

Collection and marketing of Bitter Cola (*Garcinia kola*) in Nkwerre Local Government area, Imo State, Nigeria

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Abstract

The study was carried out to assess the collection and marketing of bitter cola in Nkwerre Local Government Area of Imo State Nigeria, with a general objective of determining the profitability and the constraints of bitter cola trade in the area. A total of one hundred and ten respondents were randomly selected from five rural communities. Data were collected using a well-structured questionnaire and personal interview. Most of the collectors were males. Net profit of ₦200,157.00k (about 930K euros) was recorded from sales of bitter cola by the respondents. The amount of cola collected per year was positively related to marital status, age, distance and cost of bitter cola; age and labour costs were also significant predictors. Constraints encountered by collectors and marketers include rot and decay during storage (99%), poor storage facilities (97%), pest and diseases (88.2%) and labour costs (68.2%). Recommendations based on the findings include providing financial resources in form of loans, grants or incentives in order to boost bitter cola production, increase income and reduce poverty. Research in the area of domestication, plantation establishment, preservation and storage of the seeds need to be encouraged.

Keywords: Net profit, production constraints, household income

Introduction

Commonly known as ‘bitter cola’ for the bitter attributes of the seed, *Garcinia kola* (Guttiferae) is a non-timber forest product exclusively tropical in distribution. Locally, the seed is used medicinally to treat cough and hypertension (Adebisi, 2004), and hence *G. kola* is symbolic and valued culturally across southern Nigeria. It is a typical non-timber forest product that generates income for many people in rural and urban areas in developing countries including Nigeria (Andel, 2006). It is known as “male kola” or “Aku ilu” in Igbo land, “Orogbo” in Yoruba and “Namijiri – goro” among the Hausas.

The tree is commonly found in humid lowland forests of Nigeria, Cameroun, Ghana and the Benin Republic. Other species of *Garcinia* found in Nigeria include *smeathmanii*, *ovalivolia*, *brevipedievata* and *manii*, with different fruit colours, aromatic strength and sizes. *G.kola* is characterized by a slow rate of growth; difficulties are always encountered in attempting to raise its seedlings. The tree has a naturally long gestation period which can last up to 10 – 15 years before flowering and fruiting (Adebisi, 2004), but Marcots’ farming method can lead to fruiting after only 4 – 5 years.

Ofor *et al.* (2004) identified several ethno-botanical uses to which the local people of Imo State in south-eastern Nigeria put *Garcinia* seeds. These include as antidotes to snake bite, poison or overdose, and use as a snake repellent. Among the Nkwerre clan of Imo State, *G. kola* is a very important and well recognized plant used for centuries to treat chest cold in traditional medicine (Okojie *et al.* 2009). Ofusori *et al.* (2008) reported improved respiratory function after 28 days use of cola extract on rats, supporting the folklore use among the Nkwerre clan. Eye-drops containing 0.5 % extract of *G. kola* seeds also reduces eye pressure (Adefule-Ositelu *et al.* 2008). The market price of this important forest product is escalating annually due to an inadequate supply as a result of relying heavily on natural sources, which are supplemented hardly at all by collections from a few stands in farms and home gardens.

Ladipo (2003) noted that in Nigeria less than 10% of the total annual crop of the bitter cola fruit or the kernel is harvested from planted trees, while the rest are collected from wild sources. Fruits are processed by separating seeds from the pulp, air-drying them locally and preserving them for marketing locally. In most cases non-timber forest product marketing involves intermediaries or middlemen who traverse the interior rural areas looking for primary collectors from wild sources, and then ship the product to urban markets. Middlemen distribute to retailers who have direct contact with consumers in urban areas. Data on profits from non-timber forest product marketing and its contribution to rural and national economies have not been properly recorded in developing countries due to lack of or scanty documentation (Sunderland, 2001). Many households make and sustain their livelihoods from the collection and marketing of various non-timber forest products in sub-Saharan Africa (Ogunwusi, 2012).

Over the last decades, observations as well as studies have shown that bitter cola collection from natural sources has declined significantly due to lack of improved planting materials and inadequate market outlay which has negatively affected farmers in terms of marketing of their produce (Adebisi 2004). Seasonal fluctuations in production, deforestation, pests and diseases, lack of adequate resource inputs, inadequate information, and the absence of good roads and modern techniques have reduced the motivation of collectors to source bitter cola from the forests. Presently there are few or no statistics on the economics within which bitter cola collectors operate to guide realistic policy and programme formulation to achieve profitability in the enterprise.

Thus we undertook an economic analysis of bitter cola collection and marketing. The specific objectives of this work were to evaluate the socio-economic characteristics of bitter cola farmers and collectors in the study area, determine how socio-economic factors affect bitter cola collection and marketing, assess the profitability of the bitter cola enterprise and identify any constraints.

Materials & Methods

The study was carried out in Nkwerre Local Government Area of Imo State, Nigeria (located between latitudes 4°45 N and 7°15 N, and longitudes 6°50 E and 7°25 E). Imo state has an estimated population of almost two-and-a-half million people at the 2006 census (NBS, 2006). The climate is characterized by a uniformly high temperature which fluctuates between 23 and 30 °C. The major tree crops grown include Cashew (*Anacardium occidentale*), Avocado pear (*Persia americana*), African star apple (*Chrysophyllum albidum*) and Bitter cola (*Garcinia kola*). The local people are mainly involved in arable agriculture of cassava, cocoyam and maize. Bitter cola is not usually grown in large quantity; however, it is preserved on farms and occasionally planted on compound farms. The Local Government Area is comprised of twenty communities, out of which five are the main bitter cola collectors: these five were selected for the study: Amaokpara, Abo, Ama ike, Ama uju, Umuegbe (Imo State Government, 2013).

A well-structured and pre-tested questionnaire was then administered among 110 randomly selected bitter cola collectors and marketeers in the selected communities. Questionnaires were interpreted in the local language (Igbo) for proper understanding and responses carefully documented by the researchers. The data obtained from the questionnaire were analyzed using regression, and net profit calculated from the following:

Profit margin = revenue – costs

Revenue = price per kg x quantity

Costs = variable costs + fixed costs

Gross margin = revenue – variable costs

Net farm profit = gross margin – fixed costs

All values are in the local currency (₦). Variable costs include items such as the cost of labour. Fixed costs are derived through depreciation of the costs of fixed inputs, such as head pans, machetes, etc. The costs of collection and revenue consist of the sum for all the bitter cola collectors interviewed.

Linear multiple regression explored relationships between the response (dependent) variable of the total amount of bitter cola collected per year and a set of predictors (sex, age of farmer in years, marital status, level of education in years, farming experience in years, number of people in household, distance, cost of cola and labour costs). Both predictor and response variables were used in all combinations of untransformed and log-transformed format.

Results

Most of the bitter cola collectors were men, advanced in age (50-60) and very experienced in the trade (Table 1). Most of the respondents had only primary education, with only about a fifth with secondary education; a few had tertiary education and non- formal education. The majority were married, with a mean household size of 11.

Characteristics	Frequency	Characteristics	Frequency
Age (yrs)		Marital status	
20-29	6	Single	9
30-39	21	Married	72
40-49	18	Widow(er)	21
50-59	32	Separated	8
60 and above	33	Household size	
Sex		1-5	23
Male	69	6-10	50
Female	41	11-15	35
Educational level		Above 15	2
Nil	41	Farming experience	
Primary	43	1-10	14
Secondary	12	11-20	50
Tertiary	14	21-30	35
		Above 30	11

Table 1: Socio-economic characteristics of Bitter cola collectors and marketeers from field surveys in 2012.

The double-log model was the best fit in the regression analysis of the socio-economic characteristics that affect Bitter cola harvesting and marketing in the study area (Table 2). The significant coefficients for age, marital status, and the costs of Bitter cola and labour all showed positive relationships, indicating a direct effect on output. The coefficients for household size and length of experience were negative, indicating that older collectors and larger households collected less cola.

The net farm profit analysis determines the total income from bitter cola enterprise in the study area; the model used variable cost and fixed cost in calculating the net farm profit for the enterprise (Table 3). Net farm profit represents the respondents' average net farm profit.

Variables	Double log model			
	Coefficient	t-stat		p-value
Constant	0.676	0.876		0.404
Sex	-.104	-.685		.510
Age	.484	1.759	**	.010
Marital status	.461	1.282	*	.023
Education	.211	1.567		.152
Experience	-.039	-.136	**	.010
Household	-.676	-.599	*	.050
Distance	0.069	0.293		.776
Cost	.252	3.026	*	.014
Labour	.129	-.986	*	0.03
		R square		0.804
		F ratio		4.113
		Sig		0.023

Table 2: Effects of socio-economic characteristics on Bitter cola collection and marketing, as assessed by multiple regression

Items	Amount (k ₦)	k €
Total Revenue	236,090.09	1088
Variable costs		
Organic fertilizer	1050.00	5
Tools (baskets)	1800.00	8
Labour inputs/manday (land preparation)	6800.00	31
Weeding	16800.00	77
Other expenses	1378.08	6
Total variable costs	27828.08	128
Gross margin	208262.01	960
Total fixed cost	8105.01	37
Total cost	35933.09	166
Net returns	200157.00	923

Table 3: Average annual net return of Bitter cola in Nkwere Local Government Area

Constraints	Frequency	Percentage	Ranking
Rot and decay during storage	57	10.55	1 st
Poor storage facilities	57	9.81	2 nd
Pest and diseases	52	9.76	3 rd
High cost of labour	51	9.41	4 th
Lack of credit facilities	50	9.17	5 th
Lack of market information	49	9.07	6 th
Low price of product	46	8.51	7 th
Distance from farm to market	42	7.77	8 th
Land scarcity and tenure	37	6.85	9 th
Poor infrastructure facilities	31	5.74	10 th
Low soil fertility	26	4.81	11 th
Poor knowledge of technology of bitter cola propagation	21	3.88	12 th
Lack of extension contact	13	2.40	13 th
High cost of planting materials	11	2.03	14 th

Table 4: Constraints on Bitter cola production in Nkwere Local Government Area

Factors limiting bitter cola production (Table 4) were ranked based on the major constraints affecting the study area. Seed rot and decay during storage (10.55%) were noted as a major constraint affecting the producers. Deterioration and poor quality result in low market price of bitter cola seeds. Other constraints listed by the collectors and marketers include poor storage facilities, pest and diseases and low soil fertility.

Discussion

Men dominated the collection of bitter cola in the study area because of the drudgery of Bitter cola sourcing. Thus, women engaged mostly in marketing the seeds, while men did most of the harvesting and processing (Aiyelaja *et al.*, 2012). In terms of educational status, many of the farmers had the ability and capacity to adopt new technologies and relevant information that would improve their collection and processing techniques. Similar observations were noted while assessing socio-economic characteristics affecting farmers elsewhere (Adebayo & Adeola, 2005). The Bitter cola collectors had expanded households providing cheap labour during harvesting and processing (Awotide *et al.*, 2011). The harvesting and marketing of non-timber forest products have been noted to support large households in rural areas during scarcity (Schreckenber *et al.*, 2006). The collectors were highly experienced in the collection, processing and marketing of bitter cola in order to sustain household needs.

Picking ripe Bitter cola fruits from the forest floor is not a strenuous activity, and hence there was no effect of gender on collection (Neumann & Hirsch, 2000; Elia & Carney, 2007). However, harvesting of some other non-timber forest products such as rattan, chewing stick (*Massularia acuminata*) and wine tapping from *Raphia hookeri* require physical strength and are usually carried out by men (Kalu & Rachael, 2006). The effect of educational level of respondents was positive but not significant; this contrasts with the findings of Pannin & Brummer (2000), who reported significance effects of educational level on farmer's socio-economic characteristics. Marital status and labour costs had significant effects on profits from Bitter cola marketing. Married people with expanded households collect higher quantities of bitter cola from the wild than unmarried individuals in order to meet the needs of their family.

The net farm profit analysis is similar to other reports (Ofor *et al.*, 2004; Babalola & Agbeja, 2010) of appreciably high profit margins in the sales of Bitter cola by producers and intermediaries both in south-west and south-east Nigeria. Factors limiting Bitter cola production are similar to those identified by Nwauzor (2001), especially rot as one of the main problems militating against maximum fruit production. The same constraints were reported by Mbanaso *et al.* (2008) among Bitter cola producers in Cameroon. Most farmers use organic fertilizer to improve the soil and increase the yield of Bitter cola fruits.

Based on our findings, Bitter cola collection and marketing generates a good income for stakeholders despite factors militating against its production. Bitter cola sourcing in the study area is an enterprise that engages people of different productive ages. It is not gender-specific even though its sourcing is male-dominated. The enterprise provides important support for families, and constitutes a full-time occupation for more than half of the producers.

The government and poverty alleviation agencies need to provide credit facilities for farmers to enable them to acquire inputs and processing equipment. The government needs to encourage research in the area of preservation and storage of the seeds to ensure off-season availability. Improvements in marketing efficiency for increased profit also needs to be addressed. There is an urgent need for youth empowerment programmes since most of the respondents were within their productive ages. The collectors should be encouraged to form co-operative societies that can facilitate the credit facilities required for the propagation and establishment of plantations that will secure sustainable supplies.

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الملخص العربي

جمع وتسويق الكولا المرة (*Garcinia kola*) في منطقة نكيرى المحلية - ولاية إمو - نيجيريا

إبنايزى هـ. س1 - أولاديلي أ. ت. 2 - أجول. و. 1

1. قسم الاقتصاد الزراعي - جامعة بورت هاركورت - بورت هاركورت - نيجيريا

2. قسم الغابات وإدارة الحياة البرية - جامعة بورت هاركورت - نيجيريا

صممت هذه الدراسة لتقييم جمع وتسويق الكولا المرة في منطقة نكيرى المحلية - ولاية إمو - نيجيريا، بهدف تحديد مدى العائد المادي وكذلك المعوقات التي تواجه تجارة الكولا المرة في المنطقة. تم اختيار 110 شخصاً بصورة عشوائية يمثلون خمس مجتمعات ريفية، جمعت البيانات عن طريق توزيع استبانة للأسئلة وكذلك المقابلات الشخصية. كان أغلب جامعي الكولا من الرجال. كان العائد الإجمالي هو 200.157 نايرا (تقريباً حوالي 930 يورو) من الكميات التي قام ببيعها المشاركون في الدراسة من الكولا المرة. كانت الكمية المجموعة في السنة ذات علاقة مرتبطة بحالة الزواج، العمر، بعد المسافة عن حقول الكولا وتكلفة الجمع والنقل، وكان العمر وتكاليف العمالة عاملين محددين للتكلفة. من المعوقات التي ذكرها الجامعين والمسوقين هو تحلل وتعفن الكولا أثناء عمليات التخزين (99%)، نقص الإمكانيات اللازمة للتخزين (97%)، الآفات وأمراض النبات (88.2)، تكلفة العمالة (68.2). وكانت التوصيات المستخلصة من هذه الدراسة تشمل تقديم الدعم المادي للمزارعين على شكل قروض أو منح لتمكينهم من إنتاج الكولا بصورة جيدة، زيادة الدخل وخفض نسبة الفقر بين المزارعين، أيضاً تشجيع البحوث الخاصة بزراعة الكولا والطرق المثلى لتخزين البذور وحمايتها.