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Forest crops of spice value in Benin-city: Their uses and marketing

Oboho E. G.¹, Egbuche C. T.² and Ogbolu R. U.¹

¹Department of Forestry and Wildlife, Faculty of Agriculture, University of Benin, Benin-City, Nigeria

²Department of Forestry and Wildlife Technology, School of Agriculture and Agricultural Technology, Federal University of Technology, Owerri, Nigeria

ABSTRACT

Spices are essential components of food as well as having medicinal value. Study set out to investigate the forest species of spice value and their marketing. Six markets were purposively selected in Benin City at 50% sampling intensity using semi-structured questionnaire supplemented with one on one oral interview and direct observation. Fourteen forest spice species were identified. They were *Xylopia aethiopica*, *Monodora myristica*, *Cordia millenii*, *Thymus vulgaris*, *Raphiosylis beninensis*, *Parinaria excelsa*, *Aframomundanielli*, *Aframomum melegueta*, *Corandrium sativum*, *Piper guineense*, *Celtis soyauxii*, *Tetrapleura tetraptera*, *Zingiber officinalis*, and *Piper umbellata*. They were spread across ten families and their form in use were seed (57.4%), leaf (14%), stem (14%), rhizome (7%) and fruit pulp (7%). Spice parts were collected by harvesters from the wild mostly picked from forest floor (60%), plucking (30%) and tree shaking (10%). They were sold in processed and unprocessed forms and stored using containers with tight lids, nylon, or jute bags. Processed spices could be mixed in varying proportions depending on customer preferences. Indicated uses were pepper, black and banga soups as well as promotion of well being in pregnant women and lactating mothers. The business was 100% female dominated. The marketing link was a web involving various linkages between harvesters, bulk sellers, semi bulk sellers and final consumers. Retailers sold in small quantities on demand using recognized measures. There is need to include the raising of seedlings of spice species in both private and government nurseries in order to enhance their sustainability.

Keywords: Benin City, Food, Forest, Market, Spice

INTRODUCTION

Forest provides an array of non-timber forest products (NTFPS) among which food is very prominent. Food is a basic necessity of life consumed to provide nutrition to the body. Leaves, fruits, flowers, seeds, honey, condiments and colourings are great food items obtained from forest (Oboho, 2014a). Although the actual quantity of food eaten from wild plants may be considered small, the nutritive value can be significant due to the essential vitamins and mineral composition they contain. Spices are important components of food in different cultures of the world. According to Ekhosuehi (2015) a spice is an, aromatic and pungent vegetable substance used to whet, appetizing and seasoning foods. The piquant flavor is often blended together with stimulants to give healing and fitting remedies. Social changes, including food diversification, the desire for new flavours, increasing ethnic food and the increased importance of processed food which required condiments and aromatic herbs for preparation are driving forces leading to an increase in the demand for species and condiments (Bruce and Bergstyrom, 1983).

Forest are rapidly depleting in countries of the world. Modest effort is made at afforestation/reforestation to augment the forest estate in the area of timber species with little or no focus on the NTFPS (non-timber forest products) that provide food and other values. Okafor et al, (1994) stated that there is a general decline in the quantity of NTFPS available due to increased income generation, population growth and the number of people dependent and involved in the collection, processing and marketing of NTFPS. Also, forest based activities in the area of non-timber forest products have suffered from much neglect by successive government, policy makers and natural resource managers; the poor organization of the marketing structure resulting in their over exploitation. Despite the importance of spices in the socio-cultural and dietary needs of people, only very little attention has been focused on their domestication, research and conservation especially in Nigeria. Since most of the spices are still obtained from the wild, their domestication becomes imperative in order to have sustainable production of the resource. This study therefore sets out to investigate what is available as represented in the market/marketing situation and hence an insight into what needs to be protected/conserved as well as being able to develop enduring strategies and policies of sustenance for this valuable resource. Oboho (2014b) was of the view that knowledge of species is a vital step in the enhancement of its sustainability and continued use by the people.

MATERIALS AND METHODS

Study Area

The study was carried out in Benin-City, the capital of Edo State, Nigeria. The state is bounded by Kogi state to the North, Anambra state to the East, Delta State to the South and Ondo State to the West. It is low lying area except in the North (Akoko Edo Area) where it is characterized by undulating hills rising to a peak of about 572 metres (Edo Culture Home, 2013). The local relief is 91 metres above sea level.

The city is underlain by sedimentary formation of the Miocene-pleistocene age often referred to as Benin formation. It contains 15 local depressions which may have been formed during the arching in the neogene of the lower tertiary beds (Odemerho, 1988). It is drained by a series of entrenched river and small streams such as Ikpoba, Ogba and Osse streams. The city is underlain by sedimentary formation which is made up of reddish clay sand capping highly porous fresh water bearing loose pebbly sands and sandstone with local thin clays and shale inter-beds which are considered to be of braided stream origin.

It is in the tropical rainforest zone; characterized by two distinct seasons, the wet and dry season. The wet season lasts from April – November and the dry season from December – March. Average rainfall between 2000 – 2500mm and mean monthly temperature of 28°C (82.4°F). The vegetation is predominantly rainforest but urban development has drastically reduced the vegetation (Ezemonye and Emeribe, 2014).

Notable economic activities include brass casting, wood carving and blacksmith (Ezemonye and Emeribe, 2014). Farming is an important economic activity, so also is transportation. There are two brewing factories, furniture factories, four small scale pharmaceutical production factories, a petroleum storage depot, oil pipeline, metal works, colour photo laboratories, and a battery assembly factory (Erah, et al., 2002).

Methodology

Six (6) main markets in Benin-City were purposively selected for the study as presented on Table 1.

Table 1: Investigated markets and respondents

Market	No. of respondents		GPS Location of centre point
Ikpoba hill	23	(13)	Lat 6°20' 57" N and Long 5°39' 26" E
Ekiosa	14	(7)	Lat 6°19' 24" N and long 5° 38' 11" E
Uselu	19	(10)	Lat 6° 22' 28" N and Long 5° 36' 47" E
Oba	23	(12)	Lat 6° 20' 4" N and Long 5° 37' 11" E
Ekiuwa	04	(2)	Lat 6° 21' 6" N and Long 5° 36' 49" E
New Benin	13	(7)	Lat 6° 21' 2" N and Long 5° 37' 51" E

* () Number of respondents sampled.

Reconnaissance survey was conducted to help identify the total number of spice sellers as well as draw up the questionnaire. Fifty percent (50%) sampling intensity of the total population was used to administer the respondents. Semi-structured questionnaire was supplemented with One-on-one oral interview and direct observation. Questions were explained to respondents (where necessary) in either Bini or Pidgin English. Spices on sale were photographed,

identified in the markets by their vernacular/local names and later by the use of appropriate taxonomic literature by Aigbokhan (2014). Descriptive statistics like frequency, percentages and means were used to analyse collated data. Questions revolved around species, the form use, source, uses, knowledge relating to extraction and regeneration, bio-data of sellers, marketing linkages and problems.

RESULTS

The forest spices sold in the markets were fourteen (14) namely: unien (*Xylopiasethiopia*), Ikposa (*Monodora myristica/brevipes*), Ebenetete, Erheigede (*Cordia millenii*), Osimadan (*Raphiosyilis beninensis*), Igbafilo (*Parinari excelsa*), Oriema (*Aframomum danielli*), Omilo (*Corandrium sativum*), Oziza (*Piper guineense*), atako, ohia (*Celtis soyauxii*), Eyinyan (*Tetrapleuratetraptera*), Ajo (*Zingiber officinalis*), Ebewewia (*Piper umbellata*) Ehiendo (*Aframomum melegueta*) of these, 57.14% of them were seeds, 14.2% being leafy, 7.14% being trunk or bark and 7.7% being rhizome and 7.14% being fruit pulp. They were spread across ten families namely Annonaceae (2), Boraginaceae (1), Chrysobalanaceae (1), Zingiberaceae (3) Apiaceae (1), Piperaceae (2), Ulmaceae (1) Fabaceae (1) Lamiaceae (1) and Icacinaceae (1).

Sellers in all the markets sold *Xylopiasethiopia* and *Monodora myristica/brevipes*, *Piper guineense*, *Aframomum melegueta* and *Aframomum danielli*. *Piper umbellata* was sold in two markets. *Celtis soyauxii* was found in three markets, while others occurred in varying proportions in the other markets. Observed species are on Plates 1a – 1n.

Plate 1: Observed spices in the investigated market in Benin City, Nigeria.



Plate 1a: *Cordia millenii*



Plate 1b: *Piper guineense*



Plate 1c: *Parinari excels*



Plate 1d: *Xylopiya aethiopica*



Plate 1e: *Aframomum melegueta*



Plate 1f: *Zingiber officinale*



Plate 1g: *Aframomum danielli*



Plate 1h: *Piper umbellatum*



Plate 1i: *Tetrapleura tetraptera*



Plate 1j: *Monodora myristica/brevipes*



Plate 1k: *Tetrapleura tetraptera*



Plate 1l: *Tetrapleura tetraptera*



Plate 1m: *Corandrium sativum*



Plate 1n: *Celtis soyauxii*

The forest spices were harvested through the use of rope, cutlass or sticks to pluck them (30%) tree shaking (10%) but the most used method was the picking of fallen fruits from forest floor (60%).

The respondents did not sell only spices. Some of them sold spices in combination with cultural/traditional items like cowries, tortoise, honey, kola nuts, bitter kola, red and white cloth pieces, while others combined the sale of spices with foodstuff.

The spices were sold in either, processed or unprocessed forms. Processing was done by grinding them to powder in machines to have finer particles, improve texture and appearance. But from commercial point of view their reasons were to increase shelf life (8.5%) reduce weight (11%) encourage sales (13.4%) and ease of use (62.2%). The sellers indicated that processing could keep spices for between 2 – 12 months generally but most indicated 2 months (63%), followed by 3 – 6 months (24%). Before processing, spices were either parboiled and/or dried depending on the nature.

Appropriate storage was necessary for enhanced shelf-life and retention of the specific aroma of spices. Devices used were plastic containers with tight lids (60.4%) nylon (12.5%) and jute bag (27.1%)(Plate 2). The container used also depended on individual seller know-how, type of spice and scale of business financial status.



Plate 2: Stored spices on sale in the market

Indicated uses of the spices were banga, black and pepper soups (Table 2). Respondent did not have clear knowledge of the nutrient composition of the spices but knew that their consumption could relieve pains and promote well-being especially of pregnant women and lactating mothers.

Spices were mixed in varying proportions according to consumer preference. Reasons for mixing spices included improving taste (50%), encouraging sales (21.9%), easier to use (15.6%), improves aroma (10.4%) and making cheaper (2.1%).

Their knowledge about the possibility or otherwise of spices regeneration were that spices cannot be propagated (70.8%), could be propagated (19.8%) and 9.4% had idea. Indicated season of availability for some of the species by sellers were: *Monodoramyristica* (Feb – Mar, July – Aug), *Piper guineense* (Feb – April), *Thymus vulgaris* (Sept –

March), *Xylopiiaethiopica* (Oct – March), *Celtissoyauxii* (Aug – Dec) and *Rhaphistylisbeninensis* (Jan – Feb, July – Aug).

Table 2: Observed Spices and their uses

S/N	Local Name	Botanical name	AUTHORITY	FAMILY	FORM in use	USES
1	Unien	<i>Xylopiiaethiopica</i>	(Dunal) A. Rich	Annonaceae	Pod	Peper soup
2	Ikposa	<i>Monodoramyristica/brevipes</i>	(GeartnDunal)	Annonaceae	Seed	Pepper soup
3	Ebenetete	<i>Thymus vulgaris</i>	L.		Leaf	Banga soup
4	Erheigede	<i>Cordiamillenii</i>	Baker	Boraginaceae	Seed	Banga soup
5	Osimadan	<i>Rhaphiostylisbeninensis</i>	(Hook. Jex Planck) ex Benth	Icacinaceae	Stem	Banga soup
6	Igbafilo	<i>Parinariexcelsa</i>	(Oliv.) Prance	Chrysobalanaceae	Seed	Pepper soup
7	Oriema	<i>Aframomumdanielli</i>	(Hook f.) K. Schum	Zingerberaceae	Fruit	Pepper soup
8	Omilo	<i>Corandriumsativum</i>	L.	Apiaceae	Seed	Pepper soup
9	Oziza	<i>Piper guineense</i>	Schumach&Thonn	Piperaceae	Seed	Pepper soup
10	Atako, Ohia	<i>Celtissoyauxii</i>	Engl.	Ulmaceae	Seed	Banga soup
11	Eyinyan	<i>Tetrapleuratetraptera</i>	(Schum Ex Thonn) Taub.	Fabaceae	Fruit pulp	Pepper soup
12	Ajo	<i>Zingiberofficinalis</i>	Roscoe	Zingerberaceae	Rhizome	Pepper soup
13	Ebewewia	<i>Piper umbellata</i>	Linn	Piperaceae	Leaf	Black soup
14	Ehiendo	<i>Aframomum melegueta</i>	K. Schum	Zingiberaceae	Seed	Black soup/pepper soup

Marketing:

The business of spice selling in Benin markets was 100% dominated by women. Most of the traders have been in the business for over 10 years (Table 3) and they were mostly middle aged and old women. Spices were obtained from harvesters/collectors who got the resources from the forest in unprocessed forms and kept from moisture. Harvester/collectors from different parts of the state (rural areas) sold to recognized wholesalers and some small quantities/proportion could also be sold on the side to the middlemen, retailers, commercial food sellers and consumers who sometimes met the harvesters in the market or for reason of requiring large quantities for specific needs went straight to them. The bulk sellers sold their wares in big sacks or basin. The marketing link was simple but not a straight chain distribution; it was actually a web involving various linkages at different points (Fig. 1) For example, the final consumers could skip the retailers and buy from wholesaler and at the retailer level there were sub-retailers who bought smaller quantities from bigger retailers. The bulk sellers had the financial capacity to buy in large quantities and sell to other small categories during off seasons.

Retailers sold in small quantities on demand using recognized measures (Plate 3) for specified/fixed prices. Retail prices of spices could be as little as N10 depending on the product and quantity needed by consumer. But the most commonly demanded measure of ground mixed spices was the cigarette/milk cup sold for N400/cup at Uwa market. The source of marketing knowledge was via family, training and apprenticeship. Transportation cost (32.3%), low sales (27.1%) and seasonality (39.6%) were the main problems of the business. Rainy season was the peak period of sale.

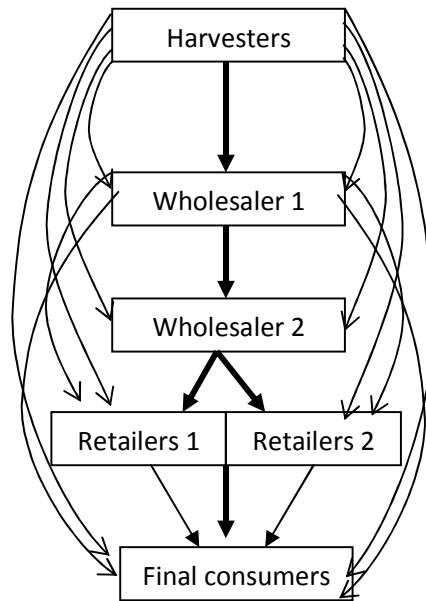


Figure 1: Linkages in the marketing of spices in Benin City markets.



Plate 3: Recognized selling measures in the markets

Table 3: Marketing experience of investigated sellers/respondents

Markets	Frequency	Percent (%)
Uselu market		
<2 years	3	15.8
3-6 years	3	15.8
6-10 years	2	10.5
>10 years	11	57.9
Oba market		
<2 years	1	4.3
3-6 years	3	13.0
6-10 years	4	17.4
>10 years	11	47.8
Ikpoba Hill Market		
<2 years	4	17.4
3-6 years	3	13.0
6-10 years	4	17.4
>10 years	12	52.2
Ekiuwa market		
<2 years	0	0
3-6 years	0	0
6-10 years	0	0
>10 years	4	100
Ekiosa		
<2 years	0	0
3-6 years	2	14.3
6-10 years	4	28.6
>10 years	8	57.1
New Benin Market		
<2 years	1	7.7
3-6 years	1	7.7
6-10 years	4	30.8
>10 years	7	53.8
Total	96	100

Source: Field Survey 2015.

DISCUSSION

The observed fourteen forest spice species were plant parts of either seed, pulp, leaf, rhizome or stem. This agrees with Iwu (1998) and Mananahar, (1995) who defined spice as a dried seed, fruit, root, bark or vegetative substance primarily used for flavouring, colouring or preserving food. The most commonly sold spices in investigated markets were *Monodoramyristica*, *Aframomummelegueta*, *Piper guineense* and *Xylopiiiaethiopica*. Egharevba (2006) also recorded five of the spices in their survey of indigenous wild fruits and condiments. The species were *Aframomummelegueta*, *Piper guineense*, *Parinariexcelsa*, *Xylopiiiaethiopica* and *Monodoramyristica*.

The selling of spices in Benin City was female dominated. Egharevba and Kalu (2004) similarly found from their survey of three Local Government Areas in Edo State that women engaged in the collection of firewood for cooking and charcoal, snails, fruits, vegetables, raffia for baskets and furniture, palm produce,spices and medicinal plants for sustainability.

Homman (1994) working in the Amazon region observed that the method of collection of spices was predatory and annihilative which entailed the destruction of source(s) in such a rate that the regeneration is slower than the rate of extraction. This view is however contrary to the result obtained in this study which found that larger percentage of the spice produce were picked from forest floor. This method is ecologically friendly. But full scale commercialization could in the future lead to more aggressive/destructive harvesting methods. Sellers obtained their spice business knowledge through family ties/relationships and apprenticeships. This means that the spice business is sustained by indigenous, knowledge. This could be a threat to the business as sellers are in the middle –old age categories and few young ones in the business. Ogbе et al. (2009) were also worried about the threat to the erosion of ethno-medicinal knowledge, characteristic of the culturally wealthy diverse ethnic groups of Nigeria, attributable to oral transmission of ethno medicinal knowledge. The fact that most of the sellers do not know/are not aware that spice species could be domesticated is not surprising as spice-species are still collected from the wild. Oboho (2014b) found in Benin that 90% of *Pleukenetiaconophora* (walnut) sellers indicated that the fruits came from the wild while 65% of respondents did not know that walnut could be raised in the nursery like other forest species.

Vermaet al. (2007) concluded that conservation of spice species were far fetched. But the little percentage of sellers that are aware/know about spice domestication in this survey is an encouraging pointer to possibility of sustainability of spice crops with the right extension and regeneration policy by the forestry sector. In fact, 2% of respondents have indicated that they have started raising *Aframomummelegueta* on their farmlands through the help of bank credit facilities.

Transportation was a major problem to the business because spice produce are bulky, delicate and perishable; they need to be carried carefully without crushing, moisture retention and contamination. Most of the people in the business only have access to and use village market vehicles that are old, rickety, often over loading and breaking down. This means therefore that the conveyance of the fresh produce is prone to losses occasioned by poor transportation. This is a negative effect on their profit margin.

The three identified traditional soups in which spices were used in the study were in respect of their medicinal and flavor values. Apart from culinary uses, most spices possess medicinal properties which proved far more effective than any form of medicine with little or no side effects (David, 2003). Plants used for medicinal purposes contain some chemical ingredients which produce certain positive physiological effects in the human body. Investigated spices had aromatic, pungent, peppery or slightly bitter tastes that suited different individual flavor and medicinal needs. The seeds of *Piper guineense* are rich in alkaloids, pepperine and the essential oil contributes to the flavor, Ekhosuehi (2015).

That rainy season had peak sale could be attributed to the fact that this period is wet and colder, with more people falling sick, often needing higher internal temperatures and stimulants, that are cheaply provided by spices. The use of *Aframomummelegueta* and *Xylopiiathropica* in female reproductive health especially post-partum stage was reported by Ogbe et al. (2009).

CONCLUSION

Spices are important plant products which have not been given much silvicultural attention but have great potentials in terms of socio-cultural value in Nigeria. The study has revealed that many forest crops in the state are used as spices in food. Examples of the spices include unien (*Xylopiiathropica*), Ikposa (*Monodoramyristica*), Ebenetete, Erheigede (*Cordiamilleni*), Osimadan (*Raphiosylibeninensis*), Igbafilo (*Parinariexcelsa*), Oriema (*Aframomummelegueta*), Omilo (*Corandrium sativum*), oziza (*Piper guineense*), Atako, Ohia (*Celtissoyauzii*), Eyinyan (*Tetrapleuratetraptera*), Ajo (*Zingiberofficinalis*), Ebewewia (*Piper umbellata*) with 57.1% of them being seeds. Other forms in use include leaf, trunk or stem, fruit pulp and rhizome. *Xylopiiathropica*, *Aframomummelegueta* and *Monodoramyristica* were the most commonly sold. Spices were mostly picked from forest floor, sold fresh by harvesters but sellers made the necessary processing and storage to meet consumer use and taste. The main use was for cooking medicinal soups. Knowledge transfer about them was through indigenous knowledge from family. The marketing linkage was a web linking the various stakeholders and a variety of standardized measures for selling were obtainable in the markets. It is a female dominated business with elderly and middle age group. There is great need to enhance extension services in the aspect of private planting of spice species and including the raising of their seedlings in government nurseries for afforestation.

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