Production, Marketing and Utilization of Aframomum melegueta (Rosc) K. Schum in Ekiti State, Nigeria

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***Abstract*- Non Timber Forest Products are highly valued among the rural people, they are gathered, utilized within the household and sold for income to improve their livelihood. This study examines the production, marketing and utilization of Aframomum melegueta and its role in the livelihood of people in Ekiti state. Primary data were collected through structured questionnaires from 200 randomly selected respondents comprising of 10 producers, 20 marketers and 20 consumers from four (4) communities in each selected Local Government Area of the state. The result of the study showed that Aframomum melegueta is preserved or cultivated on small scale mainly for medicinal values, erosion control as well as boundary delineation on farmland. Chi-square test of 10.16 and 9.96 ($p<0.05$) shows that a significant relationship exist between land acquisition methods and Aframomum melegueta cultivation; consumer's income and demand for the produce respectively. The species is greatly affected by drought, scarcity of planting stocks, inaccessibility of suitable land, ignorance and traditional beliefs. The Cost-Benefit-Ratio (CBR) of 3.95 and the mean Marketing Margin (MM) of N6,500 recorded in the study area indicates an index of viability and profitability of the produce. The study also revealed that the species apart from generation of considerable employment and income has wider traditional and medicinal uses on a variety of ailment. The study further recommended that farmers should also be encouraged on path of production through provision of planting stock and land by relevant agencies, effort should also be intensified at integrating Aframomum melegueta into Agroforestry system.**

Index terms- Aframomum melegueta, production, marketing, utilization, Ekiti state

INTRODUCTION

Forest resources are highly valued productive resources among the rural people all over Africa (Adedayo, Oyun and Kadeba, 2010). Kimmins (1997) viewed Forests as local or regional segments of landscapes in which biological and ecological conditions and processes are dominated by the presence of trees - large, generally long-lived perennial plants characterized by a large woody stem and a large woody root system. The forest and other types of Nigeria's natural vegetation form an integral part of the rural economy, providing subsistence goods and services as well as items of trade (Okafor, 1993). Collectively, these forest goods and services are referred to as forest resources. The demand for these resources rises sharply with economic growth. Until recently, forests have been traditionally valued as a source of timber and pulpwood production with little or no consideration of other goods and services it provides. There is greater emphasis on timber and pulp products because of their income generation capacity. However, there exist other several products of greater importance to the local economy that may be obtained from the forest. These products are hitherto described as 'minor forest products' (Salisu, 2015) secondary products', by-products' or non-timber forest products (NTFPs).

Non-timber forest products according to FAO (1991), are resources/products other than industrial round wood, and derived sawn timber, wood chips, wood based panels, and pulp that may be extracted from forest ecosystem, and are utilized within the household, or are marketed or have social, cultural or religious significance. However, it is now increasingly being realised that some of the locally available NTFPs can be equal to or exceed in importance than some wood products (Okafor, 1993). The importance or contribution of these NTFPs to rural economics is vital and substantial as women exploit them for financial reasons. They are gathered and sold for income. The use of these resources offers enormous opportunities for rural women in

Nigeria to improve their livelihood, support their households and improve their marginalized position (Adedayo et al., 2010)

NTFPs do support cottage industries, most especially in rural areas where they are produced and they help in improving the well-being of local people without depleting rural resources (Wickens, 1991). Such industries tend to reduce the rural-urban population drift, problems of massive unemployment, and total dependency on government for job and the uneven distribution of the national income. The relationship between NTFPs and the rural economy is subtle, but there is no reliable data in the past and to some extent even to the present on which this could be quantified due to lack of knowledge about these resources, and the demand for them as well as the value of their products which make management planning difficult.

The quest for non-timber forest produce for medicinal, spice, antibiotics and other economic, social and traditional purposes cannot be over-emphasized. These include malaria, pile, jaundice, febrile, asthma and oral contraception etc (Soladoye and Oni 1993). The dynamism in technologies had led to the discovery of essential, and volatile oils from the seeds of Aframomum melegueta used as antibiotics and antifungal (Oloke, 1997). However, one of the major challenge facing resources conservation in Nigeria is the ever increasing population which has led to pressure on many forest products. Pressures are imposed on the forest generally through human activities ranging from over-exploitation for various uses to non-replacement of the removed species. The ever increasing pressures had resulted in the dwindling supplies and fast disappearance or outright extinction of several species of indigenous fruit trees and other NTFPs. It is in this view that this study seeks to examine the mode of production, marketing and utilization of Aframomum melegueta in Ekiti state, with respect to accessing factor militating against its production, assessing its profitability and diverse utilization patterns in the study areas.

NOMENCLATURE OF SPECIES

Aframomum melegueta (Rosc) K. Schum, is a non-wood forest product belonging to the plant family Zingiberaceae (Dzoyem, McGaw, Kuete and Bakwowsky, 2017) and sub-family Zingiberoideae (Purseglove, 1985). It is a perennial herb called "Grain of paradise". It is also known as Cameroon cardamom and in some places it has been referred to as "Guinea grains" or "melegueta pepper".

SPECIES DISTRIBUTION

Aframomum melegueta is a tropical plant found in West African with its centre of distribution in Indo-malaya (Purseglove, 1985). However, Oloke (1997) opined that its country of origin was unknown, but held for its high value. By nature it grows in the wild and is also cultivated sporadically in Ethiopia, Nigeria, and nearby regions (Prabhakaran, 2011). In Cameroon, five different species of Aframomun were recognised to have attained prominence. These include grains of paradise and other four species called by their local names viz: the juicy Cardamom; Sweet cardamom; Liyambi cardamom and fragrant cardamom (Dupriez and Leener, 1989). In Nigeria, Aframomum melegueta is often cultivated in towns and villages such as Abeokuta, Akure, Benin, Calabar, Ibadan, Ife, Ilesha, Ondo, Onitsha and Owo (Isawumi, 1994).

GENERAL DESCRIPTION OF THE SPECIES

Aframomum melegueta is a monocotyledonous plant. It is perennial with leafy, erect and un-branched shoot of about 1m tall. The individual grows from an elongated rootstock (Rhizome) level with the ground. The leaves are bamboo-like with narrow lanceolate and alternately arranged along the stem. It varies both in length and width about 18-22cm and 1.8-2.5cm respectively (Purseglove, 1985). The length and width of Aframomum melegueta varies considerably according to species (Dupriez and Leener, 1989). Flowers and fruits are borne at the base of the plant. Flowers are white or yellow tinted with red or violet. Fruiting occurs between September and April (Isawumi, 1994). Fresh fruits are smooth, grooved with colour range from red to orange when matured. Matured fruits are usually hunted for and harvested from spontaneous plants growing in fallows by path, streams in valley bottom and wet land during off season. Dried fruits are brown containing numerous small brownish angular seed with cardamom flavour (Dupriez and Leener, 1989). The root system is formed by rhizome from the node of which deep

roots originate. The rhizomatous characteristic of the root ensure the regeneration of new plants from the parent stock. By nature, Aframomum melegueta is a shade loving plants which grow spontaneously in thickets. Apart from growing in the wild trough natural regeneration, it is often cultivated in most lowland forest region. The plant is cultivated in shade of fruit trees in plantations and orchards (Oladokun, 1990).

MATERIALS AND METHODS

Description of the study areas

The study was carried out in Ekiti State, Nigeria. Ekiti states was created from the old Ondo state on 1st October, 1997. It covers an area of approximately 7,000 spuare kilometres. It is bordered to the south by Ondo state; in the west by Osun state; towards the north by Kwara state and towards the east by Kogi state. The approximate location is between latitude 70 – 8.20 North of the equator and between longitude 4.80 - 60 East of the Greenwich meridian. Ekiti have the characteristics of West African monsoonal climate, marked by distinct seasonal shift in the wind pattern (Oguntoyinbo, 1987). The regime of rainfall is bimodal. The State is endowed with natural forest resources, mineral deposit with extensive fertile soils (FORMECU, 1998).

Method of data collection

Ekiti state was purposely selected based on preponderance cultivation of Aframomum melegueta in the state. Four local governments namely, (Ekiti-south West, Ijero, Ikole and Irepodun/Ifelodun) were randomly selected for the study. Three sets of structured and pre-tested questionnaires and oral interviews were used to obtain information from three respondent groups comprising of 10 producers, 20 marketers and 20 consumers in each of the selected local government areas. The total of 200 questionnaire were administered to respondents in the study.

Data analysis

The data obtained through administered questionnaires and interviews were subjected to descriptive statistics in form of frequency and percentage distribution table and charts. Chi-square test was used to test the relationship between land acquisition and Aframomum melegueta cultivation as well as consumer's income and demand for the produce. Both Benefit-Cost analysis and marketing margin were used to determine the profitability of Aframomum melegueta venture as described by Popoola (1998).

RESULT AND DISCUSSION

Table1 revealed that majority of Aframomum melegueta producers (100%) and consumers (65%) were male while high proportions of the marketers (88.75%) were female. An indication that male are more involved in cultivation and utilization while female are mostly active in marketing process. This is in agreement with Fariola, et al (2014) that females participate more in collection and marketing of Non-timber forest products. Age distribution of respondents shows that 77.5% of the producers were between 21-60years of age while 22.5% were above 60years. 75% marketers were between 21-60 years of age while 25% were above 60 years. However, 65% of the consumers were between 21-60 years and 35% were above 60 years. This indicated that most of the people involved in production, marketing and utilization of Aframomum melegueta were still within the active age group.

Majority of the respondents consisting of (82.5%) producers, (95%) marketers and (91.25%) consumers were married. The higher percentage of producers (82.5%) observed in this study agrees with the report of Babalola (2009) that production of some selected NTFPs were dominated by adult and old male, mostly of whom were married. (10%) producers, (1.25%) marketers and (8.75%) consumers were single, (1.25%) marketers were divorcee and (2.5%) marketers were widow. The predominant household size of 1-5 members were observed for producers (70%) and marketers (78.75%) while consumers have the family size of 6-10 members. This implies that the respondents will be face with many family responsibilities alongside with involvement in NTFPs related activities.

The result of educational status indicated that (27.5%) producers, (66.25%) marketers and (28.75%) consumers did not have any formal education while (72.5%) producers, (33.75%) marketers and (71.25%) consumers had one form of education ranging from primary school to tertiary education level. The high level of literacy (72.50%) observed among producers

according to Arowosoge and Popoola (2006) will however induce economic motivation, widen people's social and economic horizon and predisposed them to greater receptivity of new ideas.

Table 1: Socio-economic characteristics of respondents

Variables	Producers		Marketers		Consumers	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
Gender						
Male	-	-	9	11.25	52	65.00
Female	40	100	71	88.75	28	35.00
Total	40	100	80	100	80	100
Age (Years)						
21 – 40	4	10.00	13	16.25	19	23.75
41 – 60	27	67.50	47	58.75	33	41.25
61 – 80	9	22.50	20	25.00	28	35.00
Total	40	100	80	100	80	100
Marital status						
Single	4	10.00	1	1.25	7	8.75
Married	33	82.50	76	95.00	73	91.25
Divorce/Separated	3	7.50	1	1.25	-	-
Widow	-	-	2	2.50	-	-
Total	40	100	80	100	80	100
Household size						
1 – 5	28	70.00	63	78.75	21	25.25
6 – 10	12	30.00	17	21.25	57	71.25
11 and above	-	-	-	-	2	2.50
Total	40	100	80	100	80	100
Educational Background						
No formal education	11	27.50	53	66.25	23	28.75
Primary	24	60.00	21	26.25	38	47.50
Secondary	5	12.50	4	5.00	15	18.75
Tertiary	-	-	2	2.50	4	5.00
Others	-	-	-	-	-	-
Total	40	100	80	100	80	100

Table 2 revealed that 47.50% of the producers had a farmland size of between 7–9 ha while 5% had 13 ha and above farmland size.

Table 2: Size of farmland possessed by farmers in Hectares (Ha)

Farm size in hectare (Ha)	Frequency	Percentage %
1-3	3	7.50
4-6	7	17.50
7-9	19	47.50
10-12	9	22.50
13 and above	2	5.00
Total	40	100

Figure 1 shows that 50.00% of the producers acquired their farmland by shared cropping, 42.50% by inheritance, 5.00% by leasing and 2.50% by purchase.

Figure 1: Land acquisition techniques

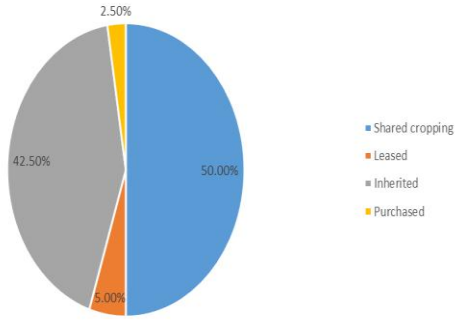


Table 3 shows that 100% of the farmers used less that 1ha of their farmland for the cultivation of Aframomum melegueta. They also reported that this NTFP has never been cultivated on a large scale but sparsely planted within cocoa plantation. This is in agreement with Oladokun (1990) that cocoa farmers intercrop Aframomum melegueta with cocoa during

his survey on cocoa farmers in former Bendel state (now Delta and Edo), Ogun, Ondo and Oyo states, Nigeria. The low level of cultivation could have been due to the fact that the respondents in the study area probably do not have free access to large area of land for farming activities as revealed by method of land ownership (Figure 1) which is mainly through shared cropping (50.00%) that prevented them from planting perennial crops; inheritance (42.50%) resulting to land fragmentation among family members. It implied that land availability can encourage farmers' involvement in cultivation of the produce.

Table 3: Proportion of farmland used by producers for cultivation of Aframomum melegueta

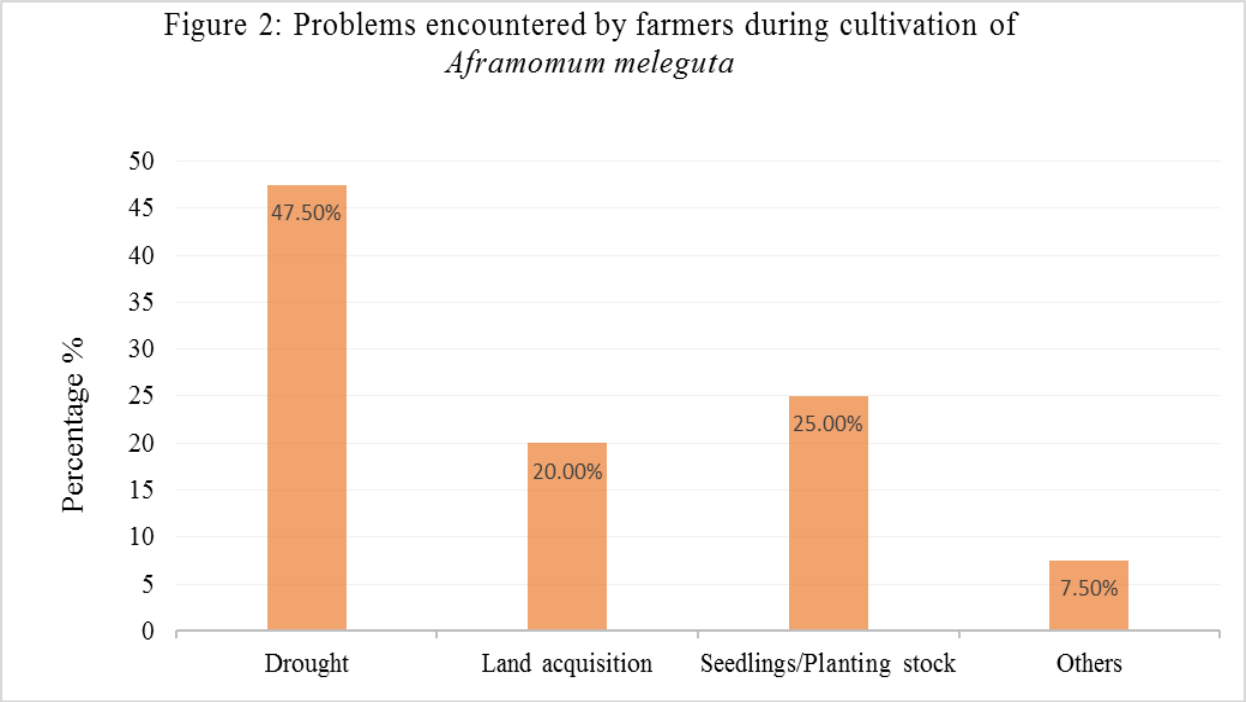
Farm size in hectare (Ha)	Frequency	Percentage%
<1	40	100
1-3	-	-
4-6	-	-
7-9	-	-
10 and above	-	-
Total	40	100

Table 4 showed that the calculate Chi-square value (10.61) is greater than the critical value (9.49). This revealed that there is a significant relationship between land acquisition methods and cultivation. This implies that land availability is key to Aframomum melegueta production.

Table 4: Land Acquisition methods and farmers participation in the cultivation of Aframomum melegueta

Factor	X^2 Calculated	Degree of freedom (df)	X^2 Tabulated	Decision
Land acquisition methods	10.61	4	9.49	Reject Ho

Figure 2 below revealed that 47.50% of the farmers indicated drought as the major militating factor against the cultivation of Aframomum meleguta, 25.00% indicated lack of seedlings/planting stock while 20.00% and 7.50% stated land acquisition methods and other factors respectively. Other identified factors include ignorance of the economic value of the plant; belief that the plant do attract dangerous snakes like python and the fear of been attack by sakes.



Result of estimated aggregate marketing margin (Table 5) of an average basket of Aframomum melegueta containing between 2,000-2,200 fruits shows a marketing margin of N1,100 for the wholesaler, N5,400 for the retailers and an aggregated margin of N6,500. This is in agreement with IFAD (2008) that NTFPs gatherer receives much lesser per cent of the selling price of the final product.

Table 5: Estimated aggregate market margin of an average basket of Aframomum melegueta containing about 2,000 – 2,200 fruits

Variables	Estimated margins
Wholesalers/Gatherers WsMMg	WsSp – WsCp ₦ 4,350.00 – ₦ 3,250.00 = ₦ 1,100.00
Retailers RtMMG	RtTp – RtCp ₦ 9,750.00 – ₦ 4,350.00 = ₦ 5,400.00
Aggregate marketing margin AgMMg	WsMMg - RtMMG ₦ 1,100.00 + ₦ 5,400.00 = ₦ 6,500.00

Result of estimated benefit and cost analysis on Table 6 indicated a benefit of N170,547 and a positive Benefit-Cost Ratio of 3.95. The positive Benefit-Cost Ratio observed is an indication of profitability.

Table 6: Estimated benefit and cost analysis of Aframomum melegueta fruits

State	Discounted Cost(₦)	Discounted Revenue(₦)	Benefit (₦)	Benefit-Cost Ratio
Ekiti	43,172.54	312,720.00	170,547.46	3.95

The monthly average income of the consumers (Table 7) revealed that majority (32.5%) of the consumers/users earned between ₦16,000 – ₦30,000 per month while 5% earned less than ₦1,000 per month.

Table 7: Consumers average monthly income

Average monthly income (₦)	Frequency	Percentage %
<1.000	4	5.00
1,000 – 10,000	18	22.50
11,000 – 20,000	26	32.50
21,000 – 30,000	6	7.50
31,000 – 40,000	16	20.00
41,000 and above	10	12.50
Total	80	100

The result of Chi-square analysis in Table 8 shows that there was a strong relationship between consumers/users income and the demand for Aframomun melegueta. This implies that an increase or decrease in consumer's income will have either positive or negative effect on the demand for the product.

Table 8: Consumers income and demand for Aframomum melegueta

Factor	X^2 Calculated	Degree of freedom (df)	X^2 Tabulated	Decision
Consumers/ Users income	9.90	4	9.49	Reject Ho

Table 9: Identified uses of Aframomum melegueta in the study area

Traditional/Cultural uses	Naming ceremony, Freedom ceremony, Wedding ceremony, Spices, Rituals, incantation and magic.
Medicinal uses	Headache, yellow fever, epiglottis, dizziness, hypertension, stomach ache,
Spices	febrifuge, indigestion and child birth.
Employment	For preparation of pepper soup in beer parlour and spice at 'suya' spot. Job creation through cultivation and marketing.

CONCLUSION

Findings from this study have revealed that Aframomum melegueta production in the study area is basically through intercropping system in cocoa plantation. The production is dominated by male while females are prominent in marketing of the produce. The study also revealed that the species cultivation is greatly affected by drought, scarcity of planting stocks, inaccessibility of suitable land, ignorance and traditional beliefs. The cost-benefit-ratio (CBR) of 3.95 and the mean marketing margin of N6,500 observed in the study gave an index of marketing viability and profitability. The result of the study also revealed that Aframomum melegueta is used in the study area for traditional/cultural purposes, medicinal purposes and as spices in pepper soup and 'suya' preparation. Consequently, upon the above findings, farmers should also be encouraged on path of production through provision of planting stock by relevant agencies. Also, there should be awareness of both marketers and consumers of the contribution of the produce to livelihood and healthy living. Finally, efforts should also be intensified on integrating Aframomum melegueta into Agroforestry

system as interest on the economics in the field has increased considerably.

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