Contributions of Guinean Pepper (*Piper Guineense* Schum & Thonn) Trade to Sustainable Rural Livelihood in Southwestern Nigeria

[1]OLADELE A.T. & [2]L. POPOOLA

[1]Department of Forestry and Wildlife Management, University of Port Harcourt, Port Harcourt, Nigeria
[2]Department of Forest Resources Management, University of Ibadan, Ibadan, Nigeria
E-mail: adekunle.oladele@uniport.edu.ng, kunleladele@yahoo.com

Abstract

Forest based communities in sub-Saharan west Africa are characteristically poor with low per capita incomes and therefore depend on harvesting of non-timber forest products (NTFPs) for additional household income. This paper therefore reports the contributions of *Pipers guineense* to rural household incomes among the collectors and marketers of this NTFP in south western Nigeria. In all, 145 sets of structured questionnaire were administered among randomly selected *Pipers guineense* collectors and marketers in 13 communities for personal interview to elicit information on seasonal supply, sources of supply, seasonal price variation, storage, transportation, processing and profit margins amongst others. The data obtained from the questionnaires were analysed using descriptive and inferential statistics such as simple percentages, paired t-test, ANOVA and multiple regression at $\rho = 0.05$. Females constitute 87.6% of marketers with no special training or formal education, while 34.5% of marketers' ranked *Piper guineense* higher than other local spices in terms of sales, modal storage method (72.4%) among respondents was drying and most suppliers of *Piper guineense* (81.4%) are growers in remote villages. Average farm gate price was between ₦101- ₦300/kg in years 2007 and 2008. Marketers observed a high rate of turnover on sales despite price increase while paired t-test indicated significant differences

in the mean price over five years. Types of suppliers, average price/kg and distance of collection points to the market (km) significantly influenced average sales and subsequent profit margin. *Piper guineense* trade in south western Nigeria is competitive and profitable. Income from marketing guinean pepper has the potential to alleviate poverty and improve livelihood among the rural poor.

Keywords: Piper guineense, NTFPs marketing, rural livelihood support, Southwestern Nigeria

Introduction

Tropical rain forest is endowed with complex plant diversity of varying life forms. These plant species are valued locally for food, medicine, shelter, household utensils, farm implements, decorations, cultural heritage and cash income. Valuable Non-Timber Forest Products (NTFPs) such as *Gnetum africana, Dacryodes edulis, Aframomum melegueta* and *Piper guineense* are traded in local, regional markets and across international boundaries. Substantial NTFPs are produced in community forests and traditional agroforestry farms alongside other tree crops, while some are cultivated in compound or home gardens (Bernholt *et al*., 2009). Large proportions of NTFPs are used in traditional medicines and herbal preparations in rural health care delivery due to non-availability and expensive modern healthcare centres (WHO, 2002). Sale of selected medicinal plants from the forest has been reported to form the main alternative income for underprivileged communities adjoining forest estates (Lacuna, 2002). Forest foods are an essential part of traditional diets among the rural dwellers with wild leafy vegetables supplying the protein required to supplement the staple carbohydrates locally (Aju and Popoola, 2011). Income generated from the collection and processing of many NTFPs help in livelihood support especially during the off-seasons. Sustainable rural livelihood is a multifaceted concept and refers to enhancement of access of rural families to food and income-generating activities on a long-term basis (Kumar et al., 2006). Jimoh and Onabanjo, (2012) observed that a very high percentage of forest communities rely on income from sale of NTFPs for livelihood sustenance. Trade in natural spices such as *Piper guineense* (Guinean pepper) and *Aframomum melegueta* (Grains of paradise) transcend national borders in sub-Saharan West Africa. Value of trade in spices globally is tremendous and hit $US2.5 billion dollars in 2005

(Douglas *et al.,* 2005), the volume of global spice trade is estimated at 450 thousand metric tonnes in the year 2000 (Spices Board of India, 2000) while *Piper species* (Black pepper) was observed to top the global spices trade. Rural communities in the West African sub region are faced with a high rate of poverty with extreme low income from peasant and subsistence agriculture. About 62.6% of the Nigerian population operates below poverty line, (World Bank, 2010). Average per capita income for Nigeria was estimated as $1760 in 2008 (Eluhaiwe, 2010). Basic social amenities such as motorable roads, electricity, safe water and health facilities are scanty or completely lacking in most rural areas. Harvesting and processing of NTFPs for additional family income by rural women in off seasons is prevalent in communities adjoining natural forests of Nigeria and Cameroun (Nkwatoh *et al*., 2011). Women in rural areas engage in NTFPs harvesting, processing and marketing to supplement family income and food security in the home front (Aiyeloja *et al.,* 2012). Women and children engage in harvesting of guinean pepper in the rural set up while men assist occasionally during collection; however, processing and marketing is regarded as an activity for women in most rural communities.

Piper guineense Schum. & Thonn (Piperaceae) is a tropical rain forest climber commonly known as West Africa black pepper or Guinean pepper while local names include *Masoro* in Hausa, *Chitta masoro* in Fulani, *Iyere* in Yoruba and *Oziza* or *Uzeza* in Igbo. Guinean pepper is an important NTFP valued as local spice across the West African sub region, and widely used as preservatives in traditional herbal preparations; sometimes it is used as the main ingredient of certain herbal remedies. This paper reports the contribution of trade in guinean pepper to rural income generation and livelihood in Ekiti, Osun and Ogun states of south western Nigeria.

Methodology

Study area

Southwest Nigeria is characterised by tropical rain forest vegetation with complex plant diversity. The people are mainly of the Yoruba heritage, speaking a common language with diverse dialect in different regions. Subsistence agriculture and trading are the main occupation of the people. About 70-80% of the population dwell in rural areas, important NTFPs produced in the area include *Piper guineense* (Guinean pepper), *Tetracarpidium conophorum* (Wallnut), *Aframomum melegueta* (Grains of

paradise) *Irvingia gabonensis, Xylopia aethiopica* and numerous valuable medicinal plants. Traditionally, women have limited access to land, they support their spouses in the farm work and are involved in the collection, processing and marketing of NTFPs.

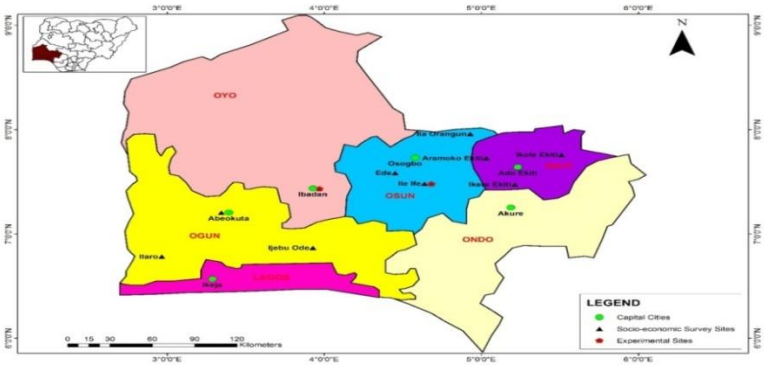

Fig. 1: Map of Southwest Nigeria showing the study areas

Data collection

A total of 145 structured questionnaires were administered among spice marketers for the study. The region consists of six states of which three states (Ogun, Osun and Ekiti) were selected randomly to make 50% sampling for the study; Nine towns (Abeokuta, Ilaro, Ijebu Ode, Ila-Orangun, Ede, Ile-Ife, Ikole, Aramoko and Ikere were further selected in a random sampling for the questionnaire administration among the marketers (Fig 1). Spice marketers were visited in randomly selected communities for personal interviews to obtain useful information for the study. The questionnaire distribution consists of Osun 44.8% respondents, Ogun state (29.0%) while 26.2% were administered in Ekiti state. Local markets visited included: Ilaro, Mamu, Ilishan Remo, Abeokuta herb market, Ila orangun (Oja Oba), Timi market (Ede), Oja Ife, Olode, Omifunfun, Aramoko, Ikole and Ikere Ekiti. Information on seasonal supply, sources of supply, seasonal price variation, storage, transportation, processing and profit margins amongst many others were obtained from the marketers and carefully recorded. The data obtained from the questionnaires were then analysed using descriptive and inferential statistics such as Simple percentages, Paired t-test, ANOVA and Multiple regression.

Results and Discussion

Table 1 shows that 64.2% of the marketers were aged 51 and above. Only 10.3% were between 41-50 years, while 17.9% fell between 31-40 years of age. Few young people (6.9%) were involved in *Piper guineense* marketing. Female marketers were more than the males in the study area, representing 87.6% and 12.4% respectively. The educational status distribution among marketers showed that 61.4% had non formal education, 23.4% had primary school certificates and 14.5% received secondary school education, while only 0.7% received tertiary education. About 58.6% of the marketers had more than 10 years' experience, while 23.4% had between 6 and 10 years' experience. The new entrants of less than five years in the trade represented 17.9%.

Table 1: Demographic status of *Piper guineense* marketers in south western Nigeria

Demographic characteristics		Frequency	Percentage
Age	Below 30	10	6.9
	31 – 40	26	17.9
	41 – 50	15	10.3
	51 – 60	40	27.6
	Above 60	53	36.6
	No response	01	0.7
	Total	145	100
Gender	Male	18	12.4
	Female	127	87.6
	Total	145	100
Education	No formal education	89	61.4
	Primary school	34	23.4
	Secondary school	21	14.5
	Tertiary education	01	0.7
	Total	145	100
Experience	0 – 5	26	17.9
	6 – 10	34	23.4
	Above 10	85	58.6
	Total	145	100

Source: Field survey, 2008

Ranking of local spices in order of demand by marketers

Respondents (47.6%) observed that guinean pepper enjoyed higher sales than other local spices (Table 2). About 39.3% of the respondents were unable to rank the spices in order of sales. Other species of local importance include; *Xylopia aethiopica, Aframomum melegueta, Tetrapleura tetraptera, and Monodora tenuifolia.*

Table 2: Local spices ranking, guinean pepper preservation, supply and annual demand trend in South western Nigeria

Spices ranking	Freq	%	Supply peak of *Piper guineense*	Freq	%
Pipers > Other local spices	69	47.6	Dry season	107	73.8
Other > Pipers and Gingers	19	13.1	Wet season	32	22.1
Cannot rank	57	39.3	Don't know	06	4.1
Total	145	100	Total	145	100
Preservation			Supply sources of *P. guineense*		
Drying and grinding	02	1.4	Nearby villages	118	81.4
Drying alone	105	72.4	Towns/cities	19	13.1
None	38	26.2	No response	08	5.5
Total	145	100	Total	145	100
Annual demand trend of *P. guineense*					
Festive period	65	44.8			
Constant in the year round	22	15.2			
Can't say	58	40.0			
Total	145	100			

Source: Field survey 2008

Marketers' observations on the supply peak of *Piper guineense*

About 73.8% of the respondents (Table 2) observed that the peak of *Piper guineense* supply was dry season (September – April), while 22.1% of the marketers' perceived supply to be highest during the wet season (May and August). The main storage method employed by marketers for *Piper guineense* seeds was drying 72.4%, while 26.2% did not preserve but sold fresh fruits. Few traders dried and ground to preserve the seeds (1.4%). Marketers obtained *Piper guineense* seeds mainly from growers in villages (81.4%), others bought from middlemen in towns and cities (13.1%). Annual demand of guinean pepper in south western Nigeria was highest during religious and cultural festivals (44.8%). The marketers normally experienced a boom during these festive periods. Only 15.2% of the respondents observed constant demand throughout the year while 40.0%

were unable to observe any trend in the demand of local spices generally. Marketers observed that increased consumption of *Piper guineense* and awareness in usage led to increase in demand.

Farm gate price/kg and daily sales of *Piper guineense* in South western Nigeria

During the period of 2007 and 2008 cropping seasons, average farm gate price of a kilogramme of *Piper guineense* seeds range between ₦101-₦300 representing 82.7% (43.4 + 39.3) of the total respondents, only 11.7% bought at ₦100 and below per kilogramme (Table 3).

Table 3: Farm gate price/kg and daily sales of *Piper guineense*

Average farm gate price in 2008 (kg)	Freq	%	Average daily sales of in 2008 (kg)	Freq	%
Below N100	17	11.7	Below 0.5	31	21.4
N101 – N200	63	43.4	0.5 – 1.0	7	4.8
N201 – N300	57	39.3	Above 1.0	101	69.7
No response	08	5.5	No response	6	4.1
Total	**145**	**100**	**Total**	**145**	**100**

Source: Field survey, 2008

Daily sales of *Piper guineense* by major collectors in cities were usually higher than 1kg representing 69.7%, the figure represent sellers that distribute to retailers (herb sellers) in the cities who in turn reach most consumers. Fresh *Piper guineense* seeds were sold for about N200/kg as shown in Table 3. This showed that marketers usually stock guinean pepper for a high rate of turnover and subsequent wide profit margin. All marketers that sell below one kg/day were mainly herb vendors that service the traditional healers.

Average Price/kg of *Piper guineense* fresh fruit (2003 – 2007) in south western Nigeria

In 2003, average price/kg of *Piper guineense* fruit as observed by 21.38% of the respondents was N10-N50, while another 33.79% submitted it to be N51 – N100. However, in the year 2004 price/kg slightly increased to N101 – N150/kg as observed by 16.55% of the respondents. Year 2005 results showed an upward trend in the price of *Piper guineense* to N200/kg as observed by 11.72% the respondents while, in 2006 and 2007 the price was observed by 22.07% of them as relatively stable at N151 – N200/kg.

Generally, an increase in price/kg was observed above N500/kg representing 0.69%, 1.38%, 1.38%, 2.07% and 4.83% in 2003, 2004, 2005, 2006 and 2007, respectively. There were also observed annual increments, except in the years 2004 and 2005, where same price were recorded above N500/kg of *Piper guineense* fruit (Table 4).

Table 4: Average Price/kg of *Piper guineense* fresh fruit (2003 – 2007) in south western Nigeria

Year	2003		2004		2005		2006		2007	
Price ₦	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
10 – 50	31	21.38	20	13.79	15	10.3	7	4.83	6	4.14
51 – 100	49	33.79	52	35.86	38	26.21	35	24.14	26	17.93
101 – 150	10	6.90	24	16.55	36	24.83	38	26.21	32	22.07
151 – 200	6	4.14	7	4.83	17	11.72	23	15.86	32	22.07
201 – 250	3	2.07	4	2.76	7	4.83	8	5.52	12	8.28
251 – 300	8	5.52	10	6.90	9	6.21	13	8.97	10	6.90
301 – 350	-	-	-	-	3	2.07	1	0.69	5	3.49
351 – 400	1	0.69	1	0.69	1	0.69	6	4.14	4	2.76
401 – 450	1	0.69	1	0.69	1	0.69	1	0.69	-	-
451 – 500	2	1.38	1	0.69	1	0.69	1	0.69	5	3.49
Above 500	1	0.69	2	1.38	2	1.38	3	2.07	7	4.83
No response	33	22.8	23	15.86	15	10.3	9	6.2	6	4.14
Total	**145**	**100**	**145**	**100**	**145**	**100**	**145**	**100**	**145**	**100**

Source: Field survey, 2008

T-test of the average *Piper guineense* fruit price (2003 – 2007)

Significant differences were observed in the mean price of *Piper guineense* seeds every year between 2003 – 2007, using student t-test (Table 5), there is an indication of increment in the price of guinean pepper over the years under study at $\alpha_{0.05}$.

Table 5: T-test of average price (2003 – 2007) of *Piper guineense*

	Period	Mean	Std. Deviation	Std. Erro Mean	Lower	Upper	T	Df	Sig. (2-tailed)
Pair 1	2003/2004	-19.14483	38.33220	3.18332	-25.43689	-12.85277	-6.014	144	.000*
Pair 2	2004/2005	-25.85862	38.68663	3.21275	-32.20886	-19.50838	-8.049	144	.000*
Pair 3	2005/2006	-33.13448	47.22586	3.92189	-40.88640	-25.38256	-8.449	144	.000*
Pair 4	2006/2007	-37.41379	61.27155	5.08833	-47.47125	-27.35634	-7.353	144	.000*

*Indicate significant values at $\alpha_{0.05}$

Regressions of the selected respondents' socio-economic background on an average daily sales of guinean pepper reveal a significant

relationship at $\alpha_{0.05}$ (Table 6), where only the type of supplier, price and collection distance impact daily sales (Table 7).

Table 6: Multiple regression ANOVA of *Pipers guineense* marketers

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	244.936	10	24.494	4.904	.000[a]
Residual	669.312	134	4.995		
Total	914.248	144			

Predictors: (Constant), Age of respondent, Sources of supply, Who are your suppliers, Average price/kg at farm gate, Collection distance to the market (km), Types of process, Gender, Level of formal education, Marketers experience in years, State. **Dependent Variable:** Average daily sales of *Pipers guineense*

Table 7: Multiple regression of socio economic factors affecting profit margin of *Pipers guineense* in south western Nigeria

	Unstandardized Coefficients		**Standardized Coefficients**		
Models	**Beta**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	2.780	1.536		1.810	.073
Who are your suppliers	0.182	0.079	0.174	2.294	.023*
Average price/kg at farm gate	1.198	0.231	0.400	5.184	.000*
Collection distance to the market (km)	-0.404	0.126	-0.259	-3.204	.002*

*Indicate significant values at $\alpha_{0.05}$

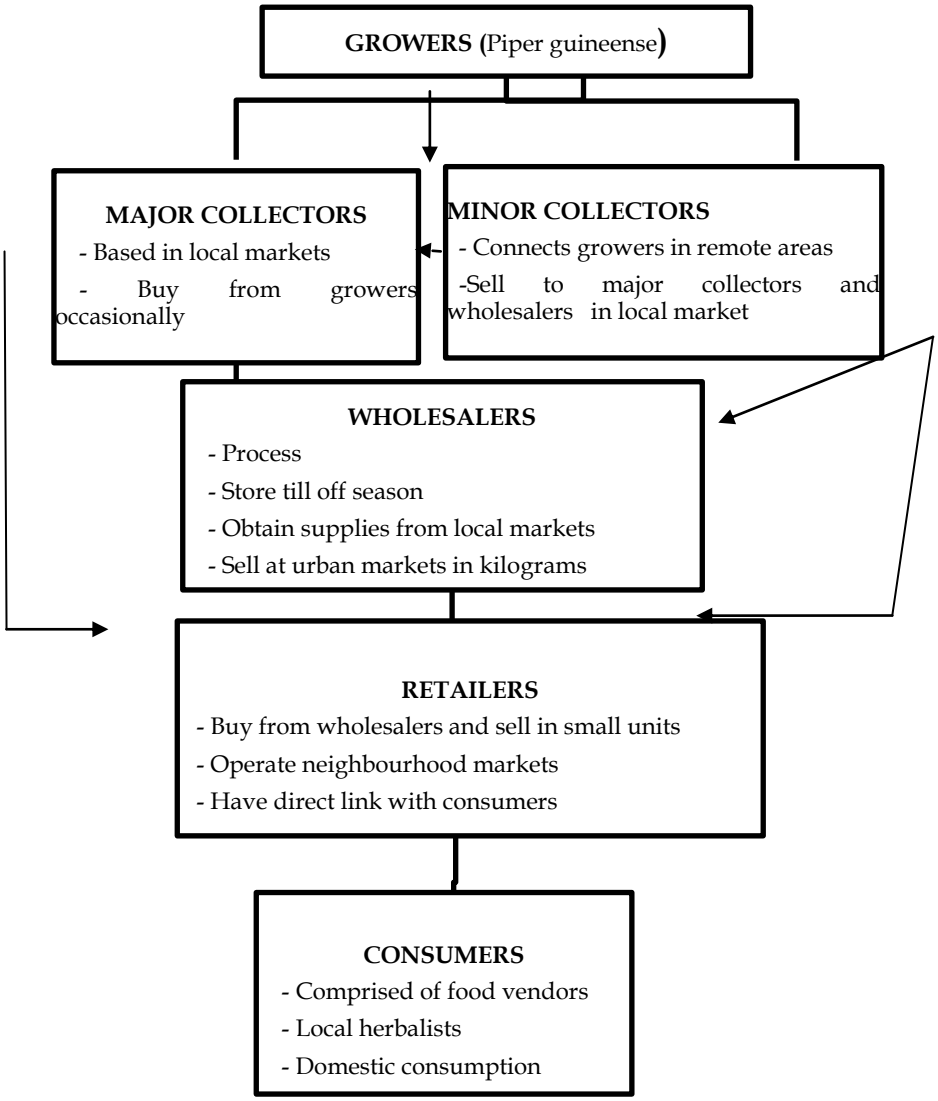

Fig 2: Marketing Channels of Piper *guineense* in southwestern Nigeria

Marketing Channel

Charting marketing of guinean pepper starts from the point of collection/growers at the farm gate where seeds are sold fresh to minor and major collectors. These collectors' criss-cross remote villages and forest based settlements with the product. Major collectors provide immediate cash income for growers and minor collectors who act as main middlemen/wholesalers. They dry and store the produce thereby adding values to the product (Fig. 2). Major collectors subsequently transports to major cities where exportation across national boundaries are initiated.

Guinean pepper is an important NTFP with high potentials for livelihood sustenance among the rural communities of southwestern Nigeria due to its wide application in local medicine and as food spice. The study revealed that collection and marketing of guinean pepper provide employment for rural women in particular. Marketing of the product generate additional family income to supplement cash from other farm activities during the dry season (Table 1). The findings corroborate other studies that females dominate NTFPs marketing as non-farm income activities in southwestern Nigeria (Babalola and Agbeja, 2010, Aiyeloja *et al*., 2012) and other developing countries where persistence poverty in rural areas make women and children to be more vulnerable. However, the trade is not attractive to young people; traders below 50 years in age are few. Reasons could be that earnings on investment in NTFPs trade may not be comparable to earnings from more lucrative jobs provided by industries in cities. This has been reposed by Anyadike *et al*., (2012) where it was observed that availability of social infrastructure in urban areas and drudgery farm works expedite rural urban migration among young people.

Trading in local spices at the local level is not specialized and requires no special training. This may be why most marketers of the product (61.4%) have no formal education and are still successful at it. Also, they are mostly spouses of growers who practiced it as off farm activity especially during the dry season when farm activities are low. Raufu *et al*., (2012), observed that majority of rural women who have access to NTFPs either through their spouses or parents are also involved in its marketing. Access of rural families to resources for income-generation was observed to be an important tool of sustainable livelihood in rural areas to offset risks, ease shocks and meet contingencies (Kumar *et al*., 2006). Any development intervention targeted at this category of rural population can be executed

and managed sustainably since long term, expensive and rigorous trainings are not required. Luqman *et al*., (2013) recommended that focus of rural development programs should include emphasis on non-farm income activities and environmental issues for sustainability.

Most guinean pepper marketers have ample experience of more than 10 years; some were born into the trade and have assisted their parents from a tender age. Many of the spice marketers could not rank different spices in order of sale, however, 47.6% (Table 2) of marketers' ranked *Piper guineense* higher than other local spices in sales. This may be an indication that volume of trade was higher in guinean pepper than other local spices in the study area. Though many local spices such as *Xylopia aethiopica* and *Aframomum melegueta* are commonly used for medicinal purposes locally, guinean pepper enjoys wider application than other local spices in herbal recipes as preservatives and therapeutics. This was why Amusa *et al*., (2012); Aju and Popoola, (2011); Nkwatoh *et al*., (2011) ranked guinean pepper highest in sales than other local spices such as Ginger, *Xylopia aethiopica, Tetrapleura tetraptera and Aframomum melegueta* due to its' universal consumption as food and medicine across West Africa.

Marketers observed the dry season as the supply peak of guinean pepper seeds. Flowering commences mostly in the month of June and matures in September. Red colouration indicates fruit ripening at the onset of the dry season when fruits were harvested (September – April). Fresh fruits are supplied by growers and minor collectors from villages who traverse remote settlements, traders preserve the seeds by sun drying and store until prices appreciates. The intermediaries are the main medium through which guinean pepper is distributed to cities and major markets. Income from NTFP marketing has been linked to poverty alleviation among rural populations of the humid zone of west tropical Africa (Falconer, 1993). Substantial income generated from trade in guinean pepper by middlemen can be used to raise the standard of rural livelihood and invariably alleviate poverty in the rural areas. Demand for guinean pepper seeds was observed to be increasing yearly; demands were highest especially during the festive periods of the year such as Christmas and Eid-el- Kabir. Increased usage and awareness have been identified as reasons for increased sales during the festive periods. Average farm gate price of fresh guinean pepper seeds in 2007and 2008 was between N100 – N300/kg. Average marketers sold above 1kg of fresh fruits on every market day. Guinean pepper market is increasing globally, with the average total export

at international market put at about 138,000t in 1998 alone, (Peter, 2000). The observed increase in demand could exert negative impact on conservation and sustainable supply of *Piper guineense* in Nigeria if deliberate cultivation is not encouraged (Oladele *et al*., 2008). Fresh leaves of the species are harvested and are being sold in markets as delicacies in the eastern part of Nigeria. NTFPs have been found to be beneficial socially and economically, it improves the livelihoods of local farmers through income generation from fruits, leaves, barks and fibres (Degrande *et al*, 2006). Deliberate cultivation of guinean pepper will be a measure toward meeting the increasing demand by the teeming population. Neglect of conservation measures through unsustainable harvesting could result in the scarcity and consequent extinction of the species. Production of guinean pepper through expanded cultivation will ensure continued supply and improved livelihood via sustained marketing of the species.

An increase in the price of guinean pepper was observed between 2003 and 2007. A kilogramme of fresh fruits was sold at an average of ₦50 - ₦100 in 2003 while the price doubled in 2007 at ₦100 – ₦200/kg (Table 4). Occasionally, the price of a kilogramme of fresh fruits could rise to above N500. Significant differences in the price of guinean pepper (Table 5) showed annual increase in price; the scenario can be linked to increase in its demand both for medicine and food use as pepper soup condiment in restaurants. Consumption of natural spices and herbs have been noted to increase globally in recent times (Adodo, 2006) with a corresponding price increase of these natural products. It should also be noted that wide profit margin by marketers and collectors can induce unsustainable exploitation of certain species such as *Piper guineense*. Sustainable harvesting and efficient resource use through processing are veritable tools of sustainable livelihoods for rural populations involved in the collection and marketing of the species.

Conclusion and Recommendations

Income from collection and marketing of guinean pepper has the potential to alleviate poverty and improve livelihood among the rural poor sustainably. Interventions aimed at sustainable development in the rural tropical regions need to integrate women who are the main traders and collectors of NTFPs. Efficient processing and marketing schemes are recommended for sustainable NTFPs resource utilization. *Piper guineense* enjoys universal consumption across West Africa's humid regions in food

and medicine. It also demonstrates potential for export due to increased usage globally, however, unsustainable harvesting methods by commercial collectors and farmers reliability on natural regeneration posed a serious threat to sustainable supply. Enabling policies that will encourage commercial cultivation and conservation of the species will be a veritable intervention for the sustainable livelihood of rural families depending on NTFPs trade in developing countries.

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