

Perceived Economic Valuation of Selected Edible Forest and Wildlife Resources in Nsukka zone of Enugu State, Nigeria

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Abstract: *Edible forest and wildlife resources are marketed in every part of eastern Nigeria but their perceived economic values and marketing channels in Nsukka rural communities of Enugu state is yet to be documented. Data used for the study were collected through oral interview, focus group discussion and administration of two sets of structured questionnaire. Oral interview was conducted with selected individuals from the communities who have been involved in the utilization and marketing of edible forest and wildlife products. One focus group discussion separated by gender and age was conducted in each community. Two sets of questionnaire were administered in the six communities. First set of questionnaire was administered to 120 full-time marketers while the second set was administered to 120 part-time marketers and consumers. A total of 240 respondents were sampled using questionnaire. Data collected were analyzed using descriptive statistics such as frequencies and percentages while Chi-square was used to test for associations. Result showed that *Parkia biglobosa* was cumulatively ranked first in the order of demand in the three local government areas surveyed. Other species with high cumulative demand included *Pentaclethra macrophylla*, *Irvingia* species and *Anacardium occidentale*. The cumulative demand rank of species on local government basis was closely related to their cumulative rank in terms of income generation. However, in Igbo Etiti local government area *Parkia biglobosa* was ranked second while *Cola acuminata* was ranked first. In the case of wildlife resources, honey was the most demanded edible wild resource in the local government areas except in Igbo Etiti where bushmeat ranked first. In income generation, most respondents ranked honey first in the three local government surveyed. On community basis *Parkia biglobosa* and honey were still the most demanded edible forest and wildlife resources respectively. Result from focus group discussion included *Parkia biglobosa*, *Pentaclethra macrophylla*, *Irvingia* species, honey, *Cola acuminata* and bush meat among products of high economic importance in the study area. *Irvingia excelsa* was ranked first in Ohodo (95%), Umuída (95%) and Ozalla (90%). *Parkia biglobosa* was ranked first in Onicha (65%) and Obollo (60%). *Cola acuminata* was ranked second by 85% of respondents in Ohodo and Ozalla respectively, and third by 80% of the respondents in Umuída. Bushmeat was ranked second in Onicha (80%), ObolloAfor (75%) and Orba (60%) based on economic importance. *Parkia biglobosa* and honey were respectively among the most important species in the study area based on income generation. *Parkia biglobosa*, *Irvingia garbonensis*, *Irvingia excelsa*, *Cola acuminata*, *Anacardium occidentale*, *Treulia africana*, *Nicotiana tabacum*, Honey, snail and bushmeat were ranked very high in terms of profitability.*

Keywords: *Edible forest and wildlife resources, Economic value, income generation, Nsukka, Nigeria*

1. INTRODUCTION

The high value placed on edible forest and wildlife resources by various users has stimulated their increased demand in many areas, thus creating markets for producers and sellers of the product at different levels and locations, overseas inclusive (Ijeomah *et al.* 2015). The involvement of households in business opportunities created by this increased demand has helped in employing many people including none users of edible forest and wildlife products. Attempts to increase revenue generation by marketers of these products, in the face of continuously increasing economic hardship instigated by rapid population increase have stimulated investigations for enhanced knowledge on ways of utilizing these species. Wildlife resources serve as a source of bush meat in many localities. Due to the increase in world population, there is tremendous demand for food including protein and minerals (Popoola, 2010). Forest resources are highly valued as source of natural medicine. All edible forest and wildlife resources are mostly considered as non-timber forest products (NTFPs). It is

obvious that wood/ timber are not edible and thereby excluded. Utilization of these edible forest and wildlife resources varies from one region to another.

There is inadequate information on economic contributions of the edible forest and wildlife resources in households' economies of Nsukka inhabitants.

The specific objectives of this study are to:

1. assess the perceived economic values of these resources in the study area.
2. evaluate perceived profit generated from these resources in the study area.

2. METHODOLOGY

2.1. Study Area

The study was carried out in three selected Local government areas of Nsukka zone, Enugu state (Figure 1). The local Government Areas are Igbo-Eze North, Igbo-Etiti and Udenu. Igbo-Eze North Local Government Area (L.G.A.) lies between latitude 6.59°N and 6.983°N , and longitude 7.27°E and 7.450°E . Igbo –Eze North L.G.A. is in the north of Enugu state, Nigeria. It borders Kogi State and Benue state. The headquarter of Igbo- Eze North is Enugu –Ezike – a large community made up of 36 villages. The Local Government has an area of 293 km^2 and a total population of 259,431 at the 2006 census (NPC, 2006).

Igbo-Etiti Local Government Area is located between latitudes 6.40°N and 6.667°N , and longitudes 7.22°E and 7.3670E . It has an area of 325 km^2 and total population of 209,248 at the 2006 census. The headquarter of Igbo- Etiti L.G.A. is located in Ogbede. Udenu Local Government Area lies between latitudes 6.55°N , and 6.917°N , longitudes 7.31°E and 7.517°E . It has a total area of 248 km^2 and a total population of 178,466 at the 2006 census. Its' headquarter is in Obollo-A for on the A_3 highway.

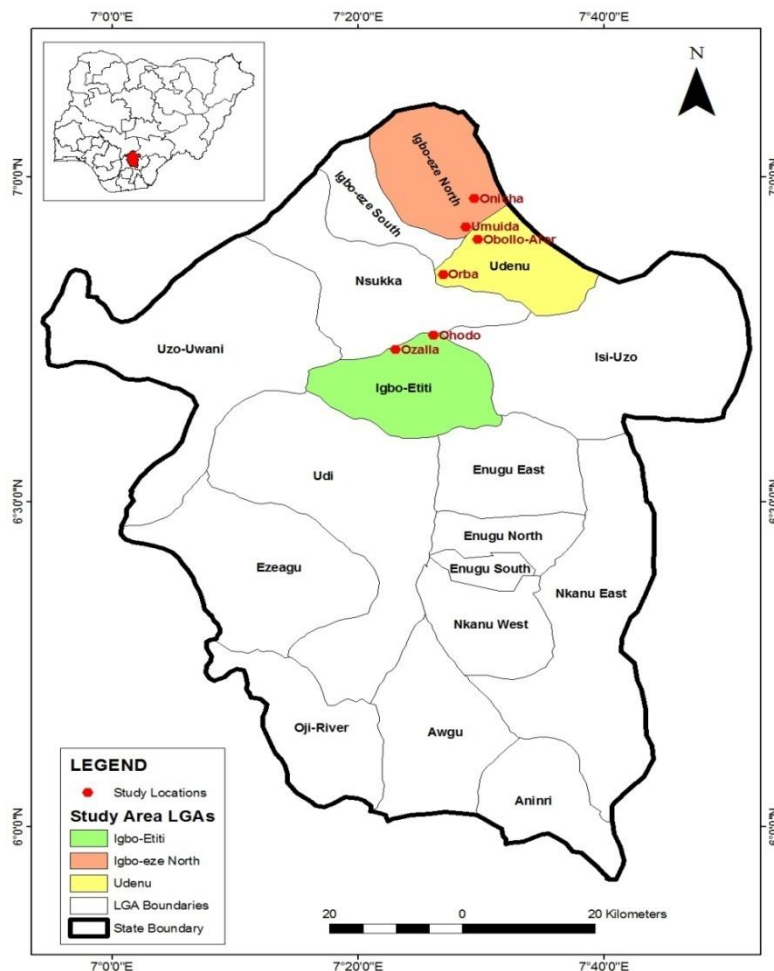


Figure1. Map of Enugu state showing the study sites

Source: Ijeomah and Ugwu (2016)

2.2. Sampling Procedure

Three Local Government Areas were selected based on the availability of edible forest and wildlife resources in the area. The Local government areas are: Udenu L.G.A., Igbo-Etiti L.G.A, and Igbo-Eze North L.G.A. Two communities were selected from each of the three selected Local Government Area as was done by Ijeomah and Ugwu (2016). Six communities were selected in all. These communities are; Umuida and Onicha Enugu-Ezike communities from Igbo-Eze North L.G.A, Ohodo and Ozalla communities from Igbo-Etiti L.G.A, and Obollo-Afor and Orba communities from Udenu L.G.A. These six communities were selected based on the availability of edible forest and wildlife resources in the area.

2.3. Methods of Data Collection

Data for this research project were collected through oral interview, field observation, focus group discussion and administration of questionnaire. Oral interview was conducted with selected individuals (both men and women) from the communities who have been involved in marketing of edible forest and wildlife resources for a minimum period of five (5) years; and those involved in utilization of edible forest and wildlife resources for a minimum period of five years (5) respectively, and are therefore quite knowledgeable about marketing and utilization of edible forest and wildlife resources in the community.

Focus group discussions were organized to confirm information on utilization, marketing of forest and wildlife resources, seasonal variation in prices of products and profitability of resources collected through questionnaire. One focus group discussion separated by gender and age was conducted in each community. Twelve persons participated in each focus group discussion. Six of the group discussants in each community were males, and 6 were females. Three participants from each gender were below 25 years of age and were classified as youngs, while the other 3 participants were above 25 years and were classified as adults in the context of this work. Using the multiple needs ranking tools, priority needs were determined through consensus of answers by group discussants as was done by Omonona (2000), Hassan *et al* (2002) and Ijeomah (2007). A total of six focus group discussions were conducted, (i.e one from each community).

Two sets of questionnaire were administered. The first set was administered to part time marketers and consumers - those involved in utilization of edible forest and wildlife products and those who harvest and sell the products. Another set was administered to full time marketers as shown on Table .1a In the course of this work a full time marketer was defined as a person who always buys forest or wildlife product for re – selling whether processed or unprocessed, and has done so for a minimum period of five years (Ijeomah and Ugwu, 2016).

Table 1a: Allocation of questionnaire to respondents in selected communities

Selected Local Government Area	Selected Communities	Number of respondents per of Questionnaire	
		A (For consumers)	B (For marketers)
Igbo-Eze North	Umuida	20	20
	Onicha Enugu-Ezike	20	20
Igbo-Etiti	Ohodo	20	20
	Ozalla	20	20
Udenu	ObolloAfor	20	20
	Orba	20	20
Total number of questionnaire		120	120

2.4. Data Analysis

Data collected from the study were analyzed using descriptive statistics such as frequencies, percentages and means. Chi-square was used to test for degree of association between the age, educational status, income and storage of edible forest and wildlife resources.

3. RESULTS

Perceived Economic Values of Forest and Wildlife Product

Results on perceived economic values of forest and wildlife resources are presented in Tables 1b, Figure 2, Figure 3, Table 1b, Figure 4 and Figure 5. *Parkia biglobosa* was the most demanded species in most communities and was therefore cumulatively ranked first in the order of demand in the three local government areas surveyed (Table 1b). Other species with high cumulative demand in the three

selected local government areas includes: *Pentaclethra macrophylla*, *Irvingia* species and *Anacardium occidentale* (Table 1b). The cumulative demand rank of species on local government basis was closely related to their cumulative rank in terms of income generation. However, in Igbo Etiti local government area *Parkia biglobosa* was ranked second while *Cola acuminata* was ranked first. In the case of wildlife resources, honey was the most demanded edible wild resource in the local government areas (Table 1b) with exception of Igbo Etiti where bushmeat ranked first. In income generation, Table 1b shows that most respondents ranked honey first in the three local government surveyed. On community basis *Parkia biglobosa* and honey were still the most demanded edible forest (Figure 2) and wildlife resources (Figure 3) respectively. Result from focus group discussion presented in Table 2 also included *Parkia biglobosa*, *Pentaclethra macrophylla*, *Irvingia* species, honey, *Cola acuminata* and bush meat among products of high economic importance in the study area. All the respondents ranked honey first in Orba community while 85% ranked it second in Obollo community. *Irvingia excelsa* was ranked first in Ohodo (95%), Umuida (95%) and Ozalla (90%). *Parkia biglobosa* was ranked first in Onicha (65%) and ObolloAfor (60%). *Cola acuminata* was ranked second by 85% of respondents in Ohodo and Ozalla respectively, and third by 80% of the respondents in Umuida. Bushmeat was ranked second in Onicha (80%), ObolloAfor (75%) and Orba (60%) based on economic importance. Figure 4 and Figure 5 show that *Parkia biglobosa* and honey are respectively among the most important species in the study area based on income generation.

Table 1b. Cumulative ranking of edible forest and wildlife resources based on income generation and peoples' demand in selected local government areas as indicated by respondents

S/N	FOREST RESOURCES	IGBO-EZE NORTH L.G.A.				IGBO-ETITI L.G.A.				UDENU L.G.A.			
		Umuida and Onicha		Ohodo and Ozalla		Orba and Obollo-Afor		Orba and Obollo-Afor		Orba and Obollo-Afor		Orba and Obollo-Afor	
		Income	Rank	Demand	Rank	Income	Rank	Demand	Rank	Income	Rank	Demand	Rank
1	<i>Parkia biglobosa</i>	820	1 st	835	1 st	855	2 nd	938	1 st	893	1 st	894	1 st
2	<i>Pentaclethra macrophylla</i>	742	3 rd	744	3 rd	829	4 th	859	2 nd	696	4 th	807	2 nd
3	<i>Irvingia garbonensis</i>	726	5 th	711	4 th	763	5 th	782	3 rd	618	6 th	663	4 th
4	<i>Irvingia excelsa</i>	746	2 nd	773	2 nd	841	3 rd	778	4 th	716	3 rd	757	3 rd
5	<i>Persea americana</i>	339	15 th	311	16 th	458	14 th	561	11 th	335	18 th	316	18 th
6	<i>Dacryodes edulis</i>	382	13 th	354	13 th	510	13 th	501	13 th	365	16 th	408	14 th
7	<i>Garcinia cola</i>	541	8 th	277	19 th	519	12 th	547	12 th	447	10 th	269	21 st
8	<i>Cola acuminata</i>	729	4 th	636	5 th	897	1 st	704	6 th	757	2 nd	757	3 rd
9	<i>Vernonia amygdalina</i>	286	18 th	568	7 th	415	16 th	621	9 th	215	21 st	493	10 th
10	<i>Anacardium occidentale</i>	577	7 th	587	6 th	725	6 th	690	7 th	622	5 th	468	11 th
11	<i>Dialium guineensis</i>	351	14 th	351	14 th	80	22 nd	73	22 nd	186	22 nd	251	23 rd
12	<i>Chrysophyllum albidum</i>	487	10 th	426	11 th	420	15 th	360	16 th	507	7 th	578	6 th
13	<i>Piper guineense</i>	444	11 th	511	9 th	311	18 th	328	18 th	367	15 th	512	8 th
14	<i>Dinnettia tripetala</i>	404	12 th	324	15 th	411	17 th	432	14 th	395	14 th	463	12 th
15	<i>Xylopia aethiopica</i>	212	21 st	175	22 nd	58	23 rd	39	23 rd	275	19 th	327	17 th
16	<i>Tetracarpidium conophorum</i>	309	16 th	448	10 th	191	21 st	181	21 st	442	11 th	398	16 th
17	<i>Pterocarpus soyauxii/mildbraedii</i>	276	19 th	529	8 th	571	8 th	629	8 th	335	18 th	641	5 th
18	<i>Pterocarpus santalinoides</i>	155	22 nd	200	21 st	299	19 th	313	19 th	254	20 th	283	19 th
19	<i>Treulia africana</i>	295	17 th	210	20 th	700	7 th	709	5 th	416	13 th	502	9 th
20	<i>Azelia africana</i>	9	24 th	21	23 rd	-	-	-	-	500	8 th	278	20 th
21	<i>Nicotiana tabacum L.</i>	688	6 th	303	17 th	533	10 th	332	17 th	618	6 th	518	7 th
22	Traditional medicines (medicinal species)	220	20 th	284	18 th	543	9 th	617	10 th	357	17 th	423	13 th
23	<i>Canarium schweinfurthii</i>	516	9 th	383	12 th	521	11 th	369	15 th	440	12 th	399	15 th
24	<i>Brachystegia nigerica</i>	11	23 rd	6	24 th	269	20 th	247	20 th	464	9 th	253	22 nd
WILDLIFE RESOURCES													
1	Honey	279	1 st	253	1 st	277	1 st	240	2 nd	254	1 st	244	1 st
2	Bush meat	217	2 nd	224	2 nd	240	2 nd	255	1 st	244	2 nd	214	2 nd
3	Guinea fowl	1	7 th	2	7 th	-	-	-	-	144	4 th	105	5 th
4	Tortoise	22	6 th	21	5 th	-	-	-	-	125	5 th	137	4 th
5	Pigeon	23	5 th	17	6 th	-	-	-	-	94	6 th	93	6 th
6	Snail	189	3 rd	206	3 rd	198	3 rd	199	3 rd	158	3 rd	164	3 rd
7	Edible termite	116	4 th	143	4 th	104	4 th	118	4 th	57	7 th	86	7 th

Source: Field survey, 2015.

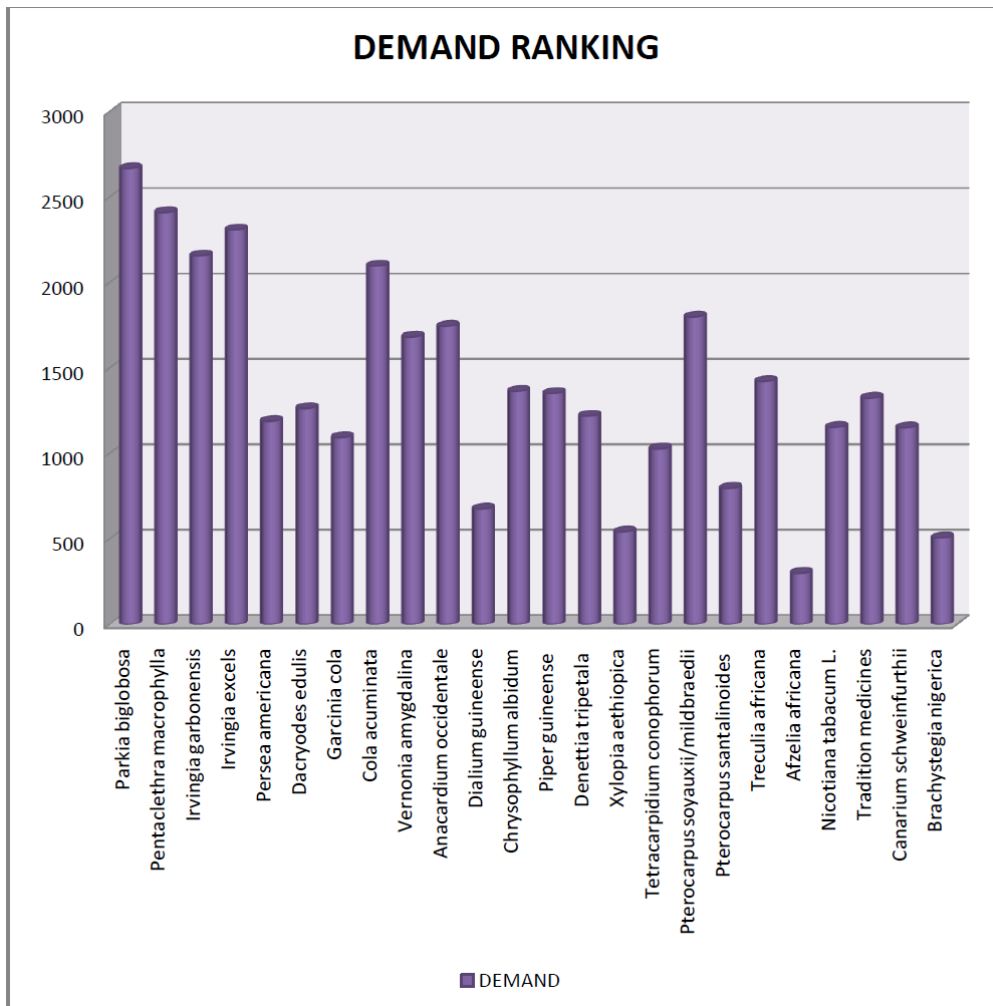


Figure2. Cumulative ranking of demand for edible forest resources in the six surveyed communities

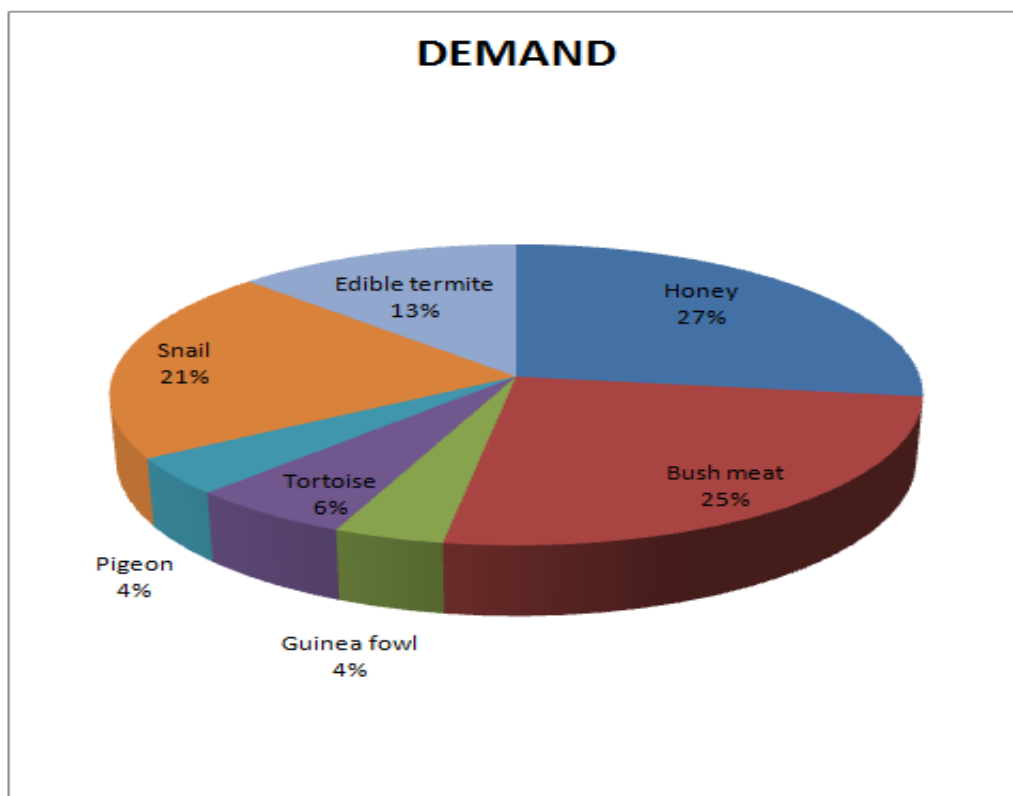


Figure3. Cumulative ranking of demand for edible wildlife resources in the studied six communities

Table2. Ranking of most important species in six selected communities based on economic importance as agreed in group discussions in the study area

S/N	FOREST RESOURCES	COMMUNITIES																	
		ONICHA						OBOLLO						ORBA					
		N= 40						N= 40						N= 40					
1 st	2 nd	3 rd	4 th	5 th	6 th	1 st	2 nd	3 rd	4 th	5 th	6 th	1 st	2 nd	3 rd	4 th	5 th	6 th		
1	<i>Parkia biglobosa</i>	26(65)	6(15)	-	-	-	-	24(60)	-	6(15)	-	-	12(30)	8(20)	4(10)	-	-	10(25)	
2	<i>Pentaclethra macrophylla</i>	-	2(5)	2(5)	-	2(5)	26(65)	4(10)	-	8(20)	10(25)	4(10)	-	6(15)	-	-	2(5)	8(20)	
3	<i>Irvingia garbonensis</i>	-	-	-	2(5)	30(75)	2(5)	-	-	6(15)	4(10)	8(20)	4(10)	-	2(5)	4(10)	-	14(35)	6(15)
4	<i>Irvingia excelsa</i>	-	2(5)	2(5)	28(70)	-	2(5)	-	12(30)	4(10)	2(5)	2(5)	-	4(10)	4(10)	2(5)	12(30)	-	-
5	Honey	40(100)	-	-	-	-	-	-	34(85)	4(10)	2(5)	-	-	24(60)	8(20)	4(10)	-	-	-
6	<i>Cola acuminata</i>	-	24(60)	6(15)	-	4(10)	-	-	10(25)	8(20)	2(5)	-	2(5)	-	12(30)	8(20)	-	-	-
7	bushmeat	-	32(80)	4(10)	-	-	-	6(15)	30(75)	2(5)	-	-	-	16(40)	24(60)	-	-	-	-
8	Snail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	<i>Anacardium occidentale</i>	-	8(20)	28(70)	2(5)	-	-	-	2(5)	22(55)	8(20)	4(10)	-	-	4(10)	12(30)	6(15)	-	16(40)
10	<i>Nicotiana tabacum</i>	-	-	-	-	-	6(15)	2(5)	-	-	-	-	2(5)	-	10(25)	2(5)	2(5)	4(10)	2(5)
11	<i>Brachystegia nigerica</i>	10(25)	-	24(60)	2(5)	-	-	2(5)	6(15)	4(10)	-	-	-	4(10)	-	4(10)	-	-	2(5)
S/N		-	-	-	-	-	-	-	-	-	-	-	18(45)	-	-	-	-	-	4(10)
S/N	FOREST RESOURCES	COMMUNITIES																	
		OHODO						OZALLA						UMUIDA					
		N= 40						N= 40						N= 40					
1 st	2 nd	3 rd	4 th	5 th	6 th	1 st	2 nd	3 rd	4 th	5 th	6 th	1 st	2 nd	3 rd	4 th	5 th	6 th		
1	<i>Parkia biglobosa</i>	6(15)	14(35)	6(15)	12(30)	-	-	10(25)	6(15)	2(5)	-	8(20)	-	30(75)	-	2(5)	-	4(10)	
2	<i>Pentaclethramacrophylla</i>	-	4(10)	16(40)	4(10)	6(15)	6(15)	-	14(35)	-	-	6(15)	20(50)	4(10)	14(35)	-	6(15)	12(30)	
3	<i>Irvingia garbonensis</i>	-	-	4(10)	6(15)	20(50)	2(5)	4(10)	-	-	16(40)	2(5)	2(5)	-	4(10)	26(85)	2(5)	2(5)	
4	<i>Irvingia excelsa</i>	-	10(25)	8(20)	10(25)	-	-	10(25)	-	24(60)	-	2(5)	2(5)	2(5)	6(15)	22(55)	2(5)	2(5)	
5	Honey	38(95)	2(5)	-	-	-	-	36(90)	4(10)	-	-	-	-	38(95)	2(5)	-	-	-	
6	<i>Cola acuminata</i>	26(65)	8(20)	-	-	-	-	6(15)	20(50)	4(10)	6(15)	-	-	14(35)	6(15)	-	12(30)	-	
7	Bush meat	2(5)	34(85)	4(10)	-	-	-	4(10)	34(85)	2(5)	-	-	-	32(80)	6(15)	2(5)	-	-	
8	Snail	-	4(10)	34(85)	-	-	-	2(5)	38(95)	-	-	-	-	4(10)	24(60)	8(20)	-	-	
9	<i>Anacardium occidentale</i>	-	-	-	4(10)	2(5)	16(40)	-	-	-	4(10)	10(25)	6(15)	-	-	-	-	2(5)	18(45)
10	<i>Nicotianatabacum</i>	6(15)	-	-	2(5)	-	2(5)	10(25)	-	-	-	-	-	2(5)	-	-	2(5)	4(10)	
11	<i>Brachystegia nigerica</i>	-	2(5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		6(15)	14(35)	6(15)	12(30)	-	-	10(25)	6(15)	2(5)	-	8(20)	-	30(75)	-	2(5)	-	4(10)	

Source: Field survey, 2015.

N=Total no of respondents in each community

N/B: Numbers in parenthesis are percentage values.

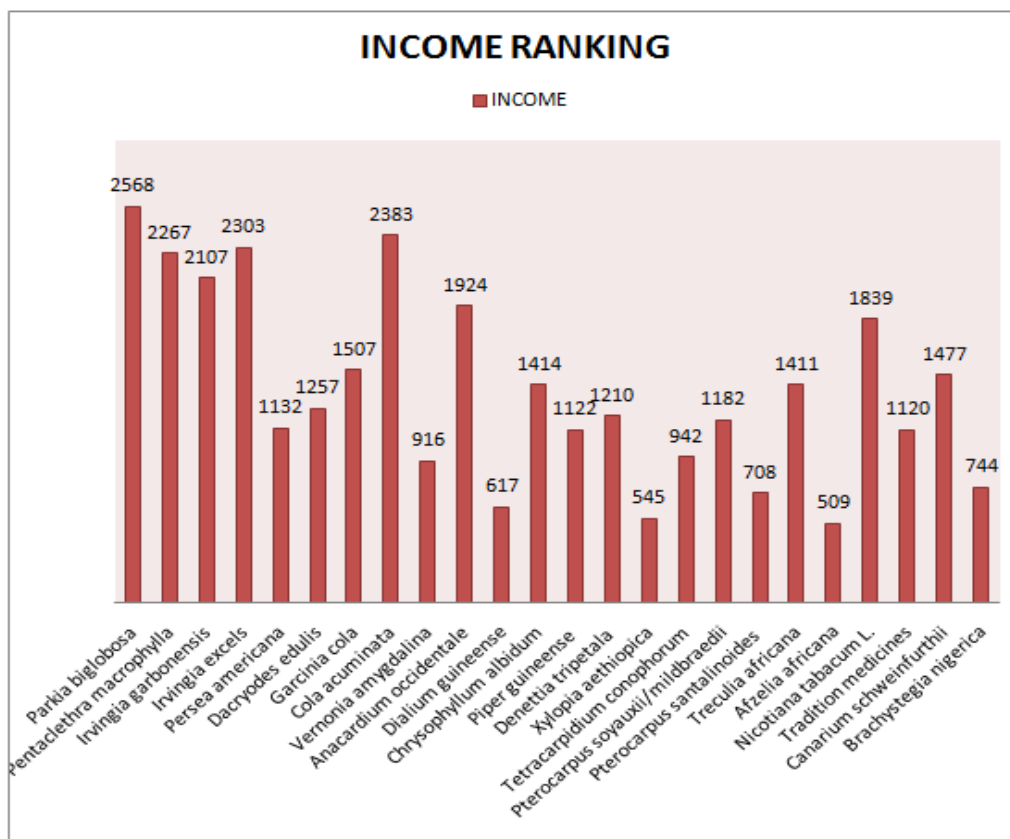


Figure 4. Perceived valuation of income generation from edible forest resources in the studied six communities

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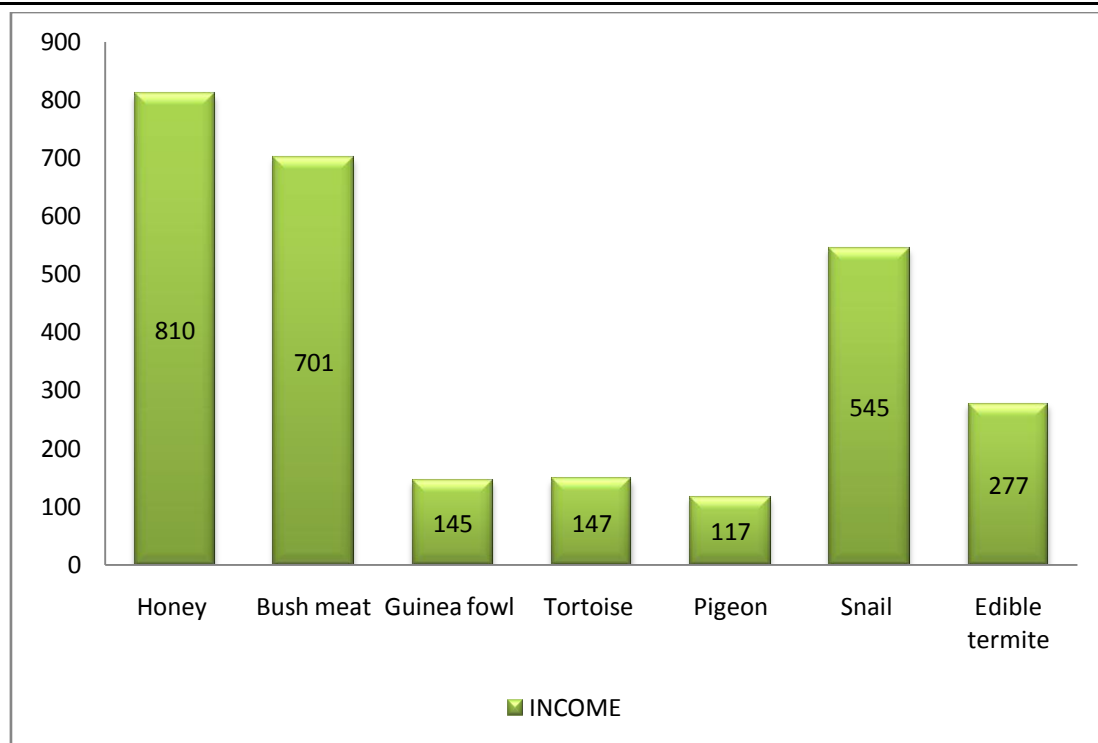


Figure 5. Perceived valuation of income generation from edible wildlife resources in the studied six communities

Seasonal Variation in Product Availability and Price

According to Table 3 seasonal variations are experienced in the prices of most species due to relative abundance during on-season and shortage of supply during off season. Some species have no season, and can be found in the study area all the time.

Table 3. Seasonal variation in prices of selected edible forest and wildlife resources in the study area as reported by focus group discussants

S/N	Forest and wildlife resources	Common Names	On-Season Selling Price (*₦)	Off-Season Selling Price (*₦)
1	<i>Parkia biglobosa</i>	Locust bean	27 milk cups(seed) – 1000 (Before December)	20 milk cups(seed)-1000 (After December)
2	<i>Pentaclethra macrophylla</i>	Oil bean	One small pent bucket- 600 (November)	Same quantity-1,200 (December)
3	<i>Irvingia garbonensis</i>	Bush mango	A milk cup(seed)- 100 (July)	Same quantity- 250 (December)
4	<i>Irvingia excelsa</i>	---	A milk cup(seed)-200 (December)	Same quantity-500 (July)
5	<i>Persea americana</i>	Avocado	Better quality, bought on stand- 2,000	Same as in on- season
6	<i>Dacryodes edulis</i>	Butter pear/ Native pear	Better quality, bought on stand (normal tree size) – 20,000	Low quality, bought on stand (medium/small sized tree)- 8,000
7	<i>Garcinia cola</i>	Bitter kola	10-15 seeds-50 (July)	Same as in on- season 5 seeds- 50 (before August)
8	<i>Cola acuminata</i>	Kolanut	4 seeds—150 (July)	4 seeds---300
9	<i>Vernonia amygdalina</i>	Bitter leaves	One bundle, measured with hand---10 (July)	Same size---50 (January--February)
10	<i>Anacardium occidentale</i>	Cashew	Fried cashew nut- A milk cup is 50 (March – April)	Fried cashew nut- A milk cup is 100-120 (June/July)
11	<i>Dialium guineense</i>	Black velvet	A milk cup(pod): 10 Bought on stand: Low quality—5,000	A milk cup(pod): 20
12	<i>Chrysophyllum albidum</i>	African star apple	High quality--- 15,000—20,000. [10 balls--50]	Same as in on- season [5balls--50]
13	<i>Piper guineense</i>	Black pepper	A milk cup(seed): 100 (July)	A milk cup: 200 (November--December)
14	<i>Denettia tripetala</i>	Pepper fruit	Bought on stand, normal sized tree—4,000	Same as in on- season
15	<i>Xylopia aethiopica</i>	Ethiopian pepper	It has no season in the study area	It has no season in the study area
16	<i>Tetracarpidium</i>	African walnut	4 processed Nuts (cooked): 20	3--4 processed Nuts (cooked): 20

		<i>conophorum</i>	
17	<i>Pterocarpus soyauxii/mildbraedii</i>	-----	One normal sized bundle, measured with hand---20 (from January) Same quantity: 150 (July)
18	<i>Pterocarpus santalinoides</i>	-----	One normal sized bundle, measured with hand---10 (from January) One normal sized bundle, measured with hand---30 (June/July)
19	<i>Treculia africana</i>	African bread fruit	A milk cup(seed) is 50 A milk cup: 80-100
20	<i>Azelia africana</i>	-----	A milk cup(seed) is 150 A milk cup(seed) is 250
21	<i>Nicotiana tabacum L.</i>	Snuff /tobacco	It has no season in the study area Price depends on the medicinal species, nature of the medicine and quantity (it has no season)
22	Traditional medicines (medicinal plant parts)	concoctions	It has no season in the study area Price depends on the medicinal species, nature of the medicine and quantity (it has no season)
23	<i>Canarium schweinfurthii</i>	---	Bought on stand, bought based on quality—price ranges from: 5,000; 25,000—30,000
24	<i>Brachystegia nigerica</i>	---	A milk cup(seed) is 150 Same as in on- season A milk cup(seed) is 250
24	Honey	---	A lucozade bottle (1 litre) 500--700 A lucozade bottle (1 litre)1000—1,500
25	Snail	---	A normal sized snail: 50 A normal sized snail: 70—100
26	Tortoise	---	It has no season in the study area It has no season in the study area
27	Edible termite	---	A milk cup of processed edible termite (fried): 40—50 (April--June) A milk cup of processed edible termite (fried): 40—50 (April--June)

Source: Field survey, 2015.

N/B: *N220.00 = 1 USD as at the time the study was conducted

Table 4 shows that *Parkia biglobosa*, *Irvingia garbonensis*, *Irvingia excelsa*, *Cola acuminata*, *Anacardium occidentale*, *Treculia africana*, *Nicotiana tabacum*, Honey, snail and bushmeat were ranked very high by focus group discussant in terms of profit generation to rural households in the study area.

Table4. Perceived Profitability level of products in the study area as ranked by focus group discussants

Forest/Wildlife Resources			
S/N		Common Names	Profitability level
1	<i>Parkia biglobosa</i>	Locust bean	Very high
2	<i>Pentaclethra macrophylla</i>	Oil bean	Very high
3	<i>Irvingia garbonensis</i>	Bush mango	Very high
4	<i>Irvingia excelsa</i>	---	Very high
5	<i>Persea americana</i>	Avocado pear	Low
6	<i>Dacryodes edulis</i>	Butter pear/ Native pear	High
7	<i>Garcinia cola</i>	Bitter kola	High
8	<i>Cola acuminata</i>	Kolanut	Very high
9	<i>Vernonia amygdalina</i>	Bitter leaves	Low
10	<i>Anacardium occidentale</i>	Cashew	Very high
11	<i>Dialium guineense</i>	Black velvet	Low
12	<i>Chrysophyllum albidum</i>	African star apple	Low
13	<i>Piper guineense</i>	Black pepper	Low
14	<i>Denettia tripetala</i>	Pepper fruit	Low
15	<i>Xylopiiia ethiopica</i>	Ethiopian pepper	Low
16	<i>Tetracarpidium conophorum</i>	African walnut	High
17	<i>Pterocarpus soyauxii / mildbraedii</i>	-----	Low
18	<i>Pterocarpus santalinoides</i>	-----	Low
19	<i>Treculia africana</i>	African bread fruit	Very High
20	<i>Azelia africana</i>	-----	Low
21	<i>Nicotiana tabacum L.</i>	Snuff /tobacco	Very High
22	Traditional medicines (medicinal plant parts)	Concoctions	Low
23	<i>Canarium schweinfurthii</i>	---	Low
24	<i>Brachystegia nigerica</i>	---	Moderate
25	Honey	---	Very High
26	Snail	---	Very High
27	Tortoise	---	Low
28	<i>Macrotermes natalensis</i>	Edible termite	Low
29	Bushmeat	-	Very High

4. DISCUSSION

Perceived economic values of forest and wildlife products

Income generation from marketing of edible forest and wildlife species in the study area differs. On cumulative ranking of demand and income generation for forest resources (Figure 2), the high ranking of *Parkia biglobosa* could be attributed to the fact that it is used as cultural condiment for cooking almost all types of traditional food in the study area. The fact that the species is not deliberately planted by respondents in the study area (Ijeomah and Ugwu, 2016) implies that the price will always be high as it is mostly sourced outside the study area especially, Anambra or Kogi state. The fact that it could only sprout and germinate by chance in the study area also means that the species is prone to be threatened. This agrees with Ijeomah and Ogara (2006) that most fruit trees in eastern Nigeria are threatened. Even if the existing trees in the study area fruits, the quantity most likely to be harvested can hardly be large enough for household to use and at the same time sells. The high demand with limited or seasonal availability culminates in high income generation to the sellers in the study area. People travel far and wide in search of *Parkia biglobosa* to buy due to the high price and income generation of this product. This is also the reason it is always traded on, stored and protected when found (the tree) in farms.

Another species of high economic value is *Pentaclethra macrophylla*. The species is used in preparing tapioca, a highly cherished cultural food among Ibo speaking areas of eastern Nigeria. The fact that tapioca has cultural significance in every occasion makes the demand very high (Table 1b). The high demand reflects in high income generation from the species. Ijeomah and Ogara (2006) obtained similar result in Ideator south of Imo state.

The seeds of *Cola acuminata* are consumed on daily basis and culturally used to welcome visitors. This makes it to have a high economic value in the study area (Table 1b). In terms of economic importance, it was rated first in Igbo Eiti local government area (Ohodo and Ozalla communities) (Table 1b), and second by many respondents in the same communities in overall economic importance (Table 2). The high economic rating could be attributed to the fact that many of the trees are found in the area. Households in Ohodo and Ozalla have been harvesting and trading on the fruits, and are therefore aware of the high profit margin between it and other species. It is also rated second and third in Orba and Obollo-Afor respectively. Marketers are aware of the high demand and revenue generated from the sales. The demand for *Cola acuminata* is a little lesser than that of *Irvingia* species but the value placed on it is higher because very few pods could easily be sold for high price. It is a major cash crop in the study area. Fruits of *Cola acuminata* and *Irvingia* species in family lands are occasionally harvested with money generated from the sales shared among many members of the family based on culture. The value placed on *Cola acuminata* is so high that owners guard the fruits jealously to ensure that nobody picks the ones that fall under gravity. This is different from other species like *Chrysophyllum albidum*, *Persea americana*, *Dacryodes edulis* and *Canarium schweinfurthii* which people could be allowed to pick the fallen fruits. When people pick the fallen fruit of *Cola acuminata*, they may be forced by the owner to drop them. Similar things happen in the case of *Irvingia* species, particularly *Irvingia excelsa* because of its high income generation to households and perceived economic value (Table 2). *Irvingia excelsa* is used as a soup thickener. It is a major source of revenue generation to many households in the study area especially during off-season. *Irvingia excelsa* has a bitter taste and therefore the fruit is less consumed (raw) than those of *Irvingia gabonensis* that has sweet fruits, however, kernels of the former are more valued as a soup thickener because of its consistent draw ability or slimy consistency. This agrees with Agbor (1986) that the bitter variety was more demanded than the sweet one. The demand for *Irvingia* species is very high as the species are part of the important diet of many Africans (Onyeike *et al.* 1995). *Irvingia* kernels are dried, ground, packaged and sent to Nigerians in Europe and many parts of the world who cherish consumption of soup prepared with the species. This is done on regular basis. This corroborates earlier findings (Okafor, 1985; Okafor, 1991; Ladipo and Boland, 1994; Akubor, 1996; Ladipo, 1999; Ikhatua and Falodun, 2012) that *Irvingia* species generates high cash income within and outside Nigeria, and that the kernels are highly priced as soup condiments (Okafor, 1985; Okeke, 1995; Ikhatua and Falodun, 2012). The consumption of *Irvingia* seeds is limited by supply, and in urban areas, by high prices (Department of Forest Resource Management, Nigeria, 1986).

Anacardium occidentale is a major cash crop in the study area. The fruits are frequently consumed while the seeds are processed for sale. Marketing of processed *Anacardium occidentale* seeds is an all season business in the study area especially Obollo -Afor community; which serve as a depot for the product. Processed seeds are sold along major access roads to travellers who buy and consume them as snacks. Marketers from many cities in southern Nigeria such as Aba, Enugu, Owerri, Onitsha, Okigwe and Port Harcourt travel to the study area to buy processed seeds of *Anacardium occidentale*. Consumption of processed seeds of *Anacardium occidentale* is cherished by many travellers, who also buy it as gift items for their relations. *Treculia africana* is rated 5th and 7th in Ohodo and Ozalla communities because the species is abundant therein and contributes a lot to household economies. Many marketers from Enugu town visit the communities to buy *Treculia africana* in large quantities as it is cherished by many diabetic patients. It is also a major source of income to respondents in the study area. Species like *Xylopia aethiopica* might still be needed by people but usually in smaller quantity and it therefore attracts lower income and might not worth people travelling to buy such product. In the case of tortoise, marketers travel to Kogi State (a far distance) to buy it yet, the price is very low in the study area, which culminates in lower income generation. The demand for *Pterocarpussayauxii* and *Pterocarpusmilbraidii* is high as vegetables always utilized for cooking cultural soup. The rate of income generation from the species could be high but the amount of revenue generated is relatively low. It was not listed among the six very important species in the study area.

In the case of edible wildlife resources honey, bush meat and snails are perceived to have high economic value in the study area. Honey production is a common business in the study area. Clay pots are commonly hung on trees in the study area as artificial hives to attract bees for honey production. Selling of honey and snail harvested from the wild is a major source of revenue to households in the study area. Baskets of snails could be freely collected from the wild and sold to generate income. Bush meat which is considered as a delicacy contributes economically to many local economies. Bushmeat, honey and snail are sources of income to respondents and were therefore highly valued in the study area. This agrees with the work of Ogogo *et al* (2010), and Onu and Ijeomah (2012). Irrespective of existing age-old legislations to protect endangered species, and the high rate of deforestation which has destroyed many wildlife habitat and reduced the productive ability of games, hunting and marketing of bushmeat remained a major source of income and employment to many respondents. Scarcity of bushmeat increases the value of available ones. Thus, bushmeat, honey and snails are sold along major access roads to the study area, special beer parlours, and restaurants and in community markets both in dry, fresh and cooked forms. This corroborates Asibey (1987a), Asibey (1987b) and Ajayi (1979) who reported that hunting and sales of bushmeat provide higher, though less secured income (and variety of needed products) to local farmers in Nigeria than revenue generated from farming operations. This also agrees with the findings of Ntiama-Baidu (1987) in Ghana where bushmeat trade is the mainstay of local economies of many women. Bushmeat, when preserved by smoking or roasted could be supplied to cities within and outside Nigeria. This is the reason FAO (Undated) reported that bushmeat is valued throughout the West African region. Similarly, Ijeomah *et al* (2015) reported cases of poachers in Cross River National Park who spent weeks in the reserve, killing and roasting wild animals for sale. Consumption of bushmeat is limited by availability. Previously middle sized animal species were consumed by households while bigger ones were sold for revenue generation but presently small animals like squirrel could be sold due to the desire to generate revenue. The consumers can buy a small sized animal like squirrel due to the high demand for bushmeat. Awareness of health benefits of snail consumption is continuously creating more markets for snail sellers whereas all snail sold in the study area are sourced from the wild.

Seasonal Variation in Price of Products and profit generation

The desire to make more profit drives marketers to search and discover areas where products are abundant and cheap. These products are bought at cheap prices and sold directly to consumers, wholesalers, or to retailers at high profit margin. *Parkia biglobosa* is normally sourced from Onitsha or western part of Nigeria. However, some products sourced from distance areas could still be sold at cheap prices. Tortoise is sourced from Kogi state being a far distance area from Nsukka, yet its selling price ranges between #300 and #1,500 depending on sizes. A tortoise of 9 inches in length sells for about #1,000--#1,500. *Xylopia aethiopica* could be sold as low as #20--#30 per wrap notwithstanding that it is mostly sourced from Kogi state. These show that apart from the desire to make high profit,

marketers also try to fill market gaps. Since most respondents market many products, it becomes easy for marketers to cope when profit from different products are combined. This agrees with Oka for, 1989a and 1990a that forest products are sources of significant cash income for rural people. The fact that many products like *Parkia biglobosa*, *Treculia africana*, *Pentaclethram acrophylla* and *Irvingia* species are seasonal (Table 3) creates opportunity for marketers who have these products during off-season to sell at higher price and make more profit (Table 4). A milk cup full of *Irvingia excelsa* sold #200 during on-season (December), sells for #500 during off-season (after December); which is more than 100% increase in price. Similar increase in price during off-season is experienced in *Garcinia cola*, *Cola acuminata*, *Parkia biglobosa*, *Treculia africana* and *Pterocarpus soyauxii* (Table 3). Many of these seasonal products are bought during on-season and stored for sale during off-season. However, *Pterocarpus soyauxii* is highly perishable and cannot be stored. Effective storage of the products is based on the indigenous knowledge and experience of respondents (Ijeomah and Ugwu, 2016), while the quantity stored per each species depends on respondents capital level.

More income is generated from species without alternatives during the off- season. *Parkia biglobosa* and *Pentaclethram acrophylla* will always be used for preparing cultural delicacies irrespective of the season of the year. Similarly, *Treculia africana* will always be utilized by many diabetic patients. Contrarily, people who could not afford *Irvingia excelsa* during the off – season because of the tremendously increased price may either switch over to other soup thickeners or reduce the quantity usually used at once by mixing the species with okro (another soup thickener that draws). It was on this basis that Department of Forest Resource Management, University of Ibadan (1986) attributed its consumption during the off – season as a luxury. The price of *Irvingia excelsa* is usually cheaper during the on –season but high every year during the off - season. Profit level from the marketing of some species (such as *Pterocarpus soyauxii/ mildbraedii*) could also be low but with high demand during off - season economics of large scale supply increases profit. The spread of availability of many products in the study area shows that there will always be resources to market at any season.

CONCLUSION AND RECOMMENDATION

Parkia biglobosa, *Pentaclethram acrophylla*, *Treculia africana*, *Irvingia excelsa*, *Cola acuminata*, *Garcinia cola*, *Anacardium occidentale*, bushmeat, *Irvingia abonensis*, *Tetracarpidium conophorum*, snail and honey were among species with high economic and profit values in the study area. The high economic values of these species extend to many parts of the world where these resources are utilized. The market for many of these species can hardly be exhausted due to limited availability, especially for the products of high economic values that are seasonal. This creates regular opportunities for sellers to make profit. Respondents should be encouraged to embark on large scale rearing of snails, grasscutters and giant rat for bushmeat production. Modern form of honey production should be introduced in the study area to increase productivity. Awareness should be created towards establishment of plantations for edible forest products in the study area.

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