Marketing of *Irvingia* spp (Bush mango) in Southwest Nigeria: prospects and challenges

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**Abstract:** The study identified the different marketing networks of Irvingia products starting from the point of production in southwest Nigeria. Data were collected using structured questionnaires which were administered through individual and Focus Group methods. The intermediaries were of three categories – the village merchant (that moves from village to village buying the products); the wholesaler (that buys the products in bulk from village merchant); and the retailer (that sells in small quantities to final consumers). More than 75% of the Irvingia fruits was sourced from the farmland; 43.3% of the traders sold the Irvingia products in retail quantity; 66% of the traders processed the products before selling; and 71.7% of the consumers were household. The traders (65%) indicated that they neither received the products on credit nor pay advance payment to the producers; all the traders (100%) affirmed that there was change in the price of the Irvingia within the past five years and that the price was increasing. The most important marketing problem of *Irvingia* spp was lack of storage facilities (40.0%) and inadequate and/or lack of transport (28.3%). In conclusion, the study recommends provision of appropriate processing and preservation facilities; organisation of skill upgrading programmes for value addition, packaging, and storage for the producers and traders; construction of rural road network; and plantation establishment of the Irvingia trees.

**Key words:** *Irvingia* spp, profit analysis, traders, producers, village merchant, price, marketing problems, advance payment

**INTRODUCTION**

Among other things, rural and poor people depend on non-timber forest products (NTFPs) as sources of food, fodder, medicines, gums, resins and construction material. Forest products were also considered more accessible to rural populations, especially the rural poor. In addition to local consumption, NTFPs are also important traded commodities on local, regional, national as well as international markets. Traded NTFPs contribute to the fulfillment of daily needs and provide employment as well as income.

Information about markets, together with the capacity to act upon it, is an important prerequisite for entering, and maintaining a hold in, new markets. Engagement in the market therefore changes the opportunities and strategies of forest-related people. In most tropical countries, NTFPs play an important role in the daily lives and well being of the local population.

*Irvingia* trees are a valuable source of income for West and Central African farmers. The fruits are sold, but by far the most important product is the kernels, which fetch a price several times higher than the fruits. The trade in kernels not only benefits the producers financially, but also generates income for traders. *Irvingia* kernel markets extend to local, regional and international levels and there is even inter-continental export. ICRAF reported that in 1975 the market for kernel products was worth in the region of US$50 million. This market is still growing.

*Irvingia* spp is commonly known as the African mango, Dika nut, bush mango or wild mango. Two different species of Irvingia have been identified - *Irvingia gabonensis* and *Irvingia wombolu*. Both are very similar, and indeed are often difficult to tell apart from herbarium specimens alone, however there are characteristics that distinguish the two, most noticeably the edibility of the fruit mesocarp of *I. gabonensis*. The kernels of these species also have various local names: in Nigeria, they are 'ogbono’ in Ibo and ‘apon’ in Yoruba. Dudu et al. report that Nigerians distinguish between kernels from *I. gabonensis* and *I. wombolu*, referring to the former as ‘ugiri’ and the latter ‘ogbono’.

The distinction between two forms of *Irvingia* spp was made by Okafor, recognising *I. gabonensis* var. *gabonensis*, which has a sweet edible pulp, and *I. gabonensis* var. *excelsa*, which has a bitter inedible pulp. In other words, *I. gabonensis* fruits are normally bought for their juicy edible pulp, but *I. wombolu* fruits are purchased for their kernels. In 1996, Harris raised...
the var. *excelsa* to species status, naming it *Irvingia wombolu*. The juicy fruit pulp of *I. gabonensis* is rich in vitamin C and is widely reported to be consumed as a dessert fruit or snack throughout Western and Central Africa \(^{(4,19)}\). Agbor \(^{(1)}\) relates that the average adult may eat over 20 ripe fruits at a time. *I. gabonensis* pulp can be used for making jam, jelly and juice \(^{(5)}\). The fruit is sometimes also fed to pigs \(^{(2)}\). The fruit pulp of *I. wombolu*, however, is bitter and tastes of turpentine, so it is not edible \(^{(4)}\).

The kernels of *I. gabonensis* and *I. wombolu* are classed as oilseeds. *Irvingia* kernels form an important part of the West and Central African diet, providing carbohydrate and protein \(^{(16)}\). The kernels are highly valued for the slinky consistency they produce. They are ground with a pestle and mortar or on a stone into a paste or cake called ‘dika bread’, which is used as a soup, stew or sauce additive, for flavouring and thickening \(^{(6)}\). Okafor \(^{(14)}\) notes that whilst kernels from both *Irvingia* spp. are used in soupmaking, *I. gabonensis* kernels can only be used when fresh since they become too slimy over time. Fat extracted from the kernels can be used for food applications, such as in margarine or cooking oil, and is also suitable for soap, cosmetics and pharmaceuticals \(^{(5)}\).

The extent of price variation of the *Irvingia* fruit and seed over the season is such that high prices are experienced at the start when availability is low, then reduced prices as the quantity of product increases, and finally a price increase as the products become scarce at the end of the season. Leakey \(^{(11)}\) also reports that the price of kernels in West Africa varies with the season between £1 (≈US$1.6) and £3 (≈US$4.8) per kg. Ndoye et al. \(^{(13)}\) examined the sales value of *Irvingia* spp. in 28 markets in the humid forest zone (HFZ) of Cameroon and found that over 29 weeks, the total value of sales was 34,633,100 CFA francs (≈US$70,000). The margins gained by the traders were 30% of the total value of sales. These high market values are repeated in Rio Muni, in Equatorial Guinea, where Sunderland \(^{(18)}\) reports that *Irvingia* spp. seeds are sold more widely than any other forest product. Again, sales and prices are greatly influenced by the seasonal availability of bush mango seeds. Sunderland states that in June-September, when *Irvingia* products are in season, 100 CFA francs will buy 40 seeds, whereas during September-December, at the end of the season, the same money will only buy 20 seeds.

The study identified the different marketing networks of Irvingia products starting from the point of production. This covers trade characteristics, channel of distribution by the intermediaries as well as condition for purchase of products and price changes in Southwest Nigeria. This intends at improving the trade and marketing of bitter kola thereby enhancing rural economy and product development.

**MATERIALS AND METHODS**

Five states in southwest Nigeria were selected for the study. They were Ekiti, Oyo, Ogun, Ondo, and Osun (Fig. 1). Multistage random sampling technique was used to select six study sites within each of the states in the order of three Local Government Areas (LGAs) and two villages from each of the three LGAs, totaling thirty (30) sites for the study.

The respondents for the study include thirty traders and thirty producers of *Irvingia* spp. within each of the state totaling 60 respondents per state and 300 for the five states. The tools used for data collection was structured questionnaires which were administered to the respondents through individual and Focus Group methods. Also, interview of the respondents was conducted to supplement the data obtained from the questionnaires. Trained field assistants accompanied the reseaecher to the field for the data collection process and interpretation of the questionnaires.

For the study of marketing and channel of distribution of the Irvingia, this started from the point of production (collection and harvesting from the wild and on-farm), couple with monitoring of the exchange of the products among the middlemen. Purposive sampling method was used to select local markets where Irvingia products were sold. The processing methods which leads to value addition and subsequent change in price among the intermediaries was evaluated. Contributions of the Irvingia to the middlemen and producers, as well as its potential to the livelihood of the rural economy were evaluated.

Descriptive analysis include the use of frequency, percentages, photographs and charts. Inferential analysis employed the use of chi-square and profit analyses. Mathematically,

- **Profit level of the products was determined from the difference of the purchase and selling prices with other external factors held constant.**

  \[
  \text{Profit} = \text{CP} - \text{SP}
  \]

  Where: \( \text{Profit} \) = Profit; \( \text{CP} \) = Purchase price; and \( \text{SP} \) = Selling price

- **Chi-square was determined using:**

  \[
  \chi^2 = \frac{\sum (Oij - Eij)^2}{Eij}
  \]

  Where; \( \chi^2 \) = Chi-square; \( Oij \) = Observed frequency; \( Eij \) = Expected frequency; \( \sum \) = Summation
RESULTS AND DISCUSSION

The traders were both female and married, and between the age class of 41 – 50 years. Trading constituted the highest type of occupation engaged in by the traders and 66.7% of the traders did not attend formal education. Majority of the Irvingia traders in southwest Nigeria were immigrant from other states.

The marketing chain of Irvingia spp as identified in the Fig. 2 started with the producers who are the farmers and owns the tree on their farm and the gatherer who collects the fruit of the tree from the wild. Marketing of Bush mango (Irvingia spp) include the fresh and sweet fruits of Irvingia gabonensis and the kernel of both species (I. gabonensis and I. wombula).

Farmers may either allow the mature fruits to drop and family members pick for further processing or leased standing trees on their land to the village merchants for an agreed period of time (normally fruiting season) and at a cost before fruiting of the trees commenced. The village merchant moves from town to buy the fruit which is then process or buy already processed dry kernel. Also, the traders sell both the fresh fruits or the dry kernel. The wholesaler buys already processed and dry kernel from the village merchant while the retailer sells both the fresh fruits and the dry kernels in small quantity to the consumers.

Trade Characteristics of the Irvingia: As indicated in Table 2, Irvingia fruits was sourced from the farmland. All the traders affirmed that the quantity of the Irvingia has been decreasing within the past five years. Many of the traders sold the Irvingia products in retail quantity, moreover, more than half of the traders processed the products before selling. Majority of the consumers were household. Although not significant from the Chi-square analysis, the traders indicated that both the producers and traders transport the Irvingia from the field to the market. Public transport ranked the highest among the mode of transporting the product, but this was also not significant.

The traders indicated that they neither receive the products on credit nor pay advance payment to the producers. All the traders affirmed that there was change in the price of the Irvingia within the past five years and that the price was increasing. When further asked on the reaction they got from the producers when market price of the product increases, many indicated that the producers also increase price (Table 3).

Table 4 presents the differences in the selling prices of the trees, fresh fruits and kernels of Irvingia spp using different measuring units by the producers and intermediaries in southwest Nigeria. The producers (farmer/gatherer) sell the standing trees and fresh fruits (measure by counting an in basket) to the village merchants. The village merchant in turn sells the fresh fruits (in basket) and the dry kernel (in basin or bag) to the wholesaler who later sells to the retailers in bowl and basin. The retailer finally sell to the consumers using tin of milk and bowl as the units of measurements.

Table 5 reveals the most important marketing problem of Irvingia spp as lack of storage facilities and lack of transport. Other important marketing problems include lack of modern processing technology, price fluctuation, deforestation, and middlemen low price.

Discussion:
Traded Irvingia Products: Bush mango, I. gabonensis, is one of the most frequently harvested and sold product in southwest Nigeria. Although majority of the traders were from the eastern part of the country due to the fact that many of the consumers of the kernel are mostly from the east. Both the pulp and dry kernel of Irvingia spp are traded in southwest of Nigeria, although the dry kernel commands more price and demand than the pulp. The sweet edible pulp is nutritious and consumed as a dessert fruit or snack by the people. The dry kernel of Irvingia spp is used as soup condiment and is mostly eaten by the people from the eastern part of Nigeria, although it is now becoming a delicacy among the people of the southwestern part of Nigeria. Farmers either directly process the fruits of the Irvingia before selling the kernel to village merchants or the fruit could be sold at the local markets or to the village merchant for further processing. Fruit of one of the two major species – I. gabonensis – is eaten while the kernels in the seeds of the eaten fruits are extracted and added to the quantity to be sold.

Marketing Networks of the Irvingia Products: The marketing chain of Irvingia spp started with the producers who are the farmers and owns the trees on their farm or on a leased or fallow land, and the gatherer who collects the fruit of the tree from the wild. Bulks of the fruits were from the farmers, although the quantity contributed by the gatherer from the wild could not be ignored. In some cases, farmers leased standing trees on their land to the village merchants for an agreed period of time (normally fruiting season) and at a cost before fruiting of the trees commenced. Farmers and the village merchant negotiate for the amount that a tree will be leased and the final price depends on how heavy a tree fruits. This final price may vary from tree to tree. In some cases, farmer may collect money in advance before fruiting commenced. In this second case, after the deal has been sealed, the village merchant is responsible for the
harvesting and processing of the fruits, and the profit that he/she makes is left at the mercy of the quantity of the fruit produced by the tree in the leased season.

Apart from buying of standing trees, the village merchant also moves from village to village to buy the fruit which is then process or buy already processed dry kernel. In addition, local markets serve as the trading point where the village merchant and other intermediaries buy the products from the producer. The quantities of the dry kernel bought by the village merchant were sold to the wholesaler who resides in the town and city or sometimes arrange to meet the village merchant at an assembling or marketing point.

The wholesaler buys already processed and dry kernel from the village merchant. Also, the wholesaler stores the dry kernel in large quantity and distributes as far as the eastern part of the country. Due to its significant role of standing between village merchant and retailers, storing and distributing of the product, most of the retail prices are influenced by the wholesaler. The retailer sells both the fresh fruits and the dry kernels in small quantity to the consumers. Most public restaurant that specializes in cooking soup popularly known as “Ogbono” also buys from the retailers.

**Transportation of the Products:** Actually, producers of the Irvingia transport bulk of the products to the market where the intermediaries come to buy. This is good for good pricing and bargain for the producers. In a situation where the intermediaries come to buy on the field, the products were bought at a cheap and low prices, so many of the producers prefer to take to the market. Whichever the case, the transporter (whether the producer or the traders) puts into consideration the cost of transportation and ease of getting the transport. The higher the cost of transportation, it is expected that there will be higher in the price of final sale. When the producer incurred such increase in transportation cost before getting to the market, and plan to sell at a desire price, this could only be possible when there is little quantity of the Irvingia in the market to compete with. But in a situation that the gross quantity available for sale in the market is much (i.e. a glut), the producer has less bargaining power and at the mercy of the middlemen.

**Payment Facilities by the Producers to the Traders:**
Many of the traders of Irvingia revealed that the producers did not give them credit facility neither gave them deferred payment. During field interview of the farmers, many of them affirmed that they did not give credit nor differed payment because of the long distance that the traders use to come from. If the traders refuse to turn up for payment, the farmers informed that they do not know how to trace them neither will they be able to authenticate any discription of their place of residence. In short, the major reason why such opportunities were given to the traders by the producers was lack of total trust. Despite of the foregoing, some of the producers still gave credit facility and deferred payment to the traders, in in which case there exist long trading relationship between such parties concerned.

**Change in Prices and Reaction from the Producers:**
It was confirmed that there has been price increase of the Irvingia products within the last five years. Many of the respondents indicated that the price increase was as a result of the prevailing economic situation and decrease in the availability of the product. Although, price fluctuations were observed within a season in the trend of increase in the price at the beginning and at the end of the season while a reduction in price was experienced at the middle of the season when there is normally glut in the quantity of the product.

Actually, the price that producers get for Irvingia fruits and kernels depends on the location of the market and cost incurred from transportation, this also fluctuates greatly with seasonal availability. Fresh fruits of both *I. gabonensis* and *I. wombolu* are marketed...
locally where they are produced and are traded to non-producing areas. Agbor [1] found that prices were higher in non-producing areas of Nigeria than in producing areas, as would be expected. In producing areas I. gabonensis fruits were more expensive than I. wombolu fruits; however in non-producing regions this situation was reversed. He reports that the value of fruits increased immensely between 1986 and 1994. In some northern areas of Nigeria, he notes that prices are astronomical, due not to low fruit production, but to the absence of sufficient storage facilities and the high costs of transportation. In the Korup National Park, in Cameroon, difficulties in transporting bush mango fruits to the suburban markets because of nearly impassable roads during the peak season reportedly reduced the prices that producers received [19].

The reaction of the producers to price increase of the product was also assessed during the study. In a situation where there is increase in the price of the Irvingia, the producers could only increase the price and not the quantity supplied due to the nature of the product (which is a forest product); its quantity produced is currently at the mercy of nature.

Units of Measurement and Selling Prices of the Irvingia: From the survey, a range of between 3 – 30 trees per farmer was recorded during field. A unit of fresh fruit of Irvingia was sold for an average price of N10 ($0.08) by the producers to the village merchant while an average cost of basket of fresh fruit goes for N350 ($2.92). At an average price of N1,900 ($15.83) that a farmer sells a tree to the village merchant gave an average of N46,200 ($385) that a farmer realized from the transaction. In return, a Village merchant buys between 20 – 30 trees and realized between 3 – 5 Basins of dry kernel from a single tree making 60 – 150 basins per village merchant.

The village merchant sells the a basin and bag of the dry kernel to wholesaler for average prices of N2,500 ($20.83) and N5,000 ($41.67) respectively, this translated to average selling price of N10,000 ($83.33) for the estimated of between 3-30 trees and N262,500 ($2,187.50) for the estimated 60 – 150 basins that a village merchant realized per season. The wholesaler sold in bowl and basin with an average selling price of N2,000 ($16.67) and N7,500 ($62.50) respectively. The retailers sold in small units of cup (Milk cup) and bowl of the kernel for average selling prices of N175 ($1.46) and N1,750 ($14.58) (Table 4).

Major Marketing Problems of Irvingia spp: The most important problem confronting the trade of Irvingia is lack of storage facility couple with lack or inadequate of transport means to convey the products from the field to the market. Lack of good storage facility for the product caused spoilage of the products within short period of production. The producers have no option other than to quickly transport the products to the market for sale before spoilage, but with the issue of lack and inadequate transportation, some of the perishable products (fresh fruits and kernels) get spoiled on the way. These problems again lead to poor bargain or pricing of the products by the intermediaries as the producers are at the mercy of the intermediaries who get the products at cheaper prices. To prevent this, the producers find way of drying the kernel properly before transporting to market while the fruits are allow to rot and the seeds processed into kernel for value addition that attracts good bargain and higher prices.

Moreover, various modern processing and drying technology have been developed, but these are not available to the local people. If available, this would be of important solution to the spoilage problem of the fresh fruits and kernels. Deforestation was identified as one of the problems causing reduction in the density of the Irvingia trees. Deforestation occurred during land preparation for farming, plantation establishment, and construction works.

Conclusion: Despite of the potential and contribution of Irvingia trade in Nigeria, it is still facing a number of challenges which need urgent attention. The following are therefore recommended:

• The study identified that appropriate processing and preservation facilities should be provided to the rural areas where the produce is in abundance. This will go along way in curbing the current rate of spoilage during excess season.
• Organisation of skill up grading programmes for value addition, packaging, storage, account and other management skills for the producers and traders is pertinent. This will also reduce spoilage and wastage of the products and add value, uniformity and improve quality of the processed NTFPs.
• It will be of great assistance to the marketing of Irvingia spp if construction of rural road network is of paramount and pertinent to the concerned authority in the study area.
• Since the producers could only increase the price and not the quantity of the Irvingia, there is therefore the need for plantation establishment of the Irvingia trees so as to serve as steady supply and make up for the current quantity obtain from the farm and wild. This will also solve the tree density gap currently created by deforestation.
• Organization of producers and gatherers of Irvingia at the local level into groups / cooperatives will go along in improving their marketing network, bargaining power, information flow, and micro-enterprise development.
Fig. 1: Map of Nigeria showing the selected States in Southwestern Nigeria

Fig. 2: Channel of distribution of Irvingia spp by the intermediaries in Southwestern Nigeria (Source: Field Survey, 2007)

Table 1: Demographic characteristics of the traders of Irvingia spp in South West Nigeria

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency n = 300</th>
<th>Relative frequency (%)</th>
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<td>Gender</td>
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</tr>
<tr>
<td>- Male</td>
<td>10</td>
<td>3.3</td>
</tr>
<tr>
<td>- Female</td>
<td>290</td>
<td>96.7</td>
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<tr>
<td>Age distribution (years)</td>
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<tr>
<td>- 20-30</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>- 31-40</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td>- 41-50</td>
<td>130</td>
<td>43</td>
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<tr>
<td>- 51-60</td>
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<tr>
<td>- &gt;61</td>
<td>15</td>
<td>5</td>
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### Table 1: Marital status

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<tr>
<td>Married</td>
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<tr>
<td>Widowed</td>
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<td>Divorced</td>
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### Major occupation of the traders

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<th>Occupation</th>
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<td>Civil servant</td>
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<tr>
<td>Others</td>
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### Highest Education status the traders

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<th>Relative frequency (%)</th>
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<td>No formal education</td>
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<tr>
<td>Primary</td>
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<tr>
<td>Secondary</td>
<td>10</td>
<td>3.3</td>
</tr>
<tr>
<td>Adult educ</td>
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<td>0</td>
</tr>
<tr>
<td>Diploma</td>
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<td>0</td>
</tr>
<tr>
<td>Degree</td>
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### Nativity of the traders

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<th>Frequency n = 300</th>
<th>Relative frequency (%)</th>
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<td>Native</td>
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<tr>
<td>Immigrant</td>
<td>255</td>
<td>85</td>
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### Table 2: Trade characteristics of the Irvingia spp in southwest Nigeria

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<th>Variables</th>
<th>Frequency n = 300</th>
<th>Relative frequency (%)</th>
<th>Chi-square</th>
<th>p-level</th>
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<tr>
<td>Sources of the products</td>
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<tr>
<td>Farmland</td>
<td>225</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wild</td>
<td>75</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How is the change in the quantity within the five years like?</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Decreasing</td>
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<td>100</td>
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<td></td>
</tr>
<tr>
<td>Moderate</td>
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<td></td>
</tr>
<tr>
<td>Do not know</td>
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<td>0</td>
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<td></td>
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<tr>
<td>Quantity that the traders sold the Irvingia</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>130</td>
<td>43.3</td>
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<td></td>
</tr>
<tr>
<td>Wholesale</td>
<td>90</td>
<td>30</td>
<td></td>
<td></td>
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<tr>
<td>Both</td>
<td>80</td>
<td>26.7</td>
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</tr>
<tr>
<td>Forms of selling the products</td>
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<td></td>
</tr>
<tr>
<td>Raw</td>
<td>60</td>
<td>20</td>
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<tr>
<td>Processed</td>
<td>200</td>
<td>66.7</td>
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<td></td>
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<tr>
<td>Both</td>
<td>40</td>
<td>13.3</td>
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Table 2: Continue

<table>
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<tr>
<th>Customer</th>
<th>Frequency</th>
<th>Relative</th>
<th>Chi-square</th>
<th>p-level</th>
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<td>Household</td>
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<td>71.7</td>
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<tr>
<td>Industry (small)</td>
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<td></td>
</tr>
<tr>
<td>Industry (Medium)</td>
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<td>0</td>
<td>33.1270</td>
<td>0.0000*</td>
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<tr>
<td>Industry (Big)</td>
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<tr>
<td>Other marketers</td>
<td>85</td>
<td>28.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Who transport the products from the field to market

<table>
<thead>
<tr>
<th>Customer</th>
<th>Frequency</th>
<th>Relative</th>
<th>Chi-square</th>
<th>p-level</th>
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<tbody>
<tr>
<td>Producers</td>
<td>115</td>
<td>38.3</td>
<td>4.0967</td>
<td>0.1289</td>
</tr>
<tr>
<td>Traders</td>
<td>55</td>
<td>18.3</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Both</td>
<td>130</td>
<td>43.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mode of transportation

<table>
<thead>
<tr>
<th>Mode of transportation</th>
<th>Frequency</th>
<th>Relative</th>
<th>Chi-square</th>
<th>p-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal automobile</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public transport</td>
<td>265</td>
<td>88.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td>0</td>
<td>0</td>
<td>0.2194</td>
<td>0.6395</td>
</tr>
<tr>
<td>Animal</td>
<td>0</td>
<td>0</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Human</td>
<td>35</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at p < 0.05 ns not significant

Table 3: Condition for purchase of products from producers and price changes of the Irvingia in southwest Nigeria

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency n = 300</th>
<th>Relative frequency (%)</th>
<th>Chi-square</th>
<th>p-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did producer sell the product to you on credit or received advance payment?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit</td>
<td>45</td>
<td>15</td>
<td>8.4057</td>
<td>0.0037</td>
</tr>
<tr>
<td>Advance payment</td>
<td>60</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>195</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there change in price within the past five years?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>300</td>
<td>100</td>
<td>5.5009</td>
<td>0.0000</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How is the change in the price within the five years like?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing</td>
<td>300</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decreasing</td>
<td>0</td>
<td>0</td>
<td>265.0212</td>
<td>0.0000</td>
</tr>
<tr>
<td>Moderate</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What reaction did you get from producer when market prices of the product increase?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Producer / supplier also increase price</td>
<td>165</td>
<td>91.7</td>
<td>2.5161</td>
<td>0.1127</td>
</tr>
<tr>
<td>Producer retain old price</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Producer increase supply</td>
<td>35</td>
<td>8.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reaction</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Selling Price differences between the intermediaries of the trade of Irvingia spp in Southwestern Nigeria

<table>
<thead>
<tr>
<th>S/N</th>
<th>Variables</th>
<th>Producer (Farmers / Gatherer) to village merchant</th>
<th>Dry kernel realized by village merchant per season and price sold to Wholesaler</th>
<th>Total realized per Season</th>
<th>Dry kernel by wholesaler to retailer</th>
<th>Dry kernel by retailer to consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Unit of measurements</td>
<td>Standing tree</td>
<td>Per fruit</td>
<td>Bag price to wholesaler</td>
<td>Basins per tree</td>
<td>per Season</td>
</tr>
<tr>
<td>B</td>
<td>Price Range (Naira)</td>
<td>800 – 3,000</td>
<td>3,000</td>
<td>90,000</td>
<td>15</td>
<td>200</td>
</tr>
<tr>
<td>C</td>
<td>Average price (Naira)</td>
<td>1,900</td>
<td>46,200</td>
<td>10</td>
<td>2,500</td>
<td>5,000</td>
</tr>
<tr>
<td>D</td>
<td>Equivalent in US Dollar ($)</td>
<td>15.83</td>
<td>385</td>
<td>0.08</td>
<td>2.92</td>
<td>20.83</td>
</tr>
</tbody>
</table>

Units of measurement:
1 bag (50 kg) = 2 basins (approx. 25 kg/basin)
1 Basin = 5 bowls (approx. 2.5 kg/bowl)
1 Bowl = 10 cups (approx. 0.25 kg/cup)
1 bag = 10 bowls
1 Basin = 50 cups
1 bag = 100 cups
Exchange rate: USD ($1) = N120

Table 5: Problems facing the traders of Irvingia in Southwest Nigeria

<table>
<thead>
<tr>
<th>Marketing problems</th>
<th>Frequency = 300</th>
<th>Relative frequency (%)</th>
<th>Most important problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of transport</td>
<td>85</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td>Lack of storage facilities</td>
<td>120</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>Price fluctuation</td>
<td>30</td>
<td>10.0</td>
<td>Lack of storage facility</td>
</tr>
<tr>
<td>Middlemen low price</td>
<td>101</td>
<td>3.3</td>
<td>Lack of transport</td>
</tr>
<tr>
<td>Unavailability of market</td>
<td>0</td>
<td>0</td>
<td>Deforestation</td>
</tr>
<tr>
<td>Seasonal fluctuation in production</td>
<td>0</td>
<td>0</td>
<td>Lack of processing technology</td>
</tr>
<tr>
<td>Spoilage if not sold after cook</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Deforestation</td>
<td>25</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>Expensive labourer</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Lack of modern processing technology</td>
<td>30</td>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

ACKNOWLEDGEMENT

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REFERENCES


