

Economic Contribution of Forest Leafy Vegetables Marketing in Uyo, Nigeria

*LARINDE, Solomon. L. Egbiremhon, Victoria. N

Department of Forestry and Wildlife Management, University of Port Harcourt

Abstract

Forest leafy vegetable (FLV) are edible part of indigenous plant which are harvested from within and on the fringes of natural, manipulated or disturbed forest. But little is known and documented about their commercial performance and developmental linkages. This study therefore examines the economic contribution of forest leafy vegetables to the livelihood of dwellers in Uyo LGA of Akwa Ibom State. Structure questionnaire was used to elicit information from 105 purposefully selected marketers from six (6) markets namely Akpan andeme, Ikot oku, Itam, Ikpa junction, Nung udoe and Itak uyo. Information gathered was subjected to descriptive statistical analysis of simple proportions and percentages, while simple cost analysis of profit and rate of return on investment was also carried out for economic evaluation. Result showed that startup capital rang between N1, 000- N10, 000. Among the nine (9) FLV marketed *Gnetum africana* has the highest profit per kg (N191.50) and *Vernonia amygdalina* has the lowest profit margin per kg (N79.19). The most traded FLV are *Gnetum africana* (Afang) and *Lasianthera africana* (Editan). The highest rate of return on investment was found at Itam market with a rate of 51.52% while Akpan andeme has (47.76%), Ikot oku (50.73), Ikpa junction (49.55%), Itak uyo (49.81%), and Nung udoe (45.99%). The threats to the marketing of FLVs are seasonality and perishability of products as well as sustainability of production because most FLV are collected from the wild and not planted. In other to sustain this livelihood activity, it is recommended that domestication of FLVs be encourage among farmers and home gardens in the community.

Keywords: Forest Leafy Vegetables (FLVs), Marketing, Profitability and livelihood.

1. INTRODUCTION

Accumulation of oxidant in human body is on the increase globally and dieticians have postulated that with consumption of adequate quantity of vegetable antioxidant can be gotten to reduce effect on human health. The joint FAO/WHO 2003 Consultation on Diet, Nutrition and the Prevention of Chronic Diseases recommended a minimum daily intake of 400g of fruits and vegetables. FAO (2003) noted that vegetables apart from providing good nutrition, act as medicine for various ailments and buffers against diet related chronic diseases.

Forest leafy vegetables are cheap sources of antioxidant and they are used for prophylactic and therapeutic purposes because of their nutritional and non-nutrient bioactive properties when consumed (Prota, 2004). They are generally found in the wild, fallow lands, forest fringes and cultivated in farmlands. There are number of forest leafy vegetables which have been documented as food and they rich in minerals (Okafor, 2004). They provide minerals like sodium, potassium, magnesium, iron, calcium, phosphorus and as well used as remedy for various diseases. They are known to contain non-nutrient bioactive phytochemicals that have been linked to protection against cardiovascular and other degenerative diseases

Forest Leafy Vegetables (FLV) are plant species that are collected, cultivated or domesticated grown for their edible leaves and used as food to supplement and compliment starchy staple food. FLV are the cheap and readily available sources of important proteins, vitamins, minerals and essential amino acids in the tropical regions (Okafor 1983). Leafy vegetables found in the wild contribute immensely to the diets of Nigerians (Achinewu *et al.*, 1995). Wild vegetable are regarded as easily obtainable and palatable with good taste when cooked. Kajembe *et al.*, (2000) revealed that a great variety of wild vegetable plants are utilized on a daily basis and they make up important sources of vitamins, proteins, and minerals when served with fairly poor staple food. They are mostly picked in home gardens and farmlands where they grow as weedy or by forest trail sides on the way home from distant cultivation. However some of the species thrive in moist places or shady forest sites which might make their collection time more demanding.

Rensburg *et al.* (2004) observed that harvested leaves are normally washed and cooked in water, with or without salt, sometimes with the addition of bicarbonate of soda. Cooking times vary from a few minutes to up to 2 hours, depending on species and culture. The cooked leaves are eaten or are mixed into a relish, which is prepared by frying onions, tomatoes, minced peanuts or peanut butter together.

In other to prevent some of harvested leafy vegetables from perishing and make them available in off-season, they can be processed and preserved by partial cooking, blanching or drying. Since the forest leafy vegetables have been are evaluated for their food value and some have been domesticated it is equally important to unfold the market potential in the areas where they are endowed. Market investigations of these leafy vegetables need to be done to know economic contribution to household income using market. While much is known about the characteristics of many individual Non-Timber Forest Products (Arnold, 2004), less is known about their

commercial performance and developmental linkages. Most of these traditional leafy vegetables have a potential for income generation but fail to compete with exotic vegetables at present due to lack of awareness (Maikhuri *et al.*, 2004; Jansen *et al.*, 2004). Improved marketing of wild vegetables and NTFPs in rural and sub-urban centers is a possible strategy for sustainable development of rural economies. NTFPs production and marketing could improve quality of life (Oladele *et al.*, 2013); yield incomes for subsistence forest based communities and alleviate household poverty.

This work investigates the contributions of marketing wild leafy vegetables to house hold incomes and food security in Akwa Ibom state, Nigeria. The general objective of this study is to assess the economic return derived from forest vegetable production and marketing, while the specific objectives include identification of forest leafy vegetables that is consumed in this locality as well as the demographic characteristics of vendors. Examine the problems associated with the forest leafy vegetable production and marketing.

2.0 METHODOLOGY

2.1 Study Area

This study was carried out in Uyo local government area in Akwa Ibom state, Nigeria. Uyo is the capital city and also a local government area in Akwa Ibom. It is located in the coastal southern part of the country, which lies between latitudes 4°32'N and 5°33'N and longitudes 7°25' and 7°45'E. The region is flat and low lying. This is within the equatorial rain forest belt, which is a tropical zone and home to vegetation of green foliage of trees, shrubs and oil palm trees. The mean annual temperature of the state lies between 26° C and 28° C, while mean annual rainfall ranges from 2000 mm to 4000 mm, depending on the area. The total population of Uyo LGA is about 309,573 with about 152,113 males and about 156,490 females, according to the 2006 national census.

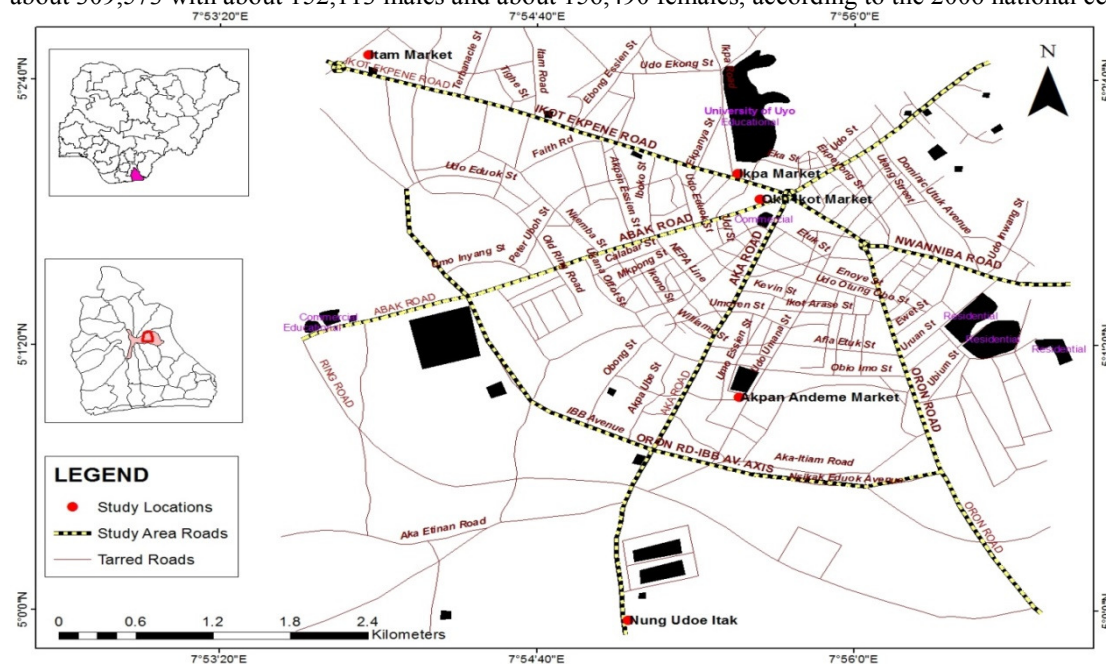


Figure 1: MAP OF UYO SHOWING SAMPLED MARKETS

Source: field work

2.2 Sampling procedure and data collection

Surveys using structured questionnaire were conducted at six selected local vegetables markets (Akpan andem, Ikot oku, Itam, Ikpa junction, Nung udoo and Itak uyo) in Uyo metropolis at least twice in a week for a month. Twenty (20) women vendors in each market were interviewed regarding the local name of the forest leafy vegetables, their source, consumers, use, daily sales and market price. To validate information provide fifteen marketers each from other smaller markets were also interviewed using questionnaire. In all a total of 105 respondents were available for this interview. Weighing balance calibrated in kilograms was taken to the markets for the standardization of measurements of forest leafy vegetables. Data obtained were subjected to descriptive statistical analysis of simple proportions and percentages. Rate of return on investment is given as:

$$RORI = \frac{TR - TC}{TC} \times \frac{100}{1}$$

Where TR =Total Revenue, TC =Total Cost.

3.0: RESULTS AND DISCUSSION

Table 1: Distribution by personal characteristics of respondents

Variables	Frequency	Percentage
Gender		
Male	NIL	0
Female	105	100
Age		
18 – 25 years	4	3.8
26 – 35 years	25	23.8
36 – 45 years	50	47.6
46-Above	26	24.8
Marital status		
Single	15	14.3
Married	74	70.5
Divorced	1	1.0
Widowed	15	14.3
Household size		
1 – 3	12	11.4
4 – 6	75	71.4
7 – 9	18	17.1
Level of education		
No formal education	15	14.3
Primary	37	35.2
Secondary	51	48.6
Others	2	1.9
Startup capital		
N1,000- 10,000	90	85.7
N10,000- 20,000	10	9.5
N20,000 - above	5	4.8
Other type of trade		
FLV + other vegetables	43	41
FLV + food stuffs	15	14.2
FLVs only	35	33.3
FLVs + family support	6	5.7
FLVs/vegetables + food stuff	3	2.8
FLVs + other business	3	2.8

Source: Field work

Table 1 show that 100% of the respondents were females. This implies that females are the only one involved in marketing of FLVs to supplement household income, 3.8% of the respondents were less than 25 years, 23.8% were between 26 and 35 years, 47.6% were between 36 and 45 years while 24.8% were above 46 years. The study also showed that majority of the respondents are married (70.5), 14.3% of the respondents are single and 14.3% is widowed. This shows that married women are those who are actively involved in FLVs marketing as a means of livelihood to satisfy the household needs, this agreed with the Marshall (2006) and Oladele *et. al* (2013) who opined that married women engages in NTFPs trade to supplement household income. The result also showed that 11.3% of the respondents have household size of 1 – 3, 71.4% have household size of between 4- 6, 17.1% have households above 7persons. The greatest percentage of the respondents has household size of 4 – 6 members. Result shows that 14.3% of the respondents had no formal education while 84.8% of the respondents were educated up to secondary school level. Also findings showed that 33.3% of the respondents market only FLVs while 41% of them do sell FLV and other vegetables. Whereas 14.2% are involved in FLV and food stuffs, only 5.7% are involved in both FLVs and family support as a means of livelihood while 2.8% each of respondents are involved in FLVs/vegetables and food stuff, FLVs and other business. This indicates that FLVs marketing is capable of supporting livelihood as also confirmed by Oladele *et. al* (2013).

Startup capital for wild vegetable marketing on the average is very low and can be raised with less effort; this has made the FLVs markets to be competitive both in rural and urban areas. Most of the marketers started the business with less than ₦10, 000 (85.7%) and a few of them with ₦10, 000 – ₦20, 000 (9.5%), ₦20, 000 and above (9.5%) especially those that deals on a large scale production in most of the markets visited (Table 1). Findings also revealed that startup capitals for the business were obtained through personal savings, loans from relatives and friends (figure 2). Most marketers travel long distances to obtain their product, while some procure directly from wholesalers in urban markets. Transportation cost may also increase the marketing cost and consequently

reduces profit margin. It was also observed that some of the marketers also sell other vegetables like water leaf to complement the sales of these forest leafy vegetables, while some sell only forest leafy vegetables, others either sell FLV to compliment other income from family support, sales of other food stuffs, and sales of FLVs and get involved in other business not mentioned (figure 3). Respondents' selling other types of vegetables such as water leaf, *Irvingia gabonensis* (Ogbono) and pumpkin has higher sales than the others.

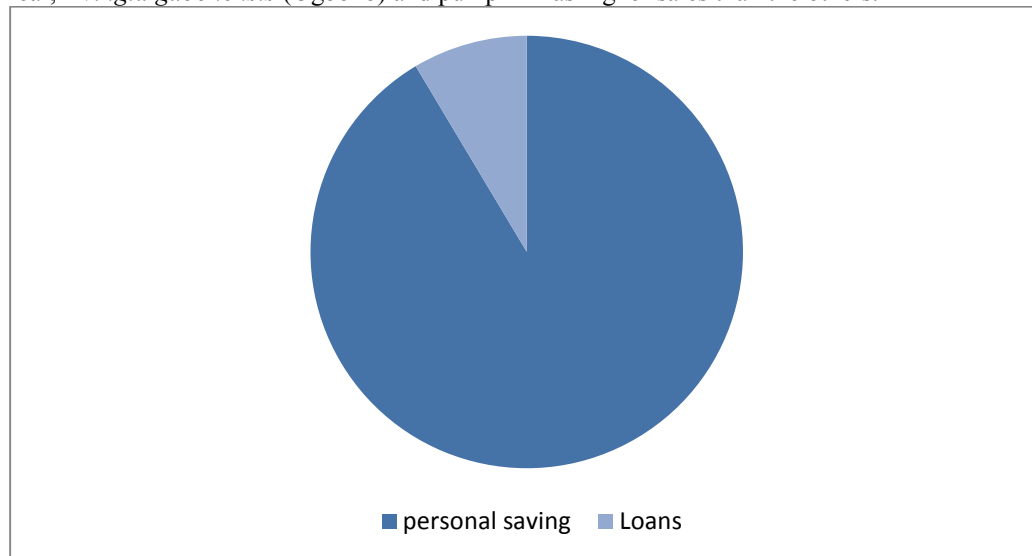


Figure 2: Start-up capital
 Source: Fieldwork, 2016

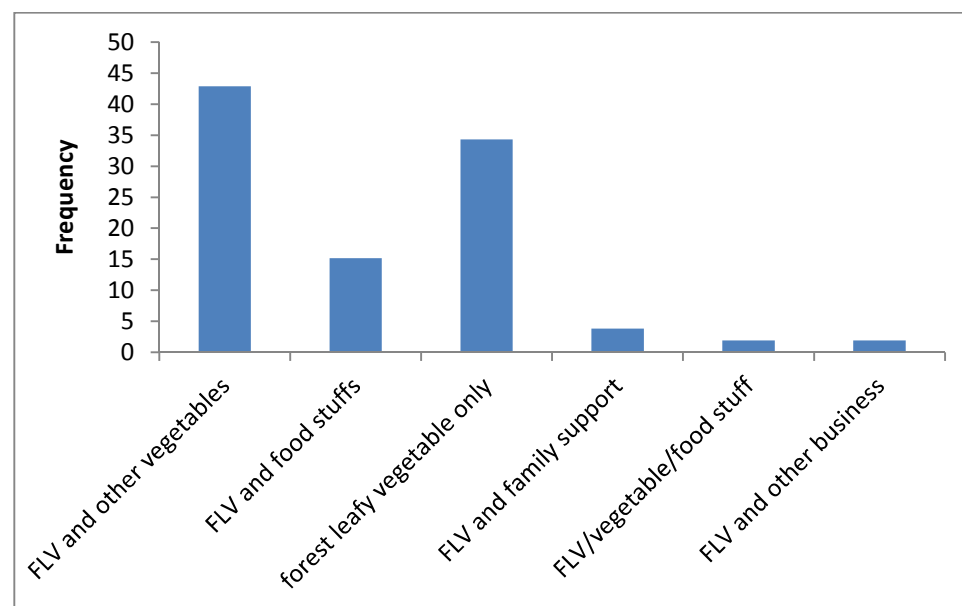


Figure 3: Forest leafy vegetables and other trade
 Source: Field work, 2016

3.1 Market Analysis

Nine (9) Forest leafy vegetables are popularly displayed in all the market surveyed in Uyo metropolis (Table 2). Major markets include Akpan andeme, Ikot oku, Itam, Ikpa junction, Itak uyo and Nung udoe. FLVs mostly marketed include *Liasanthera africana* (Editan), *Gongronema latifolia* (Gongronema), *Ocimum gratissimum* (Scent leaf), *Gnetum africana* (Gnetum), *Pterocarpus soyauxii* (Pterocarpus), *Piper guineense* (guinea pepper), *Vernonia amygdalina* (bitter leaf), *Heinsia crinata* (Atama) and *Murraya koenigii* (curry leaf) (Table 2). The reason for these may not be unconnected to demand by consumers because of the nutritive value, Okafor (2003) noted that *Gnetum africanum*, *Gongronema latifolium*, *Piper guineense* and *Vernonia amygdalina* are good sources of minerals (Na, K, Ca, Mg and Fe), He also observed that *G. latifolium*, *G. africanum* and *V. amygdalina* are good sources of fats (18.77, 14.20 and 4.50%, respectively). A recent report by IITA (2006) also indicated that leafy

vegetables account for as much as 50-85% of household budget for some farmers in Senegal. Five FLVs namely *Heinsia crinata*, *Liasanthera africana*, *Piper guineense*, *Gnetum africana* and *Gongronema latifolia* are the most traded in all the market surveyed followed by *Veronia amygdalina* (Itam, Ikpa junction, Nung udoe and Itak uyo), *Ocimum gratissimum* (Akpan andem, Ikot oku, Ikpa junction, and Nung udoe), *Pterocarpus soyauxii* (Akpan andem, Itam, and Nung udoe), and *Murraya koenigii* (Akpan andem, Ikpa junction, and Nung udoe). There are no storage facilities as leaves are left in the open and only covered with sack bags or nylon. Marketing is a daily trading matter. Unit of sale is small bundles made by tying the leaves in handful sizes. These are sold between N50 to N200 per bundle. Price of different vegetables fluctuates from time to time daily, weekly, monthly and seasonally depending on their availability.

Table 2: Forest Leafy vegetables sold in Uyo markets

S/NO.	SCCINTIFIC NAME	FAMILY	IBIBIO NAME	COMMON NAME	HABIT	USES
1	<i>Liasanthera africana</i>	Icacinaceae	Editan	Editan	Shrub	Cooked with water leaf
2	<i>Gongronema latifolia</i>	Aselepiadaceae	Utasi	Gongronema	Climber	Food/medicine
3	<i>Ocimum gratissimum</i>	Laminaceae	Ntong	Scent leaf	Shrub	Cooked as vegetable/medicine/spice
4	<i>Gnetum africana</i>	Gnetaceae	Afang	Gnetum	Climber	Cooked with water leaf
5	<i>Pterocarpus soyauxii</i>	Leguminaceae-papilionaceae	Mkpa	Pterocarpus	Tree	Cooked as vegetable
6	<i>Piper guineense</i>	Piperaceae	Odusa	Guinea pepper	Climber	Food as condiment
7	<i>Veronia amygdalina</i>	Asteraceae	Etidot	Bitter leaf	Shrub	Food/medicine
8	<i>Heinsia crinata</i>	Rubiaceae	Atama	Atama	Shrub	Food
9	<i>Murraya koenigii</i>	Rutaceae		Curry leaf	Shrub	Food as condiment

Source: Field work, 2016

These forest leafy vegetables are available at strategic periods in the year, namely the dry season, when the conventional cultivated vegetables are scarce. They are in constant demand because they contribute significantly to food security and nutritional well-being of the local people in Uyo metropolis. While some can also be used as spice which add flavour to food.

TABLE 3: Average cost per kg/ profits from the various vegetables in Uyo LGA

Forest Leafy Vegetables	Average cost ₦	Average sales ₦	Average profit ₦	RORI %
<i>Heinsia crinata</i>	340.52	490.55	150.03	44.14
<i>Liasanthera Africana</i>	314.19	479.48	165.29	52.80
<i>Gnetum Africana</i>	345.74	536.89	191.15	55.36
<i>Piper guineenses</i>	354.65	530.11	175.46	48.39
<i>Occimum gratissimum</i>	368.34	508.56	140.22	38.13
<i>Venonia amygladlina</i>	155.53	234.73	79.19	51.16
<i>Gongronema latifolia</i>	278.25	417.38	139.13	50
<i>Murraya koenigii</i>	414.01	598.29	184.28	45
<i>Pterocarpus soyauxii</i>	354.16	534.72	180.56	50.83

Source: Field work, 2016

Analyses between the various markets under study revealed that the most profitable forest leafy vegetables as *Gnetum Africana* (55.36%), *Liasianthera Africana* (52.80%) and *Venonia amygladlina* (51.16%). *Gnetum africana* and *Lasianthera africana* vegetables are major ingredients for preparing their traditional meal Afang

soup, Editan soup. While is *Venonia amygladina* is highly consumed for its medicinal value, evidence showed that it is heavily domesticated in home garden and compound farms hence it is readily available at market place. Table shows what an average vegetable marketer in Uyo LGA benefits from forest leafy vegetable marketing and that *Gnetum africana* has the highest average profitability of (₦191.15).

3.2 Performance of Forest leave vegetable at various markets

Table 4 shows the various vegetables in each of the markets and their various prices and it was observed that *Pterocarpus soyauxii* has the highest average profit in Akpan andem market of ₦208.33 with an initial cost price of ₦416.67 and a RORI of 50%. *Gnetum africana* has the highest average profit in Ikot oku with average profit ₦209.76 with an initial cost price of ₦339.1 and a RORI of 57.29%. In Itam market *Pterocarpus soyauxii* has the highest average profit of ₦208.33 with an initial cost price of ₦333.33 and a RORI of 62.50%. *Murraya koenigii* has the highest average profit in Ikpa junction market of ₦200.00 with an initial cost price of ₦400.00 and a RORI of 50%. *Pipiper guineese* has the highest average profit in Nung Udoe market of ₦195.77 with an initial cost price of ₦426.92 and a RORI of 45.86%. *Pipiper guineese* has the highest average profit in Itak uyo market of ₦314.88 with an initial cost price of ₦471.43 and an RORI of 66.79%.

TABLE 4: AVERAGE COST PRICE, AVERAGE SELLING PRICE, AVERAGE PROFIT, PROFIT MARGIN AND THE RATE OF RETURN ON INVESTED CAPITAL (RORI)

S / N	Fore st Leaf y Vege table s	Akpan andem				Ikot oku				Itam				Ikpa junction				Nung udoe				Itak uyo			
		A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %	A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %	A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %	A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %	A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %	A C P K G/ ₦	A S P K G/ ₦	A P K G/ ₦	R O I %
1	<i>Hein sia crina ta</i>	35 1. 83	50 2. 56	15 0. 73	4 8. 4	37 2. 35	52 8. 84	14 8. 48	3 9. 4	33 9. 1	51 1. 5	17 2. 4	5 0. 4	33 3. 33	50 0. 7	16 6. 7	5 0. 0	34 7. 62	48 7. 14	13 9. 52	4 0. 1 4	29 2. 86	41 5. 24	12 2. 38	4 1. 7 9
2	<i>Lias antha era afric ana</i>	30 6. 89	46 8. 85	16 1. 97	5 2. 8	28 9. 09	45 8. 41	16 9. 32	5 8. 7	34 5. 3	52 9. 75	18 4. 45	5 3. 2	35 5. 7	54 1. 3	18 5. 3	5 2. 9	33 6. 36	49 1. 89	15 5. 53	4 6. 6	25 1. 83	38 7. 03	13 5. 2	5 3. 6 9
3	<i>Pipe r guin eens es</i>	28 0. 16	40 2. 38	12 2. 22	4 3. 6 3	28 5. 71	44 0. 48	15 4. 76	5 4. 1 7	33 0. 36	47 0. 49	14 0. 13	4 2. 4 2	33 3. 33	45 8. 33	12 5. 5	3 7. 5	42 6. 92	62 2. 69	19 5. 77	4 5. 8 6	41 7. 43	78 6. 31	31 4. 88	6 6. 7 9
4	<i>Gnet um afric ana</i>	32 7. 83	52 2. 79	19 4. 96	5 9. 4 7	36 6. 15	57 5. 92	20 9. 76	5 7. 2 9	34 1. 74	51 7. 63	17 5. 89	5 1. 4 7	27 9. 99	43 0. 05	15 0. 05	5 3. 5 9	41 1. 7	62 3. 39	21 1. 69	5 1. 4 2	34 7. 05	55 1. 57	20 4. 53	5 8. 9 3
5	<i>Gon gron ema latifo lia</i>	25 0	37 5	12 5	5 0	20 0	30 0	10 0	5 0	32 2. 22	48 3. 33	16 1. 11	5 0	33 3. 33	50 0	16 6. 67	5 0	28 5. 71	42 8. 57	14 2. 86	5 0	40 8. 33	55 0	14 1. 67	3 4. 6 9
6	<i>Occi mum grati ssim um</i>	37 5	50 0	12 5	3 3 3	36 6. 15	53 1. 25	16 5. 18	4 5. 1 2	-	-	-	-	30 7. 69	42 3. 08	15 5. 38	3 7. 5	38 4. 62	53 8. 46	15 3. 85	4 0	-	-	-	-
7	<i>Murr aya koen igii</i>	38 7. 5	58 1. 25	19 3. 75	5 0	-	-	-	-	-	-	-	-	40 0	60 0	20 0	5 0	45 4. 55	61 3. 64	15 9. 09	3 5	-	-	-	-
8	<i>Veno nia amy gladl ina</i>	-	-	-	-	-	-	-	-	16 0	24 0	80	5 0	16 6. 67	25 0	83 3 33	5 0	14 1. 63	22 8. 9	87 2. 74	6 1. 6 2	15 3. 85	22 0	66 1. 5	4 2. 9 9
9	<i>Pter ocar pus soya uxii</i>	41 6. 67	62 5	20 8. 33	5 0	-	-	-	-	33 3. 33	54 1. 67	20 8. 33	6 2. 5	-	-	-	-	31 2. 5	43 7. 5	12 5	4 0	-	-	-	-

Source: Field work, 2016

FOOT NOTE: AVERAGE COST PRICE (ACP), AVERAGE SELLING PRICE (ASP), AVERAGE PROFIT (AP), AND THE RATE OF RETURN ON INVESTMENT (RORI)

TABLE 5: PROFITABILITY AND RATE OF RETURN FOR THE VARIOUS MARKETS

Market	Average Cost/ kg ₦	Average Sales/ kg ₦	Average Profit/ kg ₦	Profit Margin/kg%	RORI %
Akpan andeme	337.00	497.23	160.25	48.04	47.76
Ikot oku	314.20	472.15	157.92	50.56	50.73
Itam	310.29	470.62	160.33	51.86	51.52
Ikpa junction	312.00	466.72	154.69	49.77	49.55
Itak uyo	320.90	485.02	164.13	48.89	49.81
Nung udoe	344.62	496.91	152.29	45.67	45.59

Source: Field work, 2016

The rate of return on investment is highest in Itam market 51.52% within an average initial cost of ₦310.29 and a profit of ₦160.33. Itam is a large market that attracts a lot of people. The lowest rate of return on investment was observed in Nung Udoe (45.59%) with an initial cost of ₦314.62 and an average profit per kg ₦152.29. The low rate of return in Nung Udoe may be as a result of transportation cost because it is located on the outskirts of Uyo metropolis.

3.3 Market challenges

The various challenges affecting vegetable marketers which include low customer patronage that leads to low profits, unstable economy and this agrees with this study that seasonality and perishability of wild vegetables is a threat to the anticipated profits from its marketing (Van Rensburg *et al.*, 2007). Wild vegetables are seasonal; supplies are reduced in off season leading to rise in price. Price increase usually attracts shift to available alternative, due to low purchasing power, this in turn reduces the profit margin. Perishability is a major problem associated with wild vegetables generally (Famuyide *et al.*, 2011), they lose vigor and deteriorates due to absence of good storage facilities. Deterioration and shortages from wastes during surplus reduce the sales price and results in lower profit margin in the rural areas. The problems of FLV marketing identified in the study apart from that of the marketers include lack of uniform measures, inadequate market infrastructure, price fluctuations (this could be hourly/daily/weekly) and transportation challenge. Also FLV are available in small quantities at the onset of maturing season (shortly after maturity) while supplies gradually build up when several harvest is made and later fissured out.

TABLE 4.1.7: Challenges of Forest Leafy Vegetables Marketers

Challenges faced	Frequency	Percentages
Perishability	39	37.1
Low profit	8	7.6
Low customers	17	16.2
Unstable economy	12	11.4
No problem	22	21.0
Physical stress of collections	4	3.8
Total	102	97.1

Source: Field work, 2016

4.0 Conclusion and Recommendations

The result of this study shows the market potentials of forest leafy vegetables in as an economic activity and a valuable non-timber forest product that is traded in urban centers. It also indicates the potentials of these plants to contributes to household incomes and improve standard of living especially during the off farm seasons. Hence, FLVs can be traded to supplement household income, reduce poverty and provide employment because it is a profitable venture.

RECOMMENDATIONS

- It is recommended that these forest leafy vegetables should be properly preserved to reduce the level of spoilage.
- Improving the marketing efficiency through access to credit facilities by the traders has potentials to

alleviate poverty, ensure household food security and serve as impetus for sustainable development in the rural and sub-urban populations.

- Domestication of production should be enhanced to meet demands and reduce the cost of transportation.
- Forest leafy vegetables should be cultivated in off-season to make it available all year round.
- Private Investors should invest in this business because it is lucrative.

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