.48% of respondents have been in business for 11 to 20 years while 10.87% have been in business for 31 to 40 years.

The result showed a higher percentage of the respondents are female. 10.87% are unemployed and should be encouraged to undertake forest product business to alleviate poverty in that locality considering the large family sizes indicated in the study. Ndoye, (2005) reported that women are the vast majority of the producers of forest product and are involved in the extraction and processing of forest products. Larinde *et al.*, (2012) supports this idea by stating that women have a great desire to meet their family needs and therefore are more involved in business

**Table 1 Demographic Characteristics of Respondent**

Demographic Characteristics	Variables	Communities (%)					Total (%)
		Otari	Omalem	Ogbema	Emilaghan	Omelema	
Gender	Male	50.0	40.0	66.67	30.0	40.0	<b>43.48</b>
	Female	50.0	60.0	33.33	70.0	60.0	<b>56.52</b>
Age	16-20	10.0	-	-	-	-	<b>2.07</b>
	21-25	30.0	-	-	-	10.0	<b>8.59</b>
	26-30	20.0	10.0	-	20.0	20.0	<b>15.02</b>
	31-35	20.0	20.0	20.0	10.0	20.0	<b>19.57</b>
	36-40	-	40.0	-	60.0	50.0	<b>35.51</b>
	41 and above	20.0	30.0	40.0	10.0	-	<b>21.24</b>
Marital Status	Single	60.0	30.0	16.67	40.0	30.0	<b>36.96</b>
	Married	40.0	70.0	83.33	60.0	60.0	<b>60.87</b>
Religion	Christian	100	100	100	100	100	<b>100</b>
Employment status	Employed	20.0	10.0	33.33	20.0	10.0	<b>17.39</b>
	Self employed	30.0	90.0	66.67	80.0	90.0	<b>71.74</b>
	unemployed	50.0	-	-	-	-	<b>10.87</b>
	Civil Servant	20.0	10.0	10.0	20.0	10.0	<b>15.22</b>
Occupation	Business	40.0	70.0	5	60.0	80.0	<b>65.22</b>
	Fishermen	-	-	-	-	10.0	<b>2.17</b>
	Student	40.0	-	-	20.0	-	<b>13.04</b>
	Farmers	-	20.0	-	-	-	<b>4.35</b>
Family Size	0-5	70.0	20.0	-	20.0	20.0	<b>28.26</b>
	6- 10	30.0	80.0	66.67	60.0	60.0	<b>58.70</b>
	11 and above	-	-	33.33	20.0	20.0	<b>13.04</b>
Educational Qualification	Primary	-	-	16.67	-	10.0	<b>4.35</b>
	Secondary	30.0	60.0	33.33	40.0	30.0	<b>39.13</b>
	University	70.0	30.0	50.0	60.0	60.0	<b>54.35</b>
	Vocational	-	10.0	-	-	-	<b>2.17</b>
Years in business	1-10	20.0	20.0	16.67	-	30.0	<b>17.39</b>
	11-20	10.0	40.0	16.67	100	40.0	<b>43.48</b>
	21-30	40.0	20.0	-	-	10.0	<b>15.22</b>
	31-40	10.0	2.0	-	-	20.0	<b>10.87</b>
	41 and above	20.0	-	66.67	-	-	<b>13.04</b>

Source: Field Survey, 2023

### Forest Products of Economic Value

Survey conducted (Figure 1) shows high percentage of respondent indicated the lack of tree crops on farm lands, a very low percentage in Omalem and Emilaghan communities indicated the presence of tree crops on farm lands. Forest products of economic value identified in the study area were classified into three categories (Fruit trees, Vegetable and Timber trees). Result Shows fruit trees with highest economic value are Native Pear (*dacryodes edulis*) (63.04%) and Mango (*Mangifera indica*) (54.35%) others are Ogbono (*Irvingia gabonensis*) (15.22%), Udara (*Chrysophyllum albidum*) (17.39%), Orange *Citrus sinensis* (2.17%) and Guava *Psidium guajava* (8.7%). Vegetable of trees identified with economic value are Uziza leaf -*Piper guineensis* (8.69%), Otazi leaf *Gongronema latifolium* (8.70%), Ukazi leaf *Gnetum africanum* (2.17%) and pepper fruit *Dennettia tripetala* (67.39%). Timber trees identified with the highest economic value is Iroko *Milicia excelsa* (43.48%) followed by Rubber *Ficus elastica* and Mahogany *swietenia* with 30.43 % and 23.91% respectively. Timber species recorded with the least economic value are Opepe - *Nauclea diderrichii* (2.17%), Black and white afara *Terminalia ivorensis* and *Terminalia superba* with 4.35% each (Tab. 2).

Forest products of economic value identified are in agreement with the report by MacDicken *et. al*, (2015) which states that forest resources means those products, uses, and values associated with forestland, including timber, snails, charcoal, fruits, vegetables, fiber, forage and wildlife. Economic fruit trees of value identified are in consonance with the report by Marshal,(2013) which stated that a number of edible fruits of economic value are gotten from forest trees such as; *Mangifera indica*, *Chrysophyllum albidum*, *Psidium guajava*, *Persea gratissima* etc. Seed of some forest trees and plant are used in the preparation of food spices while edible vegetables are used as food and for food preparation.

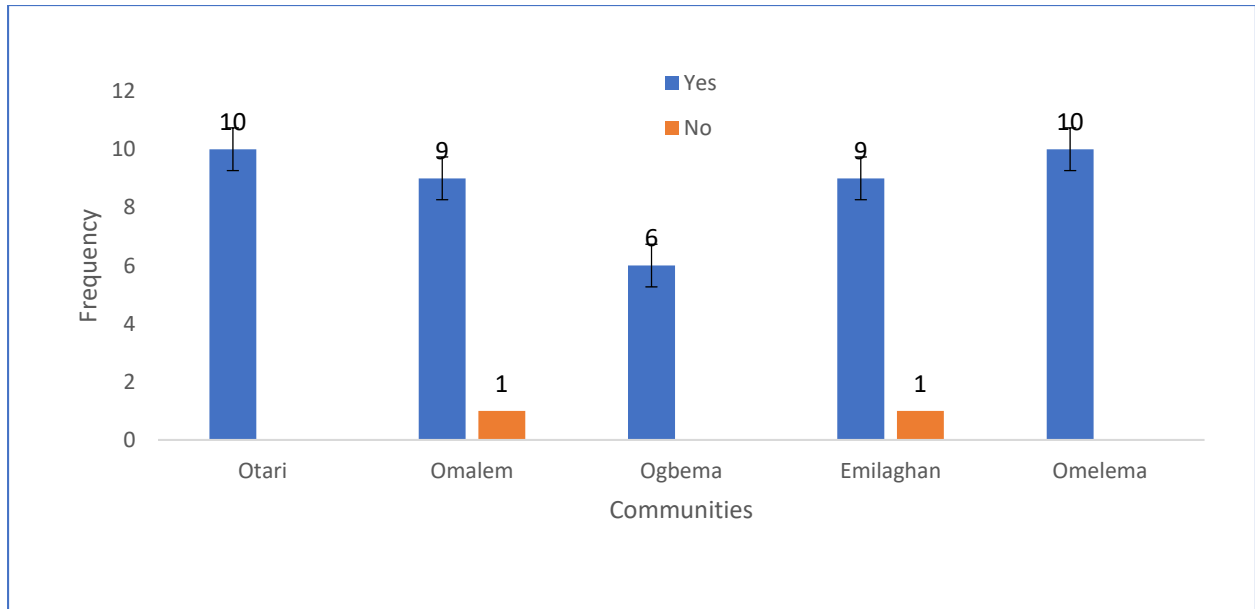


Figure 1: Presence of Forest Trees on Farmland

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**Table 2 Categorization of Forest Trees of Economic Values in Farmland**

Categories	Forest Product		Communities (%)					TOTAL (%)	
	Common Names	Scientific Names	Otari	Omalem	Ogbema	Emilaghan	Omelema		
Fruit trees	Plum	<i>Prunus domestica</i>	-	-	-	-	20	<b>4.35</b>	
	Oil palm	<i>Elaeis guineensis</i>	20	10	-	30	20	<b>17.39</b>	
	Ogbono	<i>Irvingia gabonensis</i>	40	-	-	20	10	<b>15.22</b>	
	Mango	<i>Mangifera indica</i>	70	40	66.67	50	50	<b>54.35</b>	
	Native Pear	<i>Dacryodes edulis</i>	80	70	100	40	40	<b>63.04</b>	
	Udara	<i>Chrysophyllum albidum</i>	10	20	16.67	20	20	<b>17.39</b>	
	Cocoa	<i>Theobroma cacao</i>	40	-	16.67	-	10	<b>13.04</b>	
	Soursop	<i>Annona muricata</i>	-	-	-	-	10	<b>2.174</b>	
	Pineapple	<i>Ananas comosus</i>	-	-	-	-	20	<b>4.35</b>	
	Orange	<i>Citrus sinensis</i>	10	10	16.67	-	10	<b>2.17</b>	
	Coconut	<i>Cocos nucifera</i>	40	40	33.33	20	-	<b>26.09</b>	
	Pawpaw	<i>Carica papaya</i>	50	60	50	10	20	<b>36.96</b>	
	Guava	<i>Psidium guajava</i>	10	20	-	-	10	<b>8.70</b>	
	Avocado	<i>Persea americana</i>	10	10	-	-	-	<b>4.35</b>	
	Pumpkin	<i>Telfairia occidentalis</i>	90	80	66.67	50	50	<b>67.39</b>	
	Vegetable	Scent leaf	<i>Ocimum gratissimum</i>	40	40	16.67	20	40	<b>32.61</b>
		Alligator Pepper	<i>Aframomum meliguetta</i>	20	-	-	10	-	<b>6.52</b>
Water leaf		<i>Talinum fruticosum</i>	60	40	66.67	30	-	<b>36.96</b>	
Bitter leaf		<i>Vernonia amygdalina</i>	20	60	66.67	30	10	<b>34.78</b>	
Uziza leaf		<i>Piper guineensis</i>	20	-	33.33	-	-	<b>8.69</b>	
Otazi leaf		<i>Gongronema latifolium</i>	20	-	33.33	-	-	<b>8.70</b>	
okazi		<i>Gnetum Africanum</i>	10	-	-	-	-	<b>2.17</b>	
Pepper		<i>Capsicum chinense</i>	10	-	-	10	-	<b>4.35</b>	
Okro		<i>Abelmoschus esculentus</i>	10	-	16.67	20	10	<b>10.87</b>	
Pepper fruit		<i>Dennettia tripetala</i>	90	80	66.67	50	50	<b>67.39</b>	
Ruber		<i>Ficus elastica</i>	70	-	50	30	10	<b>30.43</b>	
Timber	Iroko	<i>Milicia excelsa</i>	60	50	33.33	30	40	<b>43.48</b>	
	mahogany	<i>Swietenia</i>	30	-	33.33	30	30	<b>23.91</b>	
	Black afara	<i>Terminalia ivorensis</i>	20	-	-	-	-	<b>4.35</b>	
	White afara	<i>Terminalia superba</i>	20	-	-	-	-	<b>4.35</b>	
	Abura	<i>Mitragyna stipulosa</i>	30	-	16.67	-	-	<b>8.70</b>	
	Mansonia	<i>Mansonia altissima</i>	10	-	33.33	-	-	<b>6.52</b>	
	Bush rubber	<i>Ficus elastica</i>	20	-	-	20	-	<b>8.70</b>	

Gragraba		-	16.67	-	-	<b>2.17</b>
opepe	<i>Nauclea diderrichii</i>	-	-	-	10	<b>2.17</b>

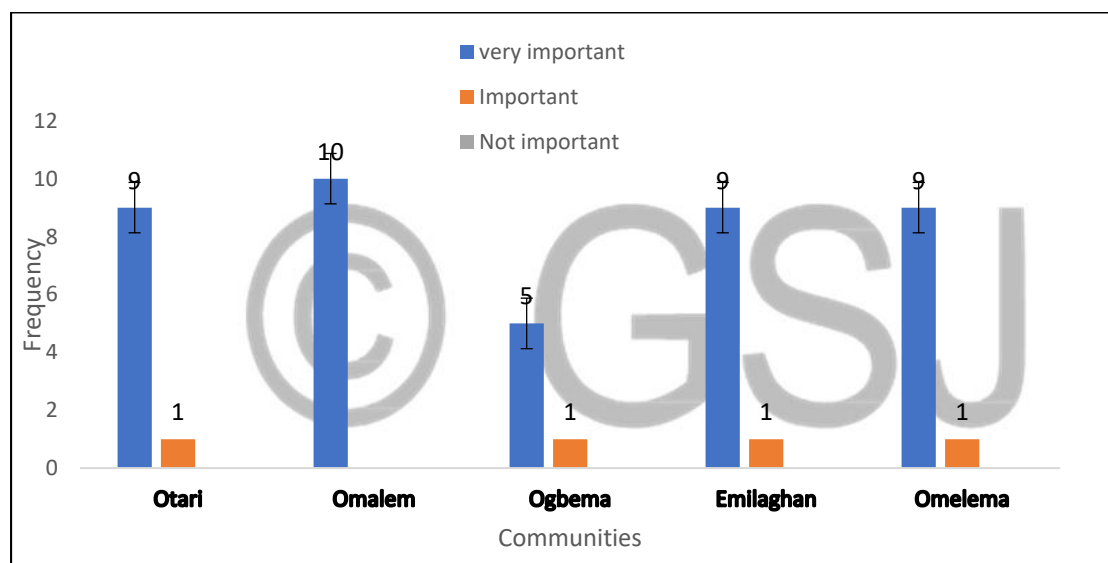
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*Source: Field Survey, 2023*

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### Profitability and Economic Value of Identified Forest Products

Forest products were perceived to be very important in Omalem (100%), Otari, Emilaghan and Omalema (90%). No percentage of the respondents perceived forest product as not important (Fig. 2). The demand for forest products as indicated in Fig. 4.3 are Emilaghan (90%), Otari and Omalem(80%), while Ogbene and Omelema recorded (60%). Cost benefit analysis (Tab. 3) revealed profitability of forest products in the study area. NPV was positive (+) and the benefit cost ratio was above one (1). The average monthly monetary value of some forest products in the study location as shown in Tab. 5 are Ogbono (Otari: ₦20,350; Omalema: ₦55,000; Emilaghan: ₦30,250). Mango (Emilaghan: ₦30,250; Omelema ₦30, 250).



**Figure 2: Forest Products**

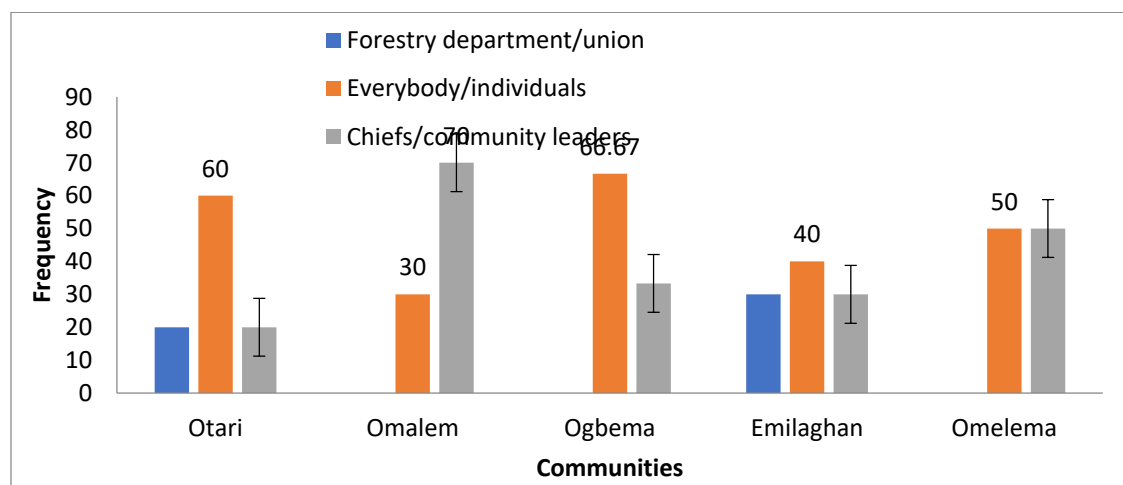
The varying monetary value of identified forest products in the study communities is an indication of differences in culture. Mac Dicken *et. al*, (2015) reported that several important products and services are derived from the forest, however, the usefulness of each is determined by the culture, taste, environment and industrial development of the indigenous people. The profitability of forest products in the study area is in agreement with several other reports on the economic benefits of forest products. According to Ikehi *et., al*( 2015) forests provide a source of income for individuals as well as a source of generating revenue for government. Forest products accounted for 0.50% of gross domestic product (GDP) in Nigeria in the year 2012 (National Bureau of Statistic (NBS), 2013).

**Table 3: Profitability of Some Forest Product in the Study Area**

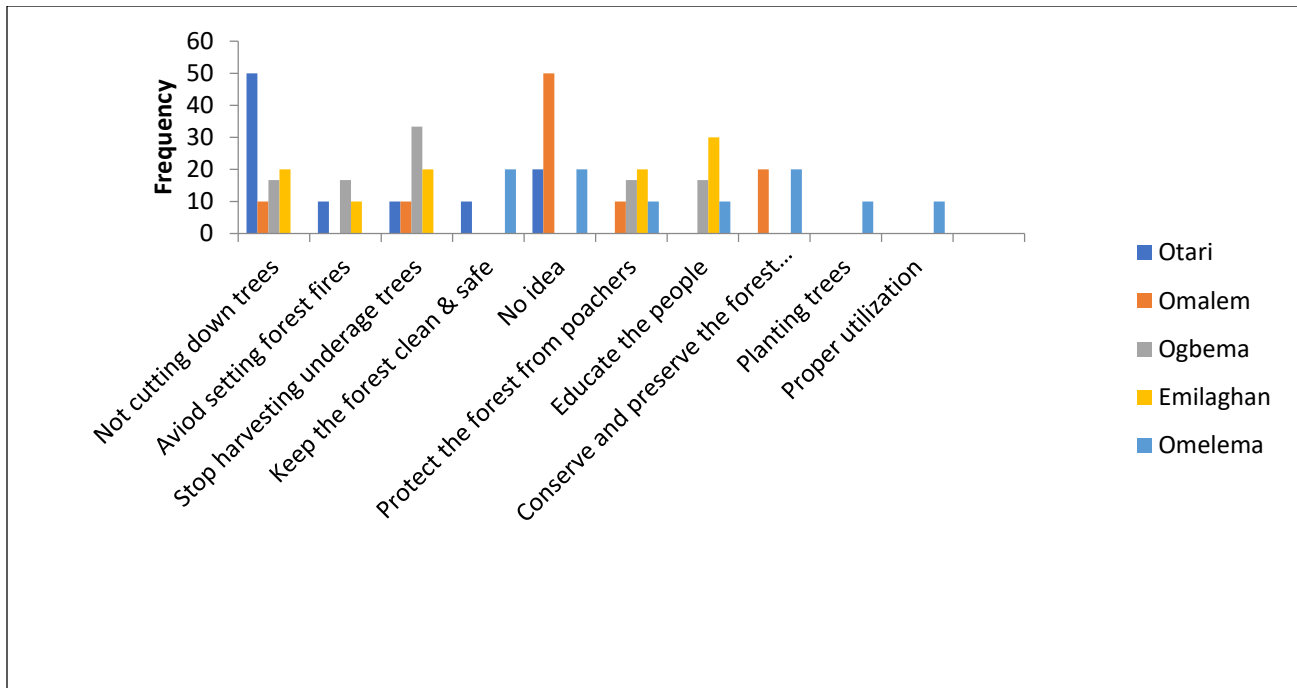
Community	Variables			B/C
	Average present cost	Average present Benefit	NPV	
Otari	6030.69	11970.73	5940.04	1.98
Omalem	6525.42	8460.47	1935.05	1.29
Ogbema	5190.19	6786.32	1596.13	1.31
Emilaghan	5727.24	32684.98	26957.73	5.71
Omelema	25933.16	98544.68	72611.51	3.80

**Forest Management Practices**

Forest management systems practiced are Agroforestry (23.91%) Crop rotation (19.57%), Bush fallow (21.94%) Others (32.61%) while Cover crop system recorded the least (2.17%). Some of the factors limiting forest management practices are ignorance (32.61%) and finance (26.09%). 66.67% indicated the lack of awareness of forest laws while 33.33% indicated awareness of forest laws (Tab. 4). High percentage of respondents in Otari community indicated “not cutting of trees” as an effective way of managing forest while a high percentage in Omalem indicated “no idea” in ways of managing the forest (Fig 5). 70% of respondents in Omalem indicated that chiefs and community leaders should be responsible for managing the forest while 60% in Otari, 66.67% in Ogbema, 50% in Omelema and 40% in Emilaghan believes forest management is the responsibility of every citizen (Fig 4).



**Figure 4: Bodies responsible for forest management**



**Figure 5: Ways of Effectively Managing the Forest**

High percentage of the respondents practice agroforestry, this report agrees with World Bank, (2004) which states an estimated 1.2 billion rural people currently practice agroforestry on their farm lands in their communities and depend upon the products.

**Table 4 Forest Management Practices**

Management Practices	Communities					TOTAL	
	Otari	Omalem	Ogbema	Emilaghan	Omelema		
<b>Management Practices carried out</b>	Agro forestry	20	30	33.33		40	<b>23.91</b>
	Cover crops		10				<b>2.17</b>
	Crop rotation		20	16.67	20	40	<b>19.57</b>
	Bush fallowing	30	40	16.67		20	<b>21.74</b>
	Others (None)	50		33.33	80		<b>32.61</b>
<b>Awareness of legal laws on management practices</b>	No	4	40	1	10	4	<b>66.67</b>
	Yes	6	60	9	90	2	<b>33.33</b>
<b>Factors limiting Forest management practices</b>	Ignorance	40	30	66.67	30	10	<b>32.61</b>
	Finance	20	20	33.33	50	10	<b>26.09</b>
	Unavailable land	20	20		20		<b>13.04</b>
	Rainfall	10	20				<b>6.52</b>
	Fuel scarcity	10					<b>2.17</b>
	Deforestation					10	<b>2174</b>
	No laid down laws		10			10	<b>4.34</b>
<b>Measures employed to sustain forest areas</b>	Educate the rural people	20			20		<b>8.70</b>
	Carrying out forest management practices	10	10		20		<b>8.70</b>
	Planting trees to replace felled trees		10	83.33	40	30	<b>28.26</b>
	Reporting illegal felling of trees		10	16.67	20	20	<b>13.04</b>
	Bringing forest laws in to play					10	<b>2.17</b>
	Maintaining forest areas properly					10	<b>2.17</b>
	Avoid setting fires					10	<b>2.17</b>

Source: Field Survey, 2023

**Table 5 Average Monetary Value of Forest Products monthly**

Forest tree category	Communities (₦)					
	Otari	Omalem	Ogbema	Emilaghan	Omelema	
Fruit trees	Plum				5500	
	Palm tree			5500	30250	
	Ogbono	20.350	55000		30250	
	Mango	3025	3025	3026	30250	
	Pear	3025	20350	3025	5500	
	Udara	3025	550			
	Cocoa	3025		5500		
	Soursop					
	Pineapple		55000			
	Orange	550	30250	5500		
	Coconut	5500	5500	3025		
	Pawpaw	3025	5500	5500	5500	
	Guava		5500			
	Avocado			5500		
Vegetable	Pumpkin	550	20350	5500	550	
	Scent leaf	3025	20350	5500	550	
	Alligator Pepper	5500				
	Water leaf	3025	3025	3025	550	
	Bitter leaf	3025	3025	3025	5500	
	Uziza leaf	550		3025		
	Otazi leaf	550		550		
	okazi	550		550		
	Pepper			5500	55000	
	Okro		5500	5500	550	
	Pepper fruit					
	Timber	Ruber	30250		5500	5500
		Iroko	30250	30250		30250
		mahogany			5500	55000
Black afara		5500		5500		
Mansonia			55000			
Bush rubber		5500				
opepe			55000			

Source: Field Survey, 2023

## CONCLUSION

This study has provided evidence on the economic potential of forest products in Abua Central, of Rivers State. Some common fruit, vegetable and timber tree crops of economic value found within Abua Central are; oil palm (*Elaeis guineensis*), ogbono (*Irvingia gabonensis*), Mango (*Mangifera indica*), Native pear (*Dacryodes edulis*), Udara (*Chrysophyllum albidum*), Guava (*Psidium guajava*), Orange (*Citrus sinensis*), Avocado (*Persea americana*), Ugwu leave (*Telfairia*

*occidentalis*), Scent leaf (*Ocimum gratissimum*), Alligator pepper (*Aframomum meliguetta*), Water leaf (*Talinum fruticosum*), Uziza leaf (*Piper guineensis*), Okazi leaf (*Gnetum africanum*), Rubber tree (*Ficus elastica*), Iroko (*Milicia excelsa*), Mahogany (*Swietenia* spp), Black Afara (*Terminalia ivorensis*), White afara (*Terminalia superba*), Mansonia (*Mansonia altissima*), Bush rubber (*Ficus elastica*), Opepe (*Nauclea diderrichii*), Abura (*Mitragyna stipulosa*). The research has proved that forest product businesses in Abua Central are highly profitable with average monetary value of some forest products ranging from ₦3,250 to ₦55, 000 monthly.

Common forest management systems practiced in the area are agroforestry and crop rotation systems. A large percentage of the people are ignorant of the factors limiting forest management practices and are also not aware of forest laws despite the fact of acknowledging the high importance of forest products.

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