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Production and socio-economic contribution of bitter kola (*Garcinia kola*) to people's livelihood in Ifedore Local Government, Ondo State, Nigeria

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Abstract

This study evaluates the production and socio-economic contribution of bitter kola (*Garcinia kola*) to the livelihood of the people in Ifedore Local Government, Ondo State. The study was conducted in six villages purposively selected in the Local Governments. A total of sixty pre-tested questionnaires were randomly administered to respondents in the study area. The study revealed that 37% of the respondents are above 50 years old while 42% and 58% are male and female respectively with 42% having primary education. The study also revealed that 48% of respondents operate farm sizes of between 11-20 hectares of land with 37% having farming experience of 11-20 years. The majority (92%) of the respondents grow *Garcinia kola* in mixed plantations while 8% collect their products from natural forests. Seventy-eight percent of the respondents produce 1-5 bags of 50 kg per year, while 35% made between ₦51,000 - ₦100,000 annually. The study shows that 33.7% of the respondents use *Garcinia kola* for medicinal and social/cultural purposes respectively. It was recommended that government should encourage farmers through incentives such as interest-free loans for large-scale production of bitter kola in plantations through a perennial crop combination agroforestry system for local and international markets.

Keywords: Production; Contribution; Bitter kola; Ondo State; Nigeria

1 Introduction

Human beings are dependent on plants for the provision of food, oxygen for breathing, and raw materials for industries and buildings [1]. Plants materials such as roots, stems, leaves, fruit seeds and nuts provide food, medicine and other economic benefits to man; most importantly, fruits and nuts of most tropical trees are good sources of minerals, fibre, protein, fat and vitamins [2]. Some certain fruits and nuts are grown in the tropical rainforest region of Nigeria whose potentials are yet to be fully explored, one of such is bitter kola (*Garcinia kola*). Bitter kola is a species of flowering plant in the Clusiaceae or Guttiferae family. It is abundantly found in the Republic of Benin, Nigeria, Senegal, and Sierra Leone. Its natural habitat is subtropical or tropical moist low-land forest. Bitter kola is an evergreen tree with a heavy spreading crown that can grow up to 30 meters tall [3].

Bitter kola plays an important role in African ethnomedicine and traditional ceremonies. Culturally, bitter kola is very important as it is used for wedding and naming ceremonies signifying longevity. The usage of bitter kola is not limited to traditional activities alone; studies have shown that fruits, seeds, nuts, and bark of the plant have been used for centuries in folk medicine to treat ailments of various kinds such as acute fever, inflammation of the respiratory tract and throat infections [4]. *Garcinia kola* also has the remedy for osteoarthritis which is the degeneration of joint cartilage and the underlying bone that causes pain and stiffness, especially in the hip, knee and thumb joints [5]. Studies have

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shown that the seed and leaf of bitter kola have antibacterial activity and it also helps in the maintenance of good respiratory track as well as treating chest colds [6].

Wild fruits assume an important role in the household income and food security of numerous communities in rural societies worldwide. Bitter kola has great economic value across West Africa, the seeds are of particular importance in the social-cultural lives of the people in the tropics [7]. The fruits contribute cash earnings as they are also sold in both rural and urban areas. The economic value of the seed from bitter kola trees makes it an important component in compound farming and agroforestry systems in Nigeria [8]. Going by the above benefits, the knowledge of the use of indigenous fruit and nuts needs urgent scientific investigation and proper documentation, otherwise, when lost it will be difficult to recover by future generations. Consequently, this study is designed to evaluate the production and contributions of *Garcinia kola* to the livelihood of the people of Ifedore Local Government in Ondo State.

2 Material and method

2.1 Study area

The study area (Ifedore Local Government) is in the western part of Ondo state in southwest Nigeria. The area lies between Latitude 7° 14' 0" N and 7° 37' 0" N and Longitude 4° 5' 0" E and 5° 21' 0" E. The diurnal temperature ranges around 26 °C. and the climate is of West African monsoonal type with dry and wet seasons. The dry season normally starts from November through March and is characterized by the dry cold wind of Harmattan, while the rainy season normally starts from March through October with occasional strong wind and thunderstorms, usually at the onset and the end of the rainy season. The annual rainfall ranges from 750mm in the northern zone to 1,500mm in the southern zone, diurnal temperature ranges from 21 °C to 31° °C with little variation throughout the year. The annual average relative humidity is about 90% at 7.00 am and 65% at 4.00 pm. The vegetation type is rainforest.

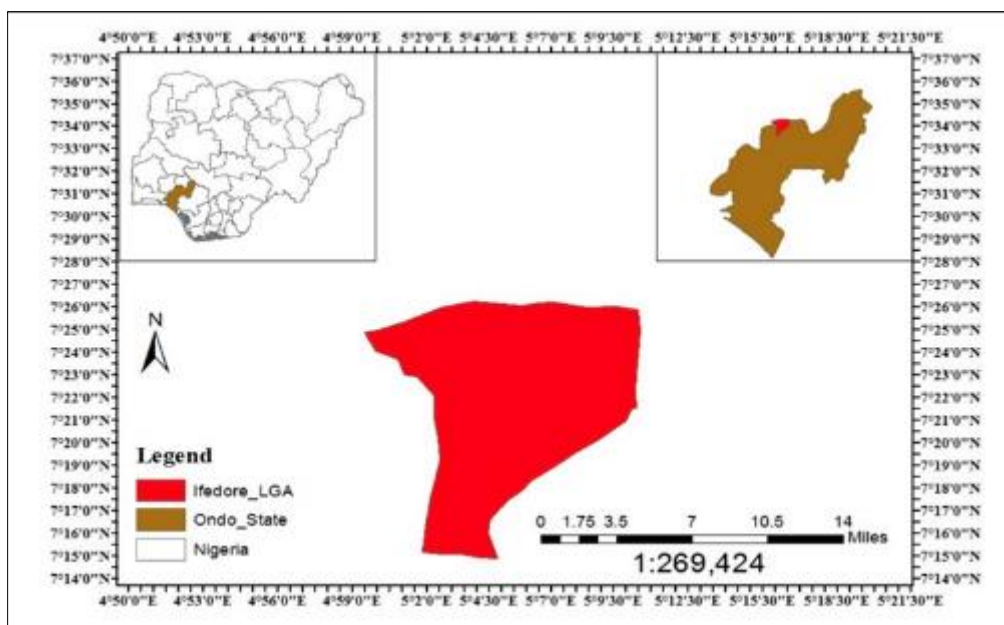


Figure 1 Map of Ondo State showing the study area

2.2 Sampling procedure, data collection and analysis

Six villages were selected for the study based on the preponderance of the production of bitter kola. The purposive sampling method was used to select ten (10) households for focus discussions in each village. Pre-tested questionnaires were administered to the respondents (one per household) (Table 1). Administration of the questionnaire was by personal interview since few of the respondents cannot read and write. This method also affords the total retrieval of the questionnaire for analysis. Data collected from questionnaires were analyzed using descriptive statistics of frequency and percentage

Table 1 Distribution of respondents in the Study Area

Name of Towns/Villages	No of Respondents
Ijare	10
Ilara-mokin	10
Igbara-oke	10
Ipogun	10
Ayetoro	10
Ibuji	10
Total 6	60

3 Results

3.1 Socio-economic characteristics of the respondents

Table 2 shows that 42% and 58% of the respondents are male and female respectively. Age distribution revealed that 37% of the respondents are above 50 years respectively while 64% are married. The result of the study also shows that 25% of the respondents have at least secondary education while 57% of the respondents have a family size of at least 4 members.

Table 2 Socio-economic characteristics of the respondents

Variables	Frequency	Percentage (%)
Gender		
Male	25	42
Female	35	58
Age		
≤20 years	0	0
21-30 years	6	10
31-40 years	17	28
41-50 years	15	25
>50 years	22	37
Marital Status		
Single	11	18
Married	38	64
Widowed	9	15
Divorced	2	3
Educational		
Non-Formal Education	20	33
Primary Education	25	42
Secondary Education	10	17
Tertiary Education	5	8

Family Size		
1-3	26	43
4-6	27	45
>7	7	12
Total	60	100

3.2 Production, harvesting, and preservation methods by the respondents

The result in Table 3 shows that 73.3% of the respondents engaged in the planting of *Garcinia kola* on their farmland, 92% grew it in mixed plantations and 8% collected their products from natural forests. The quantity of *Garcinia kola* produced by respondents in the study area. The result showed that 1-5 bags have the highest percentage (78%). Respondent's method of harvesting (table 3) revealed that picking drooped fruits has the highest percentage (80%). Table 4 shows that 50% of the respondents preserve their product by wrapping with leaves inside baskets followed by wrapping with nylon (35%) while 7% preserved in jute bags.

Table 3 Distribution of respondents by production

Variables	Frequency	Percentage (%)
Methods of cultivation		
Planting	44	73.3
Retention of wildlings	16	26.7
Sources of product		
Natural forest	5	8
Mixed-Plantation	55	92
Quantity (50kg)		
1-5 Bags	49	82
6-10 Bags	9	15
>10 Bags	2	3
Methods of Harvesting		
Fruit plucking	12	20
Picking dropped fruits	48	80
Total	60	100

Table 4 Distribution of respondents by method of preservation

Methods of Preservation	Frequency	Percentage (%)
Wrapping with leaves inside baskets	60	50
Wrapping in Nylon	42	35
Air-tight Container	10	8
Jute Bags	8	7
Total	120*	100

*Multiple responses

3.3 Marketing by the respondents

Table 5 presents results on the respondent's mode of selling. The result showed that 35% of the respondents sell in baskets, 33.3% sell by counting, 23.3% sell in bags and 8.3% sell in Kongo. Results in Table 6 show that 46.7 % of the respondents have their annual income in the range of ₦10,000 - ₦50,000; 35 % of the respondents have their annual income in the range of ₦51,000-₦100,000, 13.3% and 5% have their annual income in the range of ₦101,000 - ₦150,000 and > ₦150,000 respectively.

Table 5 Distribution of the respondents by mode of selling

Mode of selling	Frequency	Percentage (%)
Counting	20	33.3
Bags	14	23.3
Baskets	21	35.0
Kongo	5	8.3
Total	60	100

Table 6 Distribution of the respondents by annual income

Annual income	Frequency	Percentage (%)
₦10,000 - ₦50,000	28	46.7
₦51,000 - ₦100,000	21	35
₦101,000 - ₦150,000	8	13.3
>₦150,000	3	5
Total	60	100

3.4 Uses of bitter kola in the study area

The result in Table 7 shows that 33.7% of the respondents use *Garcinia kola* for medicinal and social/ceremonial purposes respectively while 32.6% use it for traditional purposes.

Table 7 Uses of bitter *kola* by the respondents

Uses	Frequency	Percentage (%)
Medicinal	60	33.7
Social/Ceremonial	60	33.7
Traditional	58	32.6
Total	178*	100

*Multiple responses



Plate A



Plate B



Plate C



Plate D

Key: Plate A = Researcher with women marketers at a local market; Plate B = Female farmers processing their collections; Plate C = Roadside marketers selling bitter kola to motorists; Plate D = Researcher interviewing a female collector.

Figure 1 Pictures of the researcher with female collectors, marketers and roadside sellers.

4 Discussion

This study revealed that bitter kola enterprise in the study area is dominated mostly by the female gender (Table 2). The possible reasons for this observation might be attributed to the fact that women in the study area are the ones responsible for the collection and gathering of the dropped matured kola fruits either on the farm or in the wild. Also, women are very much involved in the processing and marketing of the product as revealed by the pictures on plates A, B and C (Figure 1). Age distribution revealed that the majority of the respondents in the study area are middle-aged and fairly aged people. These groups represent those who are versatile, agile and strong and whose services are required on the farm because agricultural operations are strength-demanding. This assertion agrees with the findings of Roland

and Oyelana [9], who stated that the majority of the rural households involved in non-timber forest product harvesting and collection were within the age bracket of 41-50 years.

The study showed that the majority of the respondents are married with large family members. The implication of this is that large family size provides a ready-made source of labour which also helps the farmers to cultivate fairly large hectares of farmland. Observation from the study revealed that the bulk of the production comes from the farm where farmers retain and cultivate bitter kola with cocoa, kola nut, plantain, oil palm and other cash crops in a perennial crop combination form of agroforestry/mixed plantation. The study also revealed that dropped matured fruits are usually handpicked from the farm or forest floor in the case of wild collection by the women. The processed nuts are preserved mainly by wrapping them with leaves and kept inside a basket or wrapped in nylon, this is done to prevent them from drying. All these activities provide employment for the respondents thereby giving them a way of life.

Observation from the study also revealed that bitter kola nuts are usually sold at the local market, roadside and social gatherings. The sales from the bitter kola contribute immensely to the income generation of the people in the study area as most of the respondents made good sales of a substantial amount from the nut per year thereby improving their economic well-being. A similar observation was reported by Adedokun *et al.*, [10]. Other areas of great benefits of bitter kola to the livelihood of the people as observed in the study include; traditional, social/cultural and health care delivery (Table 7). The respondents opined that bitter kola is used medicinally as a remedy for curing diseases and ailments (such as cough, bacterial or viral infections, etc) and that the nut is consumed as snacks or offered as a gift, in conferences, workshops and any other social gatherings. This assertion is in agreement with Adesuyi *et al.*, [11] who submitted that the rural population depends largely on forest fruits as they contribute immensely to their food security. The observed traditional usage of bitter kola for prayers during naming ceremonies, marriage ceremonies, housewarming and traditional festivals, further attests to the socio-cultural importance of the nut among the people in the study area.

5 Conclusion

It was discovered in this study that bitter kola enterprise in the study area is mostly dominated by the female gender who usually sell their product in baskets or in counting either at the local market, roadside and social gatherings. The study also revealed that bitter kola contributes immensely to the livelihood of the people in the study area in terms of income generation, traditional values, social/cultural benefits and health care delivery. Consequent to these findings, it is recommended that government should give incentives to farmers through soft loans to encourage large-scale production of bitter kola in plantations for local and international markets. Also, the government should encourage research institutes and pharmaceutical industries to carry out research on the medicinal values of bitter kola and domesticate the result locally for health care delivery.

Compliance with ethical standards

Acknowledgment

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Disclosure of conflict of interest

We the authors of this article hereby stated that there was no conflict of interest and that we are responsible for the contents and writing of the article.

Statement of Informed Consent

This study is not about any individual it is a survey study on the production and contribution of bitter kola to peoples' livelihoods whereby respondents/informants were interviewed after obtaining their consent.

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