

FEASIBILITY STUDY ON THE IMPORT OF FRESH ORGANIC COCONUT FROM NIGERIA TO GERMANY. A CASE STUDY OF BIOTROPIC IMPORT COMPANY, GERMANY.



A Research project Submitted to: Van Hall Larenstein University of Applied Sciences in Partial Fulfilment of the Requirements for the Degree of Master in Agricultural production chain management, Specialisation; Horticulture Chain.

By

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Abbreviations

CIF:	Cost, Insurance, Freight
COBA:	
FPIS:	Federal Produce Inspection Service
FOB:	Free On Board
GAP:	Good Agricultural Practice
GMO:	Genetically Modified Organism
GMP:	Good Manufacturer Practice
HACCP:	Hazard Analysis Critical Control Point
ICS:	Internal control system
IFOAM:	International Federation of Organic Agriculture Movement
LASCODA:	Lagos State Coconut Development Agency
LASMAL:	Lagos State Ministry of Agriculture and Corporative
NAFDAC:	National Agency for Food and Drug, Administration and Control
NAQS:	Nigeria Agricultural Quarantine Service
NDLEA:	National Drug Law Enforcement Agency
NEPC:	Nigeria Export Promotion Council
NIFOR:	Nigeria Institute for Oil palm Research
NXP:	Nigeria Export Proceed
QWFP:	Quality, Weight, Fumigation and Packaging
RH:	Relative humidity
SON:	Standards Organisation of Nigeria
SPIS:	State Produce Inspection Service
SPS:	Sanitary and Phyto- sanitary Standards
WAT:	West African Tall
WTO:	World Trade Organisation

Abstract

This study focuses on the economic feasibility of fresh organic coconut in Nigeria and other important factors such as quality, volume, logistic and standard that is involved in the supply of one container fresh organic coconut from Nigeria to Germany on monthly basis.

BioTropic is an import company specialized in buying and selling of organic food product. Due to increasing demand for fresh organic coconut, the company is interested in sourcing for more coconut in West Africa preferably Nigeria. The purpose of this study is therefore to assess the feasibility of importing one container of fresh organic coconut from Nigeria to Germany every month. More than 90% of Nigeria's coconut belt is a continuation of plantations or groves along the West African coast running from Cote d'Ivoire and southeast towards Ghana, Togo and Benin to Lagos state of Nigeria. This belt continues in a 1 kilometre wide strip of groves along about 200km of Lagos state coastline. (NIFOR, 2008).The study was conducted in Badagry coconut settlement in Lagos state area of Nigeria which is renowned for coconut production in Nigeria. The settlement is responsible for 50% of coconut production in Nigeria. Semi structured interview and desk research was used for collection of data and the result was analyzed using a chain map as the tool for analysis. The conclusion from the study indicated that BioTropic requirements for a monthly supply of fresh organic coconut from Nigeria such as standard, volume, weight, quality and packaging can be met in Nigeria. The supply chain is economically feasible if there is a proper planning for the supply chain in terms of certification, farming system, logistics, quality management and if the potential stakeholders play their roles as required. Recommendations were given to Bio Tropic on what the company can do at each level of the chain to meet the objective of the study based on the conclusion. Further recommendation was given to Bio Tropic on training the farmers on organic production, ICS of the coconut farmers group and handling of coconut during loading and offloading. Also, grant from LASCODA is recommended to help the farmers in obtaining a group certification for Global GAP. Finally, a logistic planning was recommended to ensure constant supply of a container of fresh organic coconut a month from Nigeria to Germany and to avoid management of losses at the Critical Control Point to prevent economic loss for Bio Tropic.

1. Introduction to problem statement

1.1 Background information on Fresh Coconut

Coconut palm (*Cocosnucifera* L.) is one of the most essential and valuable palms in the world, it is an important crop in the agricultural economy of many countries of the world providing food, drink, housing and raw materials for industries (Nair et al, 2003).

The coconut palm, *Cocosnucifera* is the only accepted species in the genus *Cocos*. The term coconut refers to the entire palm and the seed or the fruit. There are two natural sub-groups, simply referred to as “Tall” and “Dwarf” cultivars. The Tall cultivar group is sometimes given the name *Cocos nuciferavar.typica* and the dwarf cultivar group *C. nuciferavar.nana* (Perera Et al, 2009).The tall cultivars are grown for commercial purpose because they live longer and are higher yielding than the dwarf cultivars(Chan Et al, 2006).

The origin of the plant is the subject of debate (Grimwood Et al, 1975). Several authorities submit an Indo-Pacific origin either around Melanesia and Malesia or the Indian Ocean, while others see the origin in northwestern South America (Perera Et al, 2009). The coconut palm is now widely distributed throughout Asia, Africa, Latin America, the Caribbean and the Pacific region (FAO, 2011).

Global consumption of fresh coconuts is growing at a remarkable pace for coconut water and milk (some 30% of coconut consumption). Coconut water is growing in popularity worldwide as a healthy beverage and the milk is used in a number of food products (Singh Et al, 2007).

Though, coconut oil remains the most important form of consumption of coconuts but over 350,000 tons fresh nuts were traded on the world market in 2008 which cannot be under estimated. In 2010, all EU countries together imported 31,100 t of fresh coconuts. Netherlands is the leading importer of fresh coconut, followed by Germany and U.K respectively (see table 1). Most of the Fresh coconuts imported into EU is sourced from Ivory Coast followed by Sri Lanka and Coast Rica respectively. Ivory Coast is the largest exporter of Coconut in West Africa followed by Ghana (Eurostat, 2010).

Table 1: EU market trend for fresh coconut in 2010

Destination Country	Country of Origin	Volume(t)
Netherlands	Ivory Coast Sri Lanka Coasta Rica	13,500
Germany	Ivory coast Ghana	4,648
Italy	Ivory Coast Sri Lanka	5,600
UK	Sri Lanka Costa Rica	6,300

1.2 BioTropic

Bio Tropic is an import company in Dinslaken Germany. The company is a worldwide importer and seller of organic fruit and vegetable as well as processed foods; they are directly involved in sourcing of organic produce by managing the entire supply chain from the field to the final customer. Their goal is to manage a transparent supply chain of organic-foods and to ensure that the products come from organic farming system.

In the recent years, there has been a steady increase in market demand for fresh organic coconut in Europe (Garibay, 2010). Since the goal of Bio Tropic is meeting customers demand, import of higher volume of fresh organic coconut has become one of their priority task.

Agro-Eco Louis bolk institute a consultancy company known for her expertise in international advice and research on sustainable agriculture, nutrition and health care as well as making system work render services to many agro- companies around the world including Bio Tropic. BioTropic as one of their clients contacted Louis bolk institute to assist them in finding a sustainable supply chain for fresh organic coconut (one container a month) in West Africa, preferably Nigeria.

1.3 Research problem/justification:

Since there is no existing supply chain for export of fresh organic coconut in Nigeria, Louis bolk institute task to Bio Tropic is to identify potential stakeholders in Nigeria who would be interested in the supply of one container fresh organic coconut to Bio Tropic every month. To also assess how feasible this supply chain will be in terms of volume, quality and economic.

1.4 Problem owner: Louis Bolk Institute

1.5 Objective of research:

To assess the economic feasibility of importing one container of fresh organic coconut a month from Nigeria to German.

1.6 Main research questions:

- 1) What are the requirements of Bio Tropic for import of one container fresh organic coconut a month from Nigeria?
- 2) Which ways can the supply of one container of fresh organic coconut a month be guaranteed from Nigeria to Germany including stakeholders, logistics, quality and the economics?

1.7 Sub questions:

- 1a) what are Bio Tropic standard requirement for the farmers and exporter? Certification, farming system and coconut variety
- 1b) which coconut maturity stage is needed by the import company? (Choice of end product, harvest period)
- 1c) what type of packaging is required and how many kg per pack?
- 2a) Where are the production areas in Nigeria?
- 2b) what is the type of farming system used by coconut farmers? (Organic/conventional, mono-cropping/mixed cropping).
- 2c) what is the quantity of organic coconut *Cocos nucifera* (Linn) and the variety that can be supplied monthly (seasonality)

- 2d) what is the quality management needed for import/export of fresh organic coconut?
(Temperature, relative humidity, storage, post-harvest handling, shelf life)
- 2e) How long (time) will it take to transport coconut from production area to the major port and on transit to Germany?
- 2f) what are the costs such as transport and other logistics involved in supply of one container fresh organic coconut from production area to the port of destination?

2. Methodology

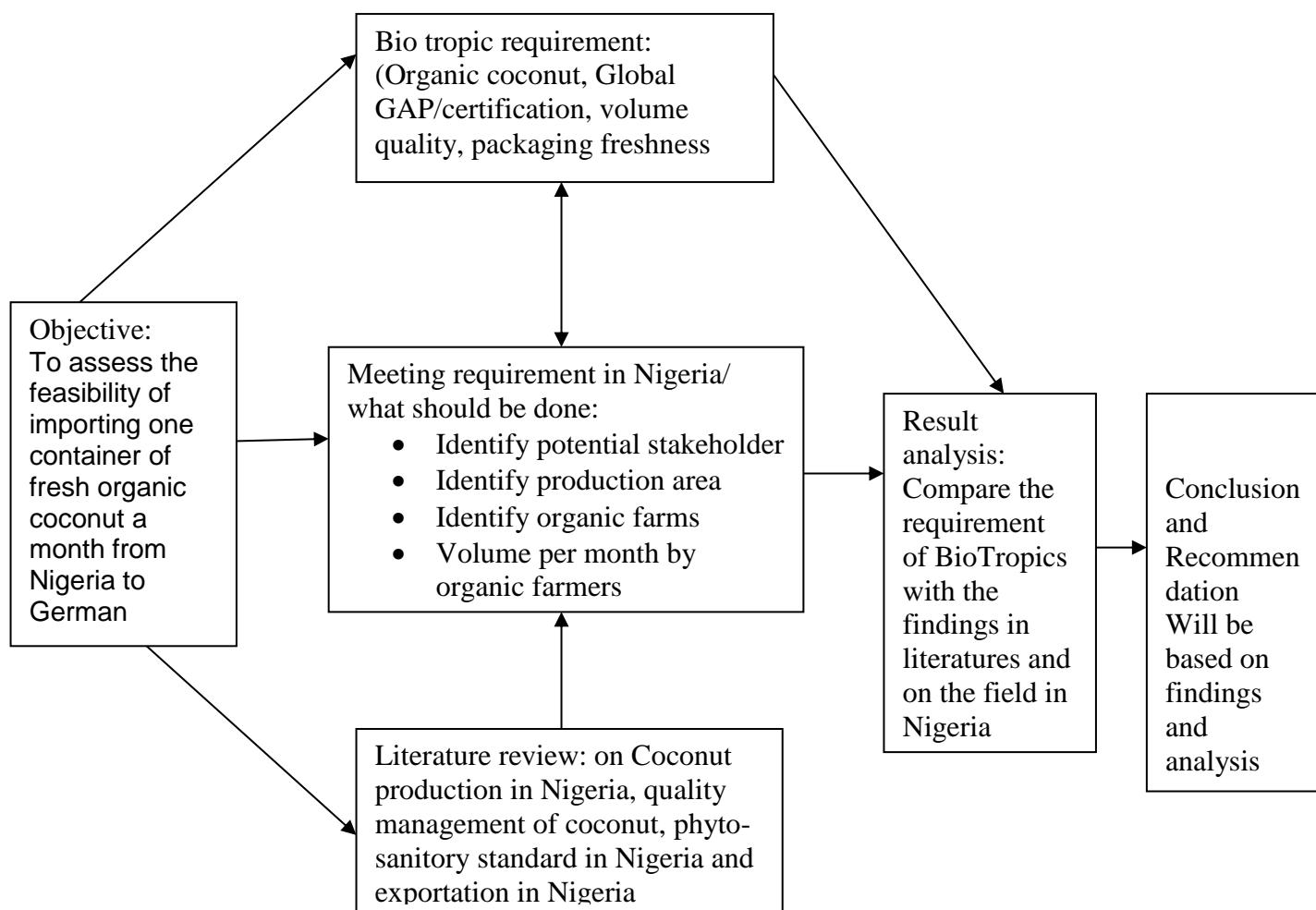
This research utilized a qualitative approach using both desk study and field work data collection. Prior to collection of data's, research objective and research questions were formulated and this was operationalised to identify where the data's will be sourced.

The research focuses on import of one container of fresh organic coconut from Nigeria to Germany. The study assesses the requirements needed for import of one container fresh organic coconut from Nigeria to Germany by Bio Tropic and how these requirements can be met in Nigeria by identifying potential stakeholders in Nigeria (including actors and supports) and their function as well as other factors and activities involved. The proposed supply chain was used as the tool for analysis. At the end, Research questions were answered in the conclusion and recommendation was made based on the research objective.

2.1 Research framework

The figure below assessed the feasibility of importing one container organic coconut a month from Nigeria to Germany by identifying the requirement of Bio Tropic and what is needed to guarantee the supply in Nigeria.

Figure 1: Research framework



Data collection: the data was sourced through desk research and Field work. Semi- structured interview was used for the field work; five informants were interview which includes:

- Representative of the import company who is in charge of import activities in Africa
- A Nigerian exporter who is into coconut product export
- Two coconut farmer groups' representative in Badagry Coconut settlement.
- A representative of LASCODA

The interviews focused on the requirements of the import company and what the role each potential stakeholders can play in Nigeria to meet this requirements. (see appendixes 1,2, 3 and 4 for details of interviews)

Importer

The Author gathered information on BioTropic requirements for import of one container fresh organic coconut from Nigeria. The requirements includes; variety, volume, packaging, weight of coconut, certification.

Exporter

The interviewee gave information base on company's experience on export of fresh coconut from Nigeria. Information was gathered on Logistics and costs that will involve in exporting of one container fresh organic coconut from Nigeria.

Farmers

The two informants are coconut farmers who are chairmen of different coconut farmers association in Badagry coconut settlement in Lagos state.

The researcher gathered information on the plantation size covered by the association, average age of plantations, variety cultivated, harvesting, farming system, export experience and present market niche.

Location:

According to LASCODA informant, Lagos state produces 70% of coconut in Nigeria and 50% of the country's production comes from Badagry. Hence, the research selected this area for the study; see **figure 2** below for the map of Lagos state showing Badagry area of Lagos state.

Figure 2: Map of Lagos state showing the location of Badagry area



LASCODA

The last informant is a representative of LASCODA. The information gathered gave an overview of coconut production in the Lagos state which includes size of Coconut settlement in Badagry, yield per hectare, sales cost and the support they are giving coconut farmers in Badagry.

Desk study

The desk research utilizes the use of literatures (such as books, Journals and local report) and official website of LASCODA, NIFOR, NCS and Eurostat. The major information gave an overview of coconut production in Nigeria, quality management of coconut, Nigeria export requirement and phyto-sanitary certification in Nigeria.

Data analysis:

The results focused on how BioTropic requirements can be guarantee in Nigeria by analyzing the role of potential stakeholders and economics involved as well as the logistics. From this, conclusion was drawn and recommendation was made based on the conclusion.

Limitation

The study had a qualitative approach because a survey could not be conduct therefore the quantitative data's' are only ranges which does not employ the use of quantitative analytical tools. Also, there were very limited literatures which are relevant to the study therefore, the research depended more on information from informant which has no literature backings.

3. Literature review

The literatures reviewed include topics that are relevant to answer the research questions such as production area in Nigeria, legal requirement involve in export of fresh organic coconut from Nigeria to Germany including quality management of coconut, coconut seasonality, freight traffic in Nigeria, phyto-sanitary requirement and certification.

3.1 Coconut production in Nigeria

The Federal Republic of Nigeria is located in West Africa and shares land borders with the Republic of Benin in the west, Chad and Cameroon in the East, and Niger in the North. Its coastline lies on the Gulf of Guinea, a part of the Atlantic Ocean, in the south (NIFOR, 2012).

Coconut is known to grow under diverse types of climate and is highly adaptable; Coconut is usually grown along the sea coast and in plain grounds. They can be cultivated up to 1,000m above sea level and it tends to grow best in places with a mean annual temperature of 25°C – 38°C and annual rain fall of 200mm (Nair et al, 2003). Although, coconut palm is not indigenous to Nigeria but of the humid tropics, more than 90% of nation's coconut belt is a continuation of plantations or groves along the West African coast running from Cote d'Ivoire and southeast towards Ghana, Togo and Benin to Lagos state of Nigeria(see figure 3). This belt continues in a 1 kilometre wide strip of groves along some 200km of coastline in Lagos state. The cultivation of coconut is mostly in grove forest zone of Nigeria. An estimated 36,000ha is presently under cultivation mostly in Lagos and Rivers state and an estimated 1.2 million hectare of land is suitable for coconut cultivation (NIFOR, 2008).

Figure 3: Map of Nigeria showing the coastline of Nigeria



Coconut, through copra was an economic player in revenue generation when Nigeria used to be purely an agrarian country. Though crude oil exploration has pushed cash crops like coconut to the background in Nigeria, coconut is still the most important cash crop in Lagos state (LASCODA, 2010). Coconut is the main cash crop in Lagos State where 30,000 families who are farmers use it as source of livelihood. Lagos' coconut belt stretches about 180km length from Seme Border through Badagry, Ojo, AmuwoOdofin, EtiOsa and IbejuLekki. The belt continues through Ogun, Edo, Delta, Akwalbom and Cross River States (LASMAC, 2010).

The first coconut plantation in Nigeria was established in 1876 Topo Island, Badagry Lagos State. Lagos state produces 70% of coconut in Nigeria and 50% of this countries production comes from Badagry (LASCODA, 2010). Its economic importance prompted the maiden coconut festivals in 2009 which has turned Badagry into the economic honey pot of Lagos state (Flora, 2011).

The West Africa tall (WAT) is most widely grown tall variety as a plantation or compound crop. Traditionally, tall varieties are commercially cultivated. They grow to a height of 15- 18 meters and their life expectancy can be up to 60- 75 years. They start flowering 6 to 7 years after planting and produces large sized nut with good quality copra and oil content (67%) (Nair et al, 2003).

3.2 Seasonality of coconut

Coconuts have characteristics of a single trunked palm which can reach up to 50- 100 ft. in height. They are said to be largely crossed pollinated and produce fruits (nuts / seeds) which are ovoid in shape, up to 15" long and 12" wide. Coconuts are usually seed propagated. They are generally planted 25 ft apart in all directions and can be intercropped with staples like corn and even other tree crops. The maturity period is within 2 – 7 years and the first fruit appears one year after flowering. One tree can yield on average 70-150 coconuts per year. Palms stay productive for 50 – 100 years and yields are highest between 10- 20 years old. A full-sized coconut weighs about 1.44 kilograms (3.2 lb) (Bourke Et al, 2009).

3.3 Quality management of coconut

The information on quality management of coconut was exerted and adapted from Gesamtverband der DeutschenVersicherungswirtschaft, "Postharvest HandlingTechnical Bulletin" by Ministry of Fisheries, Crops and Livestock, New Guyana Marketing Corporation, National Agricultural Research Institute and "Product Specifications and Postharvest Handling for Fruits, Vegetables and Root Crops Exported from the Caribbean", by Dr. A. Medicott.

Fresh coconut is expected to be brown, free from damage, cracking, and sunken eyes and attain the required size specifications (see figure 4). Losses in coconut are mainly as a result of cracking due to poor handling and inappropriate storage and transport condition. Spoilage can occur from softening and disease infection of the eyes. This can be avoided by careful grading, preventing damage to the eyes and maintaining the coconuts under suitable storage conditions. These likely losses are further explained below:

Figure 4: Picture of a good quality coconut for export



Fruit Cracking

De-husked coconuts are prone to stress cracking in which transverse fissures develop, mostly on the bottom half of the nut. Cracks may vary in width from a fine fracture up to 0.4 inch which also splits the inner shell and results in leakage of the internal water. Stress cracks access to fungi and bacteria which cause the water to turn sour and the meat to rot, rendering the fruit worthless. De-husked coconuts are also susceptible to cracking if they are exposed to more than an 8°C (46°F) temperature change within few minutes or to extreme heat or cold. To prevent cracking, coconuts should not be stored below -3°C. In addition, rough handling may also cause cracking of shells. Coconuts must be handled with care.

Mould

Mould growth on the husk surface is caused by various species of fungi and does not penetrate into the coconut meat. Mould is caused by moisture condensation on the coconut surface or storing the fruit at a RH above 90%.

Weight loss

These are indications of moisture loss. To prevent moisture loss, coconuts should be kept cold and maintain a high humidity level.

To guarantee the quality of coconut in a supply chain, grading, handling, temperature and relative humidity are every important factor which can affect the quality of coconut. The critical control points where these factors can be checked in the chain includes;

- **Harvesting**
- **Grading and packaging**
- **Transportation**
 - Inland transport**
 - Container Transport**

3.3.1 Harvesting

External fruit appearance is an indicator of maturity. Depending on cultivar, coconut fruit are green, yellow, or gold in colour when immature. Fruit size is also indicative of maturity. The fruit should be fully developed in size before being harvested. Fruit borne on mature tall trees is harvested with the aid of a ladder or climbing device by skilled climbers. The coconuts are generally left to drop to the ground and collected after the entire tree has been harvested.

3.3.2 Grading and Packing

All grading and packing is usually carried out on the field as opposed to transporting the nuts to a centralized packing facility. Size grading is required for incorrect sizes, damaged and diseased nuts.

3.3.2.1 Cleaning/De-husking

Coconuts intended for export are de-husked to reduce the transport weight and volume. The outer coloured skin (exocarp) plus the fibrous inner husk (mesocarp) is stripped away by striking the coconut against a sharp-pointed metal stake mounted on a platform. A few impaling strokes loosen the husk, making it easier to be removed. Machete can also be used to start the de-husking process. De-husked coconuts are oval to round in shape with the eyes showing. The discarded husks can be placed several layers deep over the de-husked coconuts to help reduce desiccation.

3.3.2.2 Grading

The fruit should be uniform in shape and free of noticeable blemishes or skin damage from insects, diseases, or physical injury. De-husked coconuts should be free of stress cracks and not have deeply sunken eyes. The fruit should not have any protruding germination tubes, leakage of water around the eyes, or surface mould. When shaken, the fruit should have a sloshing sound, indicating the presence of water in the coconut. Any fruit that does not have a sloshing sound when shaken should not be packed for market.

3.3.2.3 Packing

Coconuts are packed in various types of containers, depending on the market destination. Coconuts may be sold in bulk or packed in large synthetic or mesh sacks of known fruit count per sack.

3.3.3 Storage and Transportation

Coconuts are shell fruit (nut types), because of their similar characteristics with regard to transport, particularly their high oil content, their requirements regarding care during storage and transport are the same as those of oil-bearing seeds/fruits. Coconuts are exceptionally sensitive to pressure impact and jolting/vibration. Incorrect handling can result in smashed and burst fruit, which are worthless and also give rise to mold and rot on adjacent. There is also a risk that the nuts will burst under excessive stack pressure. Hooks must not be used.

Effective storage can be achieved for two to three months with the correct grading and handling procedures. Fresh coconuts can be stored at low temperature with high humidity for one to two months, however, they are susceptible to drying and mold. Alternatively, the coconut can be stored for two weeks at room temperature.

Relative Humidity

The ideal storage relative humidity (RH) for coconuts is between 80% to 90%. Coconuts are subject to weight loss and transpiration loss of the water at low RH storage. However, if the RH is above 90% the fruit is susceptible to surface mould.

3.3.3.1 Inland transportation

If the coconuts are transported inland, the fruit are usually loaded onto the bed of a large truck (see figure 5) and transported to the destination. Manual labour is required to load and unload the bed of coconuts.

Figure 5: Picture of a truck loaded with packed coconut



3.3.3.2 Container transportation

Coconuts can be shipped successfully by sea in reefer or dry containers for up to three weeks. A refrigerated container is recommended for the transport of fresh coconut. Also possible (but not ideal) ventilated container (coffee containers), storage temperature of 12°C will assist in quality maintenance.

Cargo Handling

Handling of cargo is another important factor in the chain. Coconut requires cool, dry and good ventilation. In damp weather (rain, snow), the cargo must be protected from moisture, since it may lead to mold, spoilage and self-heating as result of increased respiratory activity. No hooks should be used with bagged cargo, so as to prevent damage to the bags and loss of volume.

In order to guarantee safe transport, the bags must be sowed and secured in a way that they cannot slip or shift during transport. Coconut packs can be segregated with fiber rope or/and thin fiber nets. Attention must also be paid to storage patterns which may be required as a result of special considerations, such as ventilation measures.

Temperature

Coconuts require certain temperature, humidity/moisture and ventilation conditions. For this reason, precise details should always be obtained from the consignor as to the travel temperature to be maintained. For ideal transport conditions, coconuts should be treated as refrigerated cargo. Coconut may also be transported conventionally, provided that a cool between 5 - 25°C and well ventilated container is used. The recommended ventilation settings: air exchange rate: 6 changes/hour (airing)

Coconuts should not be exposed to direct solar radiation, as they would otherwise burst, leak and as a result arrive at the port of destination without coconut water. Coconuts should not be stored near heat sources.

3.4 Legal requirements

This includes all legal documents required for export of one container fresh Coconut from Nigeria to EU.

3.4.1 Export Requirement in Nigeria

Export business worldwide is mainly about documentation. Trust is placed on documents relating to price, quantity, packaging, shipment/movement, origin etc., in a bid to confirm adherence to stipulated procedures. Nigeria custom service explains that the buyer for instance needs documents that would enable the importer clear the goods in the destination country while the seller/exporter needs documents to ensure that he will get paid. In order words, goods may not be exported to destination outside Nigeria unless the exporter has complied with the prescribed documentation requirements.

(NSC, 2012) further explained that an exporter is required to complete and register form NXP with an Authorized Dealer (any Commercial or Merchant Bank) of his choice. The objectives of completing the form NXP are to ensure:

- That goods to be exported meet with the buyer's expectation (order) since the goods will be subjected to inspection conducted by relevant Government agencies depending on the type of export items, these include: Plant Quarantine (Federal Ministry of Agriculture), Federal Produce Inspection Service (Federal Ministry of Commerce and Tourism), National Agency for Food and Drugs (Federal Ministry of Health) and Standards Organization of Nigeria (SON).

- That only goods that have satisfied the buyer's order have been shipped – the Nigeria Customs Service on shipment will duly certify a copy of the form.
- That proceeds due to the exporter are duly repatriated within 90 days of shipment of goods and credited to his Domiciliary Account maintained with the Authorized Dealer that proceed or registered the Form NXP.

3.5 Local inspection/Phyto-sanitary certificate in Nigeria

Sanitary and Phyto-sanitary (SPS) Standards under the World Trade Organization (WTO) Agreement deals with regulatory measures applied to protect human (food safety and zootomic diseases), animal and plant health with the aim of harmonizing SPS measures such as control and inspection procedures and risk assessment methods and facilities of food and agricultural products (raw, semi-processed and processed) in international trade or supply chain (Ibrahim, 2012).

There is array of agencies which handle various aspects of SPS measures in Nigeria. The Federal Ministry of Commerce and Industry, represents the country in the WTO is the focal point for all WTO issues including SPS Standards in Nigeria. The Ministry enforces SPS measures through its parastatals as well as other Government agencies such as:

Federal Produce Inspection Service (FPIS): FPIS inspects and ensures that all agricultural produce destined for exports or local processing meets prescribed international quality standards. The FPIS conducts arrival check tests; it takes into consideration inspection of weight of the consignment, moisture content and inspection of packaging, sampling and disinfestations of produce warehouses. It also conducts inspection as well as quality controls at major seaports in Lagos, Port-Harcourt, Warri and Calabar. Based on 3% sample, it assesses the quality (Q), weight (W), fumigation (F) and packaging (P) of raw or cured agricultural produce and issue QWFP Certificate.

Standards Organization of Nigeria (SON): the custodian of all National and International Standards on Food Safety in Nigeria. SON directs the elaboration, review, adoption and adaptation of food safety standards through the active involvement of relevant stakeholders and publishes the standards for implementation after necessary stakeholder sensitization. SON has the capacity for and does training in ISO 22000 Food Safety Standards, HACCP and Good Agricultural Practice (GAP) in Nigeria. It undertakes inspection in factory for the implementation of food safety standards and issues certification mark under the mandatory conformity assessment program for all locally manufactured food products in Nigeria. It is also the Codex Alimentarius contact in Nigeria and maintains a national library of Codex standards. It is also WTO/SPS enquiry points in Nigeria.

Nigeria Agricultural Quarantine Service (NAQS)

(Adejare, 2006) reported that the NAQS implements SPS standards in Nigeria through the following ways:

Carry out of Import inspection

NAQS manages over 46 entry/exit points at International airports, seaports, land borders, general post offices and courier hub Centre's for port inspection, treatment (if necessary) and detention.

- Issues plant import permit for all plant materials (raw and semi-processed), soil, biocontrol agents, solid wood packaging materials and other regulated articles (e.g. artifacts).

- Inspection of crops during rapid growth, agricultural produces in warehouses and storage facilities prior to certification.
- Manage Post-Entry quarantine station and various laboratories for insect, fungi, virus, bacteria, nematode and tissue culture at Ibadan and zonal headquarters.
- Conduct pest survey to monitor the presence and spread of plant pest of quarantine importance.

EXPORT INSPECTION AND CERTIFICATION

- Handles request for Phyto-sanitary inspection for the presence of pathogen and pests on agricultural commodities for export and determines whether they meet SPS conditions of the importing countries.
- Issues Phyto-sanitary Certificate vouching that the consignment is free from injurious pests.
- Disinfestations of the consignments such as fumigation seed dressing, heat treatment etc. and indicated on the Phyto-sanitary certificate.

3.6 Nigeria Seaport/freight traffic

The seaports are very essential to the Nigeria's trade as almost all imports and exports move through the ports. The importance of the seaports is attested to by the fact that approximately, 99% by volume of Nigeria total imports and exports are sea-borne. Nigerian ports control 60% of imports in West and Central Africa. (Chioma, 2011).

Several studies revealed that the ports were developed in response to increased port traffic, political factors and international development in the maritime industry. Nigeria has a total of eleven ports and eight oil terminals organised in three zones of Western, Central and Eastern zones (Table 2). The central zone has its headquarters in Warri and the Eastern zone has its headquarters in Port Harcourt are predominantly oil terminals, although Warri, Sapele, Koko, Port Harcourt, Calabar and the Federal ocean terminal are important general cargoes.

Table 2: Distribution of Nigeria ports by zone

Zone	Port	Head quarters
Western	Apapa port complex: Tin Can Island, RoRo port, Inland container depot Ijora	Apapa (see figure 6)
Central	Warri port:Sapele port, Koko port, Burutu port, Aladja steel jerry, Escarvos; forcados and penington oil terminal	Warri
Eastern	Port Arcourt, Federal ocean terminal of Bonny, Brass, Qua – Iboe and Antam, Calabar port	Port Harcourt

Cargo throughout in Nigerian seaports can be classified on the basis of cargo type into general, dry and liquid cargoes cargo. General cargo includes containerized, uncreated vehicle, fish and other commodities such as flour, sugar, hides and skin. Dry cargo traffic consists of wheat grain/offal, construction cement, etc. The liquid cargo consists of refined petroleum, liquefied natural gas and vegetable oil, etc. (Chioma, 2011).

In 2005, Apapa port was responsible for 33.7% of the traffic followed by federal light terminal with 12.4% and Tin Can Island with 12.1%. While Koko port had the least with 0.3%. On the basis cargo type, Tin Can island port dominated general cargo traffic with 30.5% followed by Container terminal with 30.2% and Apapa with 23.8%. Concentration of general cargo at these ports is not shocking because the South Western zone of the country is home for 35% of the nation's industries and population. (Chioma, 2011).

Figure 6: Map of Lagos state showing the seaports in Lagos



Apapa port handled 50.8% of the dry cargo followed by Port Harcourt with 21% and Tin Can island port with 12.9%. Liquid cargo was handled mainly by Okrika port with 67% followed by Apapa with 11.8% and Federal light with 8.2%. Hence, cargo traffic is focused in Apapa, Tin Can, Federal light terminal, Port Harcourt and Okrika ports. General cargo is handled mainly by Tin Can island port, dry cargo by Apapa port and Liquid cargo by Okrika port (Chioma, 2011).

4. Result

BioTropic gave the following has the company's requirement to import a container of fresh organic coconut:

1. It has to be from West Africa preferably Nigeria.

Bio Tropic explains why the company wants coconut from West Africa, preferably Nigeria. Has stated by BioTropic informant, he said "We want Coconut from West Africa for two reasons

It is cheaper and a shorter distance is involved in import of coconut from West Africa to Germany than any other country in the world producing coconut

Also, "we are already operating in some West African countries which includes; Mali, importing Mango from there, pineapple from Senegal, Mango from Burkina Faso and Mango, Pineapple and Coconut from Ivory Coast. The Company's Africa office is in Mali. The office monitors production and harvesting in those countries. Therefore, managing another supply chain in West Africa would not be a problem".

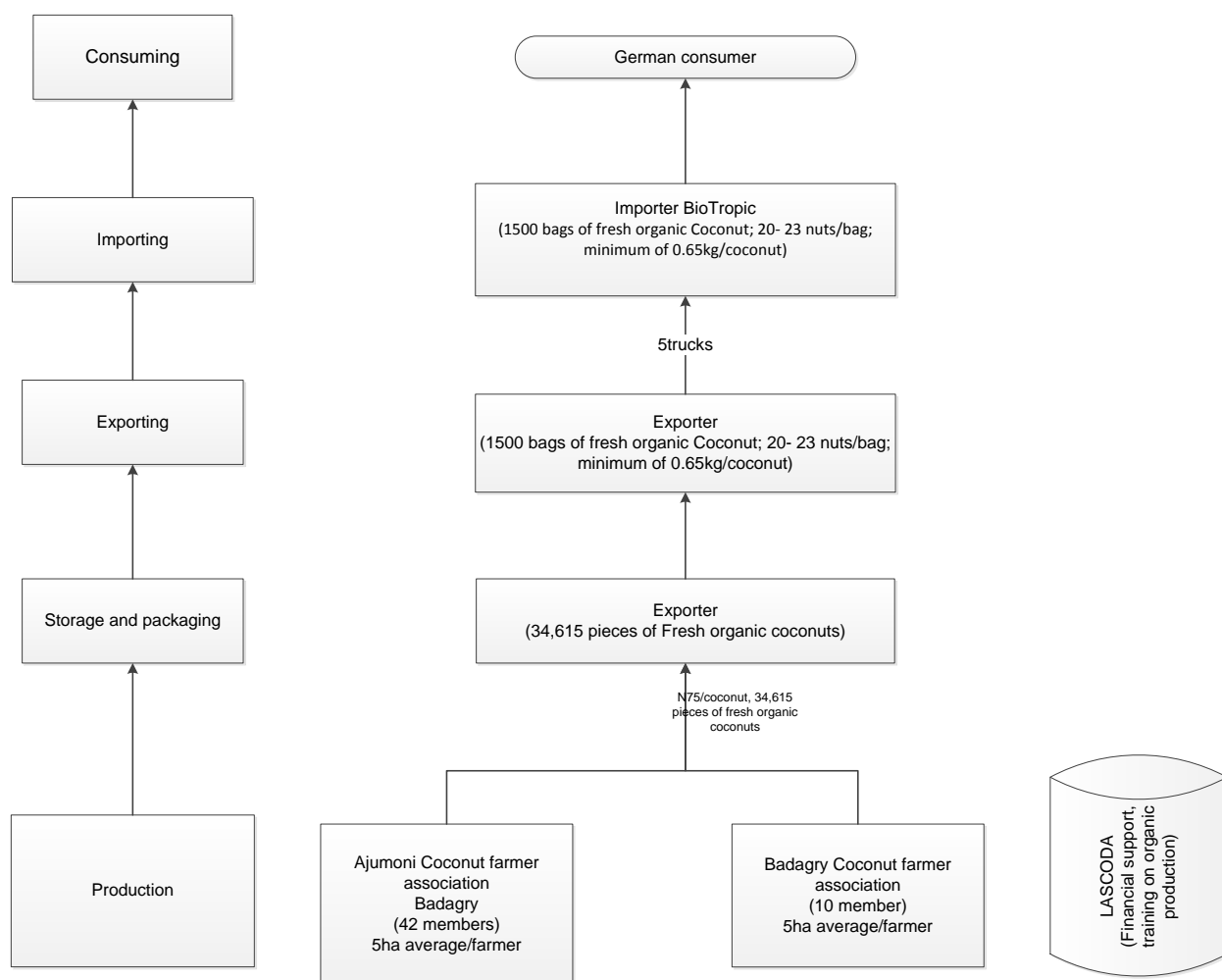
In addition, he said, "although we are presently importing coconut from Ivory Coast but we have not been able to meet the weight demand for the market because most of the coconuts from Ivory Coast weigh lesser than the required weight by the market. Therefore, they have decided to see if another West African country can fill the gap. He said Nigeria is like untapped resource because they have coconut but no export market hence opening up the export market niche will be a good advantage for us considering the volume we are looking forward to".

Other requirements of Bio Tropic are stated below

2. Supply of one container a month
3. Organic and Global Gap certified
4. Each nut must have a minimum weight of 650g
5. Nut packed in 15kg poly bags(23/20 nuts per bag with total of 15kg)
6. 1500 bags(15kg each minimum) to fit in 40 feet container

To meet this requirement in Nigeria, the stakeholders were identified and their roles as well as the logistic and costs involved, see below figure for the proposed supply chain.

Figure 7: Proposed supply chain in Nigeria for supply of one container fresh organic coconut a month to Germany.



The requirement stated by BioTropic will be addressed in the proposed supply chain above (figure 2) based on the following criteria:

- ❖ **Standard**
- ❖ **Volume**
- ❖ **Quality**
- ❖ **Grading and packaging**
- ❖ **Logistics**

Each criterion is addressed at each level in the chain where applicable starting from importation to the production. Analysis is made on activities involved and the role that each actor can play in the chain to meet each criterion listed above based on finding from informants and desk study.

4.1 Standards

Importation: The import company requires the farmers to have a Global GAP certification and practice organic farming. BioTropic informant said the company uses a second party inspection company (SGS agro control Company) which they hire for Global GAP certification inspection and auditing; this is done 2 times a year.

Production:

Presently in Badagry coconut settlement none of the farmer or farmer groups is Global GAP certified or has any other certification, gathered the researcher.

The farmers interviewed informed the researcher that they are ready to get Global GAP certification provided they can afford it. One of them said if the cost is high they do not mind getting it as a group if it is possible. He also said it will be good if LASCODA can help them with the finance for the certification.

To get Global GAP certificate in Nigeria will cost between 4000 – 5000USD dollars. See appendix 5; for Global GAP standard and requirement for fruit and vegetable as well as Global GAP requirements for farmer group certification.

(ONP, 2008) reported that organic farming takes the following into account:

- Minimum reliance on artificial inputs
- Feeding of the soil and not the plant
- Food safety practices (GMP, HACCP, non-use of hazardous chemicals from farm, to distribution, to marketing)
- Certification of the entire production chain, and not the end product
- Non-use of artificial growth enhancers (in livestock)
- Non-use of genetically-modified organisms (GMO's)

See appendix 6 for details on basic principle and requirement for organic product has stated by IFAOM standard.

The researcher gathered the following on the farming system in Badagry coconut settlement from informants.

- Farmers intercrop with vegetables, Maize, Cassava, Banana, etc
- Some farmers are into mixed farming livestock.
- The use of chemical is also very minimal, it was gathered that less than 5% of farmers uses pesticides
- Weeds are removed manually using hoes and cutlasses; animal waste is used as manure

4.2 Volume

Importation:

The import company requires a supply of one 40ft container of fresh organic coconut a month. It is expected that 1500 bags of 15kg each having 20-23 nuts (minimum weight of 0.65kg) will fit in a 40 feet container.

Hence, a 40 feet container will carry

$1500 \text{ bags} \times 15\text{kg/bags} = 22,500\text{kg coconuts} = 22.5 \text{ tonnes fresh coconuts}$

If the average weight of each coconut is 0.65kg, the total pieces of coconut will be
 $22,500\text{kg}/0.65\text{kg} = 34,615 \text{ pieces of coconut will fill a 40ft container.}$

Production:

In Badagry coconut settlement, West Africa Tall variety (see figure 8) dominates the settlement. Literature shows that, the tall cultivars are grown commercially because they live longer and have higher yield with bigger fruit than the dwarf cultivars.

Figure 8: West Africa Tall



As gathered from LASCODA spokesman, due to old age of this WAT variety in Badagry coconut settlement, each tree produces an average of 20 nuts per year. The informant said that harvest is done 3- 4 times a year. It was also gathered that each farmer has an average of 5ha coconut plantation and the average weight of coconut in Badagry is between 0.60kg - 0.95kg.

Since Bio Tropic minimum required weight is 0.65kg/coconut, 0.65kg is used as the average weight of coconut for the calculation below.

If each tree will produce 20nut/tree/year that means, per harvest there will be an average of $20/3 = 7\text{nuts/tree/harvest}$.

Total nuts/ha/harvest if there are 200 trees/ha =
 $7\text{nuts/tree/harvest} \times 200\text{trees/ha} = 1400\text{nuts/ha/harvest}$

Therefore,

The total ha needed to produce 34,615nuts/harvest = $34,615\text{nuts/harvest} / 1400\text{nuts/ha/harvest} = 24.73\text{ha}$

4.3 Grading and Packing

Importation:

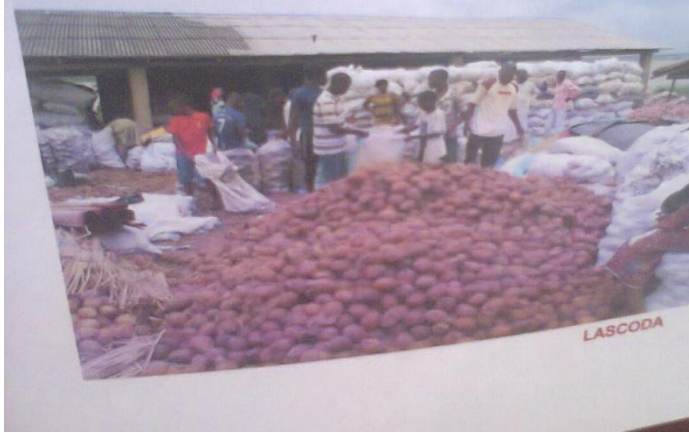
Import Company requires a total of 1500 bags of 20- 23 coconuts/bag with each coconut having a minimum weight of 0.65kg in a 40ft container from Nigeria per month.

Export:

The exporter informed the researcher that the company has been into export for 3 years now. It was gathered that the exporter package based on customers request. The exporter has permanent staff that has been trained on grading (based on weight, maturity and appearance), handling and packaging of fresh coconut.

The exporter informed the researcher that they do not have a permanent warehouse, they usually rent a warehouse to package when there is request but most of the time to save cost, they erect make shift shed at the plantation site where there will be harvest. The shed is usually made of Bamboo for frame; palm leaves for roof and cardboard for the floor. The size of the shed is usually determined by the volume they are dealing with. Also if the volume is very high, they use the settlement central shed (collection center, see figure 9) where all coconut farmers in Badagry usually assemble there produce for sale.

Figure 9: Trading of coconut in front of Badagry central collection sheds



The exporter mentioned the following has materials needed for grading and packaging:

1. Weighing scales
2. Grading tables
3. Sorting baskets
4. Packaging sacks
5. Sack fastener
6. Labels

The exporter explained that the first 3 materials are readily available since they have been using them. The remaining 3 are bought based on costumers' request.

Traceability

Labeling is essential for supply chains. It help to be able to trace back each coconut to production level right from the consumers. The exporter labels each bag of fresh coconut. The label contains the farmers' name, plot number, date of harvest, and the responsible staff for grading and packing.

Production:

LASCODA representative informed the researcher that usually, coconuts in Badagry settlement is sold as either husked or de- husked coconuts and they do not have a formal system of grading. The prices of coconut ranges between N 45 – N 75 from husked to de-husk respectively as well as size.

The exporter explained that buying de–husked coconut from farmers is logical and economical for their business because it reduces the number of workers and save cost of de-husking by the exporter. Also reduces damages due to de-husking by common laborer.

4.4 Quality of coconut

As gathered in the literature, there some activities and factors that can affect the quantity and quality of exported fresh coconut and causes loss includes: handling, grading, temperature and relative humidity. Inappropriate management of these factors can lead to the following:

Fruit cracking

De-husked coconuts are susceptible to stress cracking in which transverse fissures develop, mostly on the bottom half of the nut. Cracks may vary in width from a fine fracture up to 0.4 Inch which also splits the inner shell and results in leakage of the internal water. Stress cracks provide entry for fungi and bacteria which cause the water to turn sour and the meat to rot, rendering the fruit worthless. Rough handling may also cause cracking of shells. Coconuts must

be handled with care. De-husked coconuts are also susceptible to cracking if they are exposed to more than an 8°C (46°F) temperature change within a few minutes or to extreme heat or cold. To prevent cracking, coconuts should not be stored below 3°C. Coconut can be stored at temperature between 5- 25°C. Recommended temperature for coconut is 12°C.

Mould

Mould growth on the husk surface, caused by various species of fungi. Mould is caused by moisture condensation on the coconut surface or storing the fruit at a RH above 90%

Weight loss

These are indications of moisture loss. The normal weight loss due to evaporation of the intrinsic moisture content is 3 - 8%. The threshold for spoilage is usually set at a weight loss of 5%. To prevent moisture loss, coconuts should be kept cold and high humidity level of 80 - 90% maintained to counteract evaporation of the intrinsic moisture content loss of volume.

Importation:

The usually condition expected of coconut by importers or at destination port includes:

- Brown, uniform, fresh, no excessive hairs;
- Free from splitting and cracking;
- No sunken eyes or fungal infection.
- Meet the required weight

To meet and exceed importer expectation mentioned above, there is/are critical control point(s) at each level in the chain as listed in the literature that the actors involved pays attention to in order to guarantee the volume (quantity) and quality required by the import company at port of destination. These control points are discussed below at each level in the chain based on findings from literature.

Exporting:

Grading is required with farmers being made for incorrect sizes, damaged and diseased nuts. Exporter pays attention to the following activities while carrying out the responsibilities as the exporter. The CCPs at exporters' level are discussed below:

CCP 1: Grading and packaging

The fruit should be uniform in shape and free of noticeable blemishes or skin damage from insects, diseases, or physical injury. De-husked coconuts should also be free of stress cracks and not have deeply sunken eyes. The fruit should not have any protruding germination tubes, leakage of water around the eyes, or surface mould. When shaken, the fruit should have a sloshing sound, indicating the presence of water in the coconut. Any fruit that does not have a sloshing sound when shaken should not be packed for market.

CCP 2: Transportation and storage

Coconuts are shell fruit (nut) because of their similar characteristics with regard to transport, particularly their high oil content, their requirements regarding care during storage and transport are the same as those of oil-bearing seeds/fruits.

Fresh coconuts can be stored in a cool temperature with high humidity for one to two months, however, they are susceptible to drying and mold. Alternatively, the coconut can be stored for two weeks at room temperature. The ideal storage relative humidity (RH) for coconuts is between 80% to 90%.Coconuts are subject to weight loss and transpiration loss of the water at low RH storage. If the RH is above 90% the fruit is susceptible to surface mould. In order to

ensure safe transport, the bags must be sowed and secured in a way that they cannot slip or shift during transport. Coconut packs can be segregated with fiber rope or/and thin fiber nets.

Coconuts should not be exposed to direct solar radiation, as they would otherwise burst, leak and as a result, arrive at the port of destination without coconut water. Coconuts should not be stored near heat sources.

Inland transportation

The coconuts are usually loaded onto the bed of a large truck and transported to the destination. Considerable manual labour is required to load and unload the bed of a truck with packed coconuts. During this process of loading and unloading, careful handling of coconut is very important to avoid cracks.

Container transportation

As gathered in the literature, fresh coconuts can be shipped successfully by sea in reefer or dry containers for up to three weeks. A refrigerated container is recommended for the transport of fresh coconut. Also possible (not very idea) is ventilated container (coffee containers), coconuts require certain temperature, humidity/moisture and ventilation conditions. For this reason, exact details should always be obtained from the consignor as to the travel temperature to be maintained.

For ideal transport conditions, coconuts are treated as refrigerated cargo, a storage temperature of 12°C is good quality maintenance of fresh coconut. Coconut may also be transported conventionally, provided that a cool between 5 - 25°C and well ventilated container is used. The recommended ventilation settings: air exchange rate: 6 changes/hour. The literature explained that the major difference between the refrigerated cargo and ventilated cargo is that the shelf life of refrigerated (2 months) as longer shelf life than ventilated container (4 - 6 weeks).

Attention is also paid to storage patterns which may be required as a result of special considerations, such as ventilation measures. The appropriate storage area dimension for fresh Coconut pack in bags is 2.51 – 2.79 m²/t(bags).

Production:

The farmers pay attention to harvesting because it is a CCP where quality can be guarantee to prevent loss in quantity due to which poor field selection.

CCP3: Harvesting

Maturity stage is very important for fresh coconut quality. Fully mature fruit is required and it takes about one year to ripen, and are brown or black, depending on cultivar. The endosperm, from which the copra and oil are derived, is mature at 10 months after flowering. External fruit appearance is an indicator of maturity. Fruit size is also indicative of maturity. The fruit should be fully developed in size before being harvested.

De-husked coconuts are oval to round in shape with the eyes showing. Farmers de –husk their coconut after harvesting. The outer colored skin (exocarp) plus the fibrous inner husk (mesocarp) is stripped away by striking the coconut against a sharp-pointed metal stake mounted on a platform. A few impaling strokes loosen the husk, making it easier to be removed. Machete can also be used to start the de-husking process.

4.5 Logistic

Exporting:

It was gathered from the exporter that 5 trucks will carry 22.5 tonnes of coconut with each truck costing \$400 1USD = N160 (i.e N64, 000 each) from production area to the seaport. Total of N64, 000*5 = N320,000 is needed to transport the coconuts to the seaport in Apapa.

Apapa sea port which is known for general cargo is the most appropriate seaport to export the coconut export based on the information gathered from the literature. It takes approximately 2 weeks to ship from Nigeria to any part of Europe.

Other logistics and the costs that will also be involved in the fresh coconut supply chain are as follows:

- Procurement of coconut from farmers
- Packaging material
- Loading and off-loading costs

The following are the freight and paper requirement needed at the port and all involves cost;

- ❖ Port health certificate,
- ❖ Quarantine certificate(the sanitary and phytosanitary certificate is issued by NAQS)
- ❖ NDLEA
- ❖ NAFDAC
- ❖ Anti-bomb squad, scanning
- ❖ COBA
- ❖ Customs inspection
- ❖ Union due
- ❖ Shipping company cost and insurance

The cost estimate involved in the supply chain is analysed in the main section that follows below.

Production:

To guarantee a monthly supply of one 40ft container fresh organic coconut, there is needed to put the seasonality of coconut in Badagry into consideration. Since coconut is harvested 3 -4 times in a year and 25ha is needed per supply.

Therefore, using 3 harvests in a year is for the calculation.

$25\text{ha} \times 12/3 = 100\text{ha}$

100ha is needed to guarantee a monthly supply of 40ft for a year round.

Accords to the farmers, a total of 52 coconut farmers in Badagry coconut settlement are interested in the proposed supply with an average of 5ha each.

Hence, a total of $52\text{farmers} \times 5\text{ha} = 260\text{ha}$ is available for the fresh coconut supply chain from Nigeria to Germany.

4.6 Cost estimates

To make an estimate of the cost involved in supply of one container coconut from production area to port of destination, the following costs are required:

FOB = Free On Board

Freight

CIF = Cost, Insurance & Freight

FOB = (Production cost + Profit + Expenses) + Transport to the Port of Origin Costs

CIF = FOB + Freight from port of Origin to the Port of Destiny + Insurance

Calculation for FOB

1USD = ₦160

Table 3: Cost estimate for FOB

production/expenses/profit	₦	₦(per monthly cost)
Farm gate price (34,615nuts)	75/de-husked nut	2,596,125
Global GAP certification for farmer (\$5000/yr)	800,000/year	66,667/month
Field/production officer(Bio Tropic hired staff)/month		35,000
Packing and grading/supply(including packaging material, labour collection centre)		200,000
loading(5 trucks)		15,000
Transport to the seaport (5 trucks)\$400 each	64,000/truck	320,000/5trucks
Total		3,232,792

FOB = ₦ 3,232, 792

Landing Cost of Coconut at the port of origin= ₦ 3,232, 792

Landing cost/coconut at the port of origin= ₦3,232,792/34,615nuts
= ₦93/nut approximately**Calculation for freight from port of origin to destination port (+ insurance)**

1USD = ₦ 160

Table 4: Cost estimate for freight

Freight costs	Cost of 40ft container for coconut(₦)	Cost of 40ft container for coconut(₦)
Port Health Certificate	640	640
Quarantine Certificate	640	640
NDLEA	560	560
NAFDAC	800	800
NPA:		
Bomb Squad	800	800
Scanning	480	480
Coba	480	480
Customs inspection	80	80
Union dues	80	80

Loading cost at Sea	15000	15000
Port		
Shipping Agency + insurance:		
Reefer		?
Ventilated container	480000	
Totals	499560	19,560

Freight + insurance = ₦499,560 for one 40ft container of fresh organic coconut

CIF = FOB + Freight from port of Origin to the Port of Destiny + Insurance

CIF = ₦ 3,232, 792 + ₦499,560 = ₦ 3,732,352

Landing cost of one 40ft container of coconut at port of destination = ₦ 3,732,352

Landing cost per fresh organic coconut at port of destination = ₦ 3,732,352/ 34,615nuts = 107.80 approximately ₦ 108 = \$108/160 = \$ 0.68/nut

The land cost of each coconut at port of destination using a ventilated container = \$ 0.68/nut 0.53euro/nut and the retail price for fresh organic coconut in Germany is 1.79€/nut (GAFWT, 2010).

The estimate for a reefer transport is not known. The choice of cargo to be used for the shipment is determined by the export company after knowing the landing cost per coconut at destination port if a reefer is used. Thie price is compared with the retail price of coconut in Germany and that of landing cost per coconut for ventilated container. Shelf life is put into consideration.

4.7 Loss/ risk management in the supply chain

Importation

As calculate in section 4.2, a total of 34, 615 pieces of coconut that meet and exceeds the importer requirements and expectation at the port destination. To guarantee this volume at port of destination, each actor in the chain pays attention to possible losses at each CCP in the supply chain which could affect the volume of coconut at the port of destination.

CCP: Grading and packaging

Losses during packaging and grading can occur if there is improper handling and grading of coconut by the staffs grading and packaging the coconuts. Affected coconuts can be replaced by another to maintain the required volume.

CCP: Storage and transport

After packaging, the coconut can no longer by replace because the packs are seal and cannot be opened (except sample bags for inspection at port of departure) until arrival at port of destination where the coconut either rejected at destination port or by exporters if the requirements for coconut are not met. This rejection is usually a waste and causes economic loss for the exporter. Since excess coconut cannot be included in the container to replace the rejected ones, careful handling of coconut during loading and off-loading is important. Storage arrangement during transportation, temperature and RH is very important for shipment.

CCP: Harvesting

The quality of coconut harvested for grading and packaging volume and quality is required by Import Company. There will be loss in volume if there a lot of poor quality coconut (immaturity, blemishes, lower weight, diseased coconut and physical) is harvested for the supply chain. Allowance is usually given to loss by harvesting more than required coconuts. These excess coconuts are usually used as replacement if there is loss during grading and packaging.

All these losses are avoided by managing losses at CCPs through proper selection of coconut on field, handling during grading and packaging as well as during transportation and maintaining the required temperature and RH in storage and transport **(see section 4.4 for quality managements needed at each CCP).**

5. Conclusion and Recommendation

5.1 Conclusions

Bio Tropic as an importing company requires, a monthly supply of one container of fresh organic coconut from Nigeria to Germany. Their requirements for the farmers and the exporter are based on mandatory standards.

Farmers are required to be Global GAP certified and practice organic farming system. None of the group of farmers has Global GAP certificate as individual or group because they have never been involved in any international supply chain since 1950 when they used to export copra. The research shows that the farmers are willing to get Global GAP certification but they cannot afford the cost (\$ 5000). This research has shown that obtaining Global GAP certification is possible as a group. Farmers do not want to bear the cost of obtaining the certification because of uncertainties of entering a new market.

Organic farming is by default in Badagry coconut settlement but about 5% of the coconut farmers practice conventional farming system. WAT is the predominant variety in Badagry. Usually, WAT is bigger and weighs more than the dwarf variety. The average weight of coconut in Badagry is 0.76kg which meets and exceeds the minimum weight of 0.65kg required by Bio Tropic.

The result shows that the exporter packages coconuts based on importers request. For BioTropic, the exporter is required to package 1500 bags of fresh organic coconut, ensuring that each bag weighs 15kg with 20 – 23 coconuts (0.65kg/nut minimum). Loss management at CCPs is needed to guarantee the required volume at destination port.

50% of Nigeria coconut production is from Badagry which makes Badagry the home of coconut in Nigeria and a suitable location that can guarantee the supply of Bio Tropic. There are two main farming systems practiced by Badagry coconut farmers; intercropping and mixed farming. Larger percentage of these farmers in Badagry is into organic production. Only about 5% of them are into conventional production. The total production area of coconut plantation available for supply is 260ha whilst only 100ha is needed to ensure a monthly supply of one container fresh organic coconut all year round. This shows the possibility for expansion in export volumes.

The research showed that quality management needed for import/exports of fresh organic coconut are to be maintained. The freshness and the weight of the coconut needed to be maintained through proper grading, handling, transportation and storage at the CCPs. Coconuts should be brown, free from damage, cracking, and sunken eyes and attain the required weight of 0.65kg.

For ideal transport conditions, coconuts should be treated as refrigerated cargo. If appropriately equipped means of transport are available, they may also be transported conventionally, provided that a cool 5 - 25°C (the recommended temperature for coconut is 12°C) and well ventilated hold is used. Coconuts should not be exposed to direct solar radiation, as they would otherwise burst, leak and consequently arrive at the port of destination without coconut water. High relative humidity of 80 - 90% is required to counteract evaporation of the intrinsic moisture content.

Incorrect handling results in smashed and burst fruit, which are worthless and also give rise to mold and rot on adjacent, unblemished nuts. There is also a risk that the nuts will burst under excessive stack pressure.

After meeting all the requirements of quality management, another important part of the logistics is time and cost efficiency per shipment in order for the coconut to arrive in good condition. All activities at each level of the chain must be time bound in order not to exceed the estimated cost of exporting. Apapa sea port is known for general cargo and coconut falls into the category. The time from production area to Apapa seaport will take about 3 hours. Shipment from Nigeria to any part of Europe takes 2 weeks. The landing cost per fresh organic coconut in Germany = ₦ 108 = \$ 0.68/nut i.e 0.53euro/nut for ventilated container and the retail price in Germany is around 1.79€/nut.

5.2 Recommendation

Due to the fact that BioTropic want to be directly involved in the supply chain, based on the objective of this research, the following recommendations are made to Bio Tropic. Recommendations are made at each level of the chain that is, from production to exporting. All logistics that will help BioTropic to have an economically feasible and sustainable supply chain for the import of one container of fresh organic coconut a month from Nigeria was also recommended.

Terms and condition

For all transaction and activities that will be involved in the supply chain, it is recommended that BioTropic makes contract with the exporter and farmers. The contract should include the mode of payment, price per coconut, standards as well as term and condition that guarantee a sustainable supply chain.

Production

To ensure that the standard required by BioTropic is met and maintained by the farmers, it is recommended that Bio Tropic assist these farmers on how to obtain a Global GAP certification. Also, a group certification is recommended for the farmers (see appendix 5 for Global GAP group certification requirements). The different ways of how Bio Tropic can assist the farmers is discussed below:

Grant

The farmer need financial support to obtain the Global GAP certificate therefore, it is recommended that Bio Tropic should seek the support of LASCODA to give the farmers grant that will help them get the Global GAP certification for the first year. This idea is to give assurance to farmers on the new market niche. For the subsequent years, the farmer can take care of the certification once they have an established ICS which will assist the farmer with their financial record and account management.

Training

It is recommended that Bio Tropics organize training for the farmers and this training will assist the farmers to have an Internal Control System (ICS) which is a requirement for the group of farmers to get a Global Gap certification and it is also needed for internal and external auditing of the coconut farmers group. This ICS training will include; internal organization of the farmers group and record keeping, these are very important requirement to get certification and to retain the certification.

The training will help them to realize how imperative it is for the two coconut farmer associations to come together as one group and develop an internal structure such as having group objective, rules and regulation management system and record keeping system that will guide

their activities. Also, election of management team and committees will help farmers meet their objective for the new market niche.

It is recommended that Bio Tropic should organise the training in collaboration with LASCODA in order to guarantee the standard needed by BioTropic. The involvement of LASCODA will bridge communication gaps between the foreign trainees and the farmers. To this end, it is recommended that Bio Tropic should employ the expertise of Agro Eco Louis Bolk Institute for the training since they have always used their services.

Although, it was gathered that less than 5% of these farmers uses chemicals on their farm but all of them are into intercropping or mixed farming, it is still important to give training on organic farming because the farmers are not formerly aware of organic farming system. The organic training should focus on all criteria involved in organic farming system. Also, it is recommended that Bio Tropics identifies the farmer that are using chemical amongst the farmers that are interested in the organic market niche and exclude their plantation from the export market until they become organic. It takes 2-3 years to convert from conventional farming to organic farming depending on the prior level of chemical usage and interruption of the biodiversity.

Grading and packaging

Exporting

It is highly recommended that Bio Tropic should ensure the exporter uses the central collection shed where the Badagry coconut farmers usually assemble their produce for sale. This central shed should be used for the grading and packaging rather than doing on farm grading and packaging. Logically, this will help to avoid a clumsy arrangement and guarantee traceability.

Logistic

Logistic is very important in any supply chain. To ensure that the chain is economically feasible for Bio Tropic and still meeting and exceeding customer or consumers demand, the following recommendations are given to Bio Tropic on how to plan the logistics in the chain in Nigeria.

Production

There is the need to get all farmers that showed interest in the new market niche involved in the supply chain. Although, the group of farmers more than the required ha of plantation for the monthly supply. To guarantee the monthly supply of one container of coconut with all farmers involved, it is recommended that Bio Tropic guides the farmers in making a harvest cycle which will be favorable to all members. Bio Tropic should sensitize on the importance of the harvest cycle and how it can be organized with the consent of all the farmers.

It is also recommended that Bio Tropic should ensure that the farmer elects representatives that would be in charge of harvesting and they would be trained by BioTropic on how to monitor the harvesting at the different farms.

It is recommended that the first grading should be done on farm by the committee members responsible for harvesting. The grading should look at the weight, physical injury and other criteria that they are trained for. This farmer's representative should record and label the coconut crates or sacks that are used to transport coconut to the central packing station. The label should include name of farmer, location of plantation and date of harvest as well as the name of the committee member in charge of each farm.

Grading and packaging

As mentioned earlier, it is recommended that the grading and packaging is done at the central collection centre to ensure an organized supply chain. Also to save time and reduce the number of labours involved for exporter.

Supply chain management

Since BioTropic want to be directly involved in the chain as mentioned in the beginning of this chapter, it is recommended that BioTropic should hire locally a supply chain expert who would represent the company in Nigeria in managing the supply chain; this will make communication and organization.

Loss management

It is recommended that Bio Tropic should adopt 5% loss for the total volume required for supply chain. This means there will be additional 5% coconuts to the total number of coconuts required.

Therefore, the total number of ha needed for a monthly supply will increase from 25ha to $25 \times 5/100 \text{ha} = 1.25 \text{ha}$ in total 26.25ha and total of 34, 615 $5/100 = 1731$ coconuts + 34.615 = 36,346 pieces of coconuts will get to the exporter. It is recommended that Bio Tropic should buy the excesses at a lower rate ensure a sustainable chain and sell to the local market.

To reduce economic loss for Bio Tropic, it is recommended that Bio Tropic pays a premium price to both exporter and farmers that meet the requirement of the company this will encourage them to always meet the requirement of Bio Tropic. Also since damaged coconuts cannot be replaced after packing, it is recommended that Bio Tropic organize training for laborers that will be loading and off-loading the packed coconuts. The train will focus on handling of coconut with care and arrangement in storage.

Table 5: stakeholders and their roles and the proposed supply chain

Actor	Responsibility	Bio Tropic role	Remark
Farmers	Harvest coconut every month	Employ the service of Agro Eco and collaborate with LASCODA to train farmers on organic farming, harvest maturity, field quality management.	They will harvest in groups of 11 members with minimum of 5ha each/month
Production Committee(Farmers representatives)	Monitor harvesting at different farms. Organize harvesting cycle amongst farmers. Do the first grading (on farm grading). Label each farmer produce	Train on labeling, on farm grading and harvest cycling planning.	This committee members are elected by the farmer in the formed coconut farmers group for the export market niche The representative are trained specially on on-farm grading and labeling by BioTropic
Exporter	Grading and packaging Export arrangement	Ensure the exporter complies to their requirement	Exporter as been involved in export of coconut from Nigeria.
Field officer	Manage the entire supply chain in Nigeria and report to Bio Tropic	Employed by Bio Tropic.	Supply chain expert hired by Bio Tropic
LASCODA	Support Bio Tropic and farmers on training and grant respectively for farmers.	Collaborate with LASCODA on training.	LASCODA is a supporter of coconut industry in Badagry
Agro- Eco Louis Bolk Institute	Give training on Organic farming, ICS including internal organization of the group and record keeping for Global GAP certification	Employ Agro- Eco Louis Bolk Institute expertise for trainings.	Agro Eco Louis Bolk Institute is a consultancy company known for her expertise in international advice and research on sustainable agriculture, nutrition and health care as well as making system work.

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Appendices

Appendix 1:

Import company: Bio Tropic, Germany.

Questions

Brief introduction of BioTropic

Coconut source

Why West Africa

Your requirement for farmers and exporters

What varieties do you prefer?

What type of certification do you prefer?

What type of packaging do you like?

Who are your costumers?

What is the quality?

How many kilograms a month?

How much do you sell per kilogram?

How much are you willing to pay farmers?

Reality about one container a month

Response

Informant 1: KuemkwongSiemefo, Manager for project development and funding and project management for Africa

History:

Company is involved in buy and selling of organic food product.

Market is Europe, majorly Germany.

Started in 1997 with import of one container Banana from Dominican republic.

Now import from all part of the world.

Started import from Africa in 2007 with import of pineapple from East Africa which was a great loss due to the distance.

Move to West Africa in 2007/2008 to reduce distance and cost.

They started with import of pineapple from Cameroon

Because of volume involved and also insufficient knowledge on organic farming, as well as poor financing of farmer, they developed a project for farmers who are ready to partner with them

The project source for fund from different institutions and organisations willing to support. The fund is used to give farmers training on organic farming and other technical aspect involved(post-harvest management).

The project started in Mali with mango later moved to other countries like Senegal(pineapple), Burkina Faso (Mango) and Ivory coast(pineapple, mango and coconut).

Have their African home office in Mali with hired staffs who manages the activities of all the countries; the staffs gives training monitor farms and organise the harvesting.

They do not work with exporter because of their experience with exporters and complaint from farm that seldom see the diffidence of their labour.

They work with small farmers to spread risks and also to assure supply throughout the year.

Quality management auditing is done by a hired company who goes twice in a year for the auditing.

Coconut is majorly imported from Ivory Coast but they do not meet the market volume because the size of coconut in Ivory Coast does not meet the minimum weight of the market demand.

Requirement of Bio tropic for organic coconut

It has to be from West Africa

Supply is one container a month

Organic and Global Gap certified

Each nut must have a minimum weight of 650g
Nut packed in 15kg poly bags (23/20 nuts per bag with total of 15kg)
Usually pack 1500 bags (15kg each minimum) in 40 feet container

Appendix 2: Interview with exporter

Questions

1. Background information about your company.
2. How long have you been dealing with coconut?
3. What type of coconut product do you export mostly?
4. How often do you export fresh coconut?
5. Do you have constant supplier of coconut (i.e farmers) and which part of the country are they?
6. How many fresh coconuts can you get in a month?
7. How do you monitor quality management by farmers and your staffs?
8. Are your famers certified internationally?
9. If yes what type of certification and do they comply with the international standard?
10. Do you export organic coconut or conventional coconut?
11. What type of international certification do you have?
12. Which country(s) do you export to?
13. How do you buy the coconut?
14. How do you package fresh coconut?
15. How do you store the fresh coconut (do you have warehouse)?
16. Is there any inspection of product at the port? If yes, it is done by which body.
17. Cost estimate involve in export of one container fresh organic coconut

Response

Informant 2: Mrs Elena Clinton

The company was established in 2006 to export agric commodities. They are located in the south-south region of the country. The states include delta, imo, edo etc.

They have database of about 300 farmers. And we work with cooperative of farmers. They have been dealing with coconut for 3 years now with export of whole coconut (fresh coconut) as the major coconut product because it is easy to manage and export; also it is their customers demand

Export is done on order but have a constant supply of 9 tonnes per month to Dubai and Egypt. Agencies involved in Europe have not accepted Nigeria. They have accepted Ghana and they are still considering Nigeria.

Quality is monitored through the use of local inspection agencies and their farmers are not certified but they comply with international standards because agencies inspect them.

They export conventional coconut and has no international certification but there are government inspection agencies at the port like NAFDAC, NDLEA, NAHCO etc Produce Inspection Agency, Port Inspection Agency, Nigeria Airport Handling Company (NAHCO).

They pack in cartons (20k per carton). There warehouses is made of bamboo and raffia. The cost from farm is about N60 per coconut.

For the export to Germany;

We will need five trucks to transport 22 tonnes of coconut to the port
Each truck cost US\$400 to the sea port from farm

To ship a 20' container of coconuts to Hamburg is about US\$ 3000
(prices change quickly)

Papers required at the port include:

Port Health Certificate given for US\$4

Quarantine Certificate US\$4

NDLEA US\$3.50

NAFDAC US\$5.00

NPA

Bomb Squad US\$5.00

Scanning US\$3

Coba US\$3

Costoms inspection US\$0.05

Union dues US\$0.05

For grading and packing for the 22.5 tonne we will charge about: ₦200,000.

Appendix 3: Interview with farmers

Questions

How many coconut farmer associations are in Badagry

Total number of farmers in your association

Average farm size of farmers

Average age of coconut farms of your association members

Disease and pest management used by group members

Farming/cropping system

Badagry Coconut settlement

Informant 3:

Captain Aivoji; Chairman Coconut growers association

There 8 Coconut farmers association in Badagry Coconut settlement

Association members are 10 in number

Members grows tall Africa breed which is predominant and hybrid which is just been cultivated

The nut of the tall breed is bigger than the hybrid

Plantation ranges between 16ha - 50ha

Age of plantation ranges between 50- 70 years

Harvest is done 3 – 4 times a month

Members intercrop with cassava and maize using maximum of 5ha per season

Some member has poultry and piggery. The waste are used as manure in the plantation

Organic fertilizers are also used and teak plant powder is used as pesticides against termite which is the major pest.

Some members used chemical control when disease and pest get out of thresholds but hardly encounter any major pest and disease attack in the past 10 years

Weeds are remove manually using hoes and cutlasses

Market niche is the local company that produces crème and coconut oil. It is also sold to local market as fresh coconut or coconut oil which is processed by their wives

Interest in new market niche

Exporting fresh coconut is a good advantage to them because it will bring more money and save tem the stress of processing drying the coconut and into coconut oil because they still make use of crude equipment which is energy consuming and takes alot of time

For the volume required, they suggest cooperation with other coconut association in Badagry will make it successful

Informant 4: Alhaji Onilude; Chairman Ajumoni Coconut farmer association

Members: 42

Plantation: Ranges between 5- 25ha

Variety: Tall Africa Coconut, Just growing hybrid

Farming system:

Intercrop with Cassava, Vegetable, Maize e.t.c. Uses herbicides and pesticides to control weeds, pests and diseases when attack is intense but mostly remove weeds manually using hoes, cutlasses and some uses tractors

Shift cultivation is also practised with intercropped plant years.

Harvest: 3- 4 times a year

Export record: none because alot of cost is involved.

Market niche: Local market as fresh coconut and coconut oil which is processed by their wives

Interest in export:

Ready to adopt organic production

Will to get Global GAP certification in collaboration with other association if the price for certification is high

Appendix 4: Interview with LASCODA representative

Informant 5: Mr. Amoo, Deputy Director LASCODA

74% of the coconut farmers are males and have average age of 50years.

Majority of farmers have less than 5hectares of coconut farm and most of the land are inherited, though, a few individually owned coconut farm-land exist.

The West African Tall (WAT) variety is predominant. The hybrid and the dwarf varieties are just gaining ground.

Pesticide is used one to two times in a year, less than 5% farmers use pesticides

The target market is usually the local market. The coconut produced are either sold raw (undehusked) or dehusked. The latter commands higher price than the former which are usually sold at peanut farm gate price.

A little percentage goes into processing of coconut into different products.

Some coconut merchants transport the dehusked nuts with trailers from lagos (Badagry market) to the Northern part of Nigeria.

Weeds are removed and controlled mostly by manual method. Mechanical (tractor) is also popular while only a very few farmers use herbicides

Intercropping on coconut farms is 100%. Crops intercropped with are: maize, tomato, melon, cassava, banana, etc.

Coconut is usually harvested on quarterly basis. i.e 3-4 times/year.

Due to the old age of the trees, less than 20Nuts/Palm/year is harvested. Note: 1 ha has 200 trees

Harvested coconuts are measured in the unit called "Hand". 1 Hand = 40 Nuts in badagry. There is no standard form of grading coconut that are meant for sale (the existing grades are: small, medium, large, jumbo).

Most nuts are sold when dehusked to middlemen and merchants

An average husked and de-husked nut sells for ₦40 and ₦75 respectively

Marketing costs that are incurred include: security fees, rents, transportation, association dues etc

Interest in export market Niche

Availability of export niche will open the potentials of the crop as a commodity of international trade.



CBI
Ministry of Foreign Affairs

GlobalGAP (Fresh Fruit and Vegetables)

When exporting fresh fruit and vegetables to the EU, food safety is the most important concern of European buyers, consumers and authorities. To be assured of a high quality level of their products, a group of European retailers developed a management system based on Good Agricultural Practices (GAP), which became one of the most important buyer's requirements in the fresh produce sector. The system includes a standard and independent certification. Since it was initially a European initiative, the system was called EurepGAP. However since it is now a worldwide accepted system the name was changed into GlobalGAP in 2007. Although food safety was the initial incentive, the standard nowadays also includes requirements on environmental and social issues. Furthermore standards are developed for products other than fresh fruit and vegetables, such as fish, livestock, flowers, cotton, coffee and tea. This document provides information on the GlobalGAP standards for fresh fruit and vegetables. In general, the approach is the same for all sectors. Information is provided on the format and the content of the standards, as well as possibilities for smallholders and benchmarks with other certification schemes. More information on GlobalGAP for fishery, flowers and cotton can be found in the related documents.

How relevant is GlobalGAP in Europe?

GlobalGAP represents many leading European food retailers like AHOLD, Aldi, ASDA, Coop, Delhaize, Kesko, Laurus, Lidl, Marks and Spencers, Migros, Metro, Sainsbury's, Tesco and Waitrose. Therefore, for fruit and vegetables its market impact is substantial. The exact market impact differs in each EU Member State. Therefore, it is advised to check the GlobalGAP website for the participating retailers in order to get a clearer view. Please note, that some buyers have their own additional requirements (e.g. on lower pesticide residue levels) when purchasing fresh fruit and vegetables. It is therefore recommended to check with your buyer if there are any extra demands.

GLOBALG.A.P.

GlobalGAP in brief

- GlobalGAP is a **private sector initiative** that sets voluntary standards for the certification of agricultural products around the world.
- It is a **pre-farm-gate standard**, which means that the certificate covers the process of the certified product in all the farming activities until the product leaves the farm.
- It is a **business-to-business label**, so not directly visible to consumers.
- Certification is carried out by **independent and accredited certification bodies** in more than 100 countries.
- **Producers are inspected** during announced and unannounced inspections.
- **National or regional farm assurance schemes** that have successfully completed their **benchmarking** process are recognised as an equivalent to GlobalGAP and therefore do not need separate certification.

Certification

If you want your products to be certified, your farm has to be inspected by an independent and approved body. GlobalGAP Certification Bodies include: AB Cert, EUROCBRT, ICM, Lloyds Register QA and SGS AgroControl. More accredited bodies can be found on the GlobalGAP website.

Costs

Although the GlobalGAP-certification is demanded by EU retailers, the costs of compliance are at your expense as an exporter or producer. The costs of compliance can be divided into two categories: nonrecurring and recurring. Nonrecurring costs are



the one-off or time-limited investments made in order to be able to achieve compliance. For example, upgrading processing facilities, establishing new procedures and the training of personnel. Because certification is dependent on various factors, costs of certification can vary. Recurring costs are borne over time and include the costs of verification audits, detailed record-keeping and implementation of traceability systems.

The standard

GlobalGAP consists of an Integrated Farm Assurance standard (IFA) which integrates three main product groups: Crops, Livestock and Aquaculture. These product groups are divided again into more specific products such as Fruit & vegetables, Tea, Figs, Finfish, etc.

For all products and product groups GlobalGAP developed requirements that aim for:

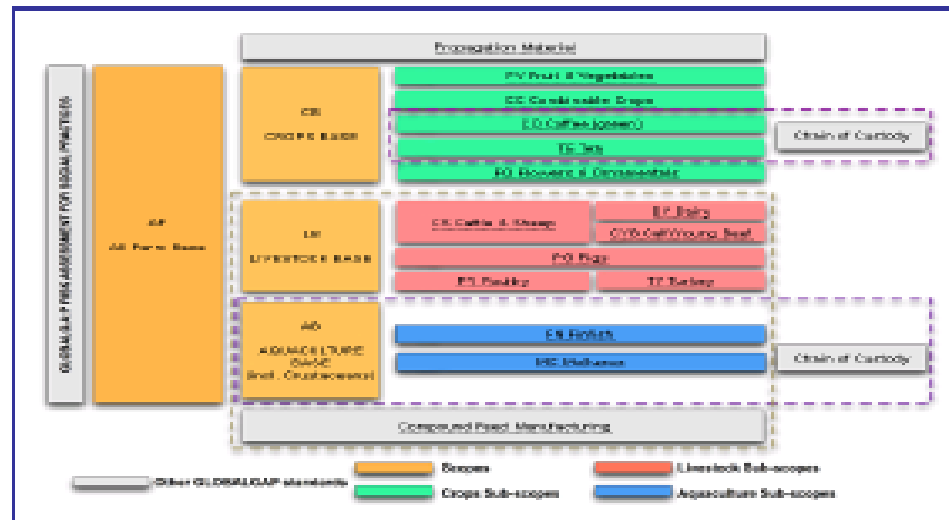
- safe products;
- traceability through the supply chain; and
- environmental aspects of agriculture.

When you put the requirements for one product group together, in practice you could certify that product group with one single audit. So, a farm with different products (for example beans, mangoes and onions) can be certified for all these products with one audit, because they all are included in the group fruit and vegetables.

Besides the IFA, there are separate standards on:

- GlobalGAP compound feed manufacturer standard (CFM)
- GlobalGAP plant propagation material standard (PPM)
- GlobalGAP risk assessment on social practice (GRASP)
- Chain of Custody certification for coffee tea and fish

See the picture below for a schematic overview of the GlobalGAP standards



Source: www.globalgap.org

The IFA includes a set of requirements that should be implemented. These are called Control Points and Compliance Criteria (CPCC). On the GlobalGAP website you will find these requirements for All Farm Base products (AF), Crops Base products (CB), Livestock Base products (LB) and Aquaculture Base products (AB) as well as requirements for the specific product groups.

For example, a producer of beans must meet the all farm base criteria, the crops base criteria and the criteria for fruit and vegetables, while a producer of tea must comply with the all farm based criteria, the crops based criteria and the criteria for tea.

On the GlobalGAP website you can find the same chart with product groups as shown above. By clicking on one of the product groups, you will find:

- all relevant criteria
- checklists
- guidance documents for that specific product group
- information on benchmarking

GlobalGAP requirements for fruit and vegetables

The requirements for fruit and vegetables consist of three types, ranging from general requirements to product specific ones.

(1) All farm based produce

- record keeping and internal self-assessment/internal inspection
- site history and site management
- workers health, safety and welfare
- waste and pollution management, recycling and reuse
- environment and conservation
- complaints
- traceability

(2) Crops-based

- traceability
- propagation material
- site history and site management
- soil management
- fertiliser use
- irrigation/fertigation
- integrated pest management
- plant protection products

(3) Fruit and vegetables

- propagation material
- soil and substrate management
- irrigation/fertigation
- harvesting
- produce handling

All documents on standards (CPCC), checklists and guidance documents relevant for fruit and vegetable producers can be found by clicking on 'fruit and vegetables' in the product overview chart on the GlobalGAP website. This list of points and criteria show the complete standard and the status of requirements. Some of the requirements are **major musts**, others **minor musts** and there are also **recommendations**. Please note that some topics appear on more than one of these checklists. In these cases there are different compliance criteria on the same topic (e.g. different criteria on traceability in the checklist for all farm based produce and crops based produce). The producer must then meet all criteria on these topics.

➡ A direct link to the documents for fruit and vegetables can be found in the external links section.

Smallholder involvement

Many small farmers based in developing countries have difficulties with fulfilling the GlobalGAP requirements. For many of them the administrative burden of the management system proves to be a bottleneck. Certification is a costly business and it is yearly recurring. Another bottleneck is the trend that European retailers are increasingly looking for bigger suppliers instead of small farmers. Because of the traceability requirements in the food sector, many European retailers have the tendency to have a few big suppliers rather than many small farmers in their supply chain.

GlobalGAP has developed four approaches that could facilitate market access for small-scale farmers.

1. Group certification

Small farmers can obtain group certification. This means that small farms can form a group and obtain a certification together. Possible advantages of group certification:

- Reduction of certification costs such as inspection charges and overhead costs.
- Centralisation of many requirements necessary for certifications such as pesticide controls.
- Group dynamics that make it easier to provide farmers with advice regarding the implementation of the standard. Peer pressure on the group members increases their motivation to comply, as when one member fails the whole of the group is affected.
- Being a more interesting partner for EU retailers who do not have to deal with many small suppliers separately.

In July 2010 there were more than 100,000 GlobalGAP certified producers in 94 countries, of which more than 60% are group certificates. These groups mostly exist of smallholders varying from 50-10,000 farmers per group.
Source: www.globalgap.org

2. Smallholder manual

In cooperation with the German development organisation GTZ, GlobalGAP has developed a smallholder manual. This will help farmers to establish their internal control system. It includes operational procedures and recording forms to be used as templates for farmer groups.

3. Feedback opportunities

GlobalGAP wants to incorporate the needs of smallholders into the application and further development of the standard. Therefore smallholders have opportunities to give systematic feedback. Examples of recent achievements are:

- Setting up a National Technical Working Group (NTWG) in Kenya
- Training of Ghanaian sector organisations on the establishment of National Technical Working Groups (NTWG)

➡ For more information, refer to www.africa-observer.info

4. Smallholder Implementation Guidelines

The GlobalGAP smallholder project developed practical tools and global best practice guidelines to facilitate implementation of the standard by smallholders worldwide. These smallholder implementation guidelines can be downloaded, free of charge, from the GlobalGAP website

Coherence with other standards

Benchmarking

Before GlobalGAP existed in its current form, several countries and organisations had developed their own Good Agricultural Practices. The presence of several standards next to each other lead to situations where companies had to be audited and certified by different inspections. To end this costly and inefficient practices, GlobalGAP has the possibility to benchmark existing GAPs with GlobalGAP. Once a standard is approved, the standard is recognised as equivalent to the GlobalGAP standard. This means that audits based on the benchmarked standards are accepted to prove compliance with both GlobalGAP and the benchmarked standard. An important example of an approved standard is the German QS (Qualität und Sicherheit). On the GlobalGAP website you can find a list of approved standards, as well as lists of provisionally approved and applicant standards.

Other management systems

As GlobalGAP is a pre-farm gate standard, technically the standard only covers the practices on the farm itself. Your buyer however may want quality assurance for the whole supply chain of the products he purchases (thus also in the stages of transport and/or processing). GlobalGAP cooperates with several other food safety management initiatives such as BRC and GPSI.

➡ For more information on these and other food safety management systems, refer to the related document.

Last updated: November 2010

IFOAM Basic Standards

At a glance

This document provides an overview of the IFOAM Basic Standards system.

IFOAM Basic Standards is one of the several standard systems that are referenced in Standards Map, the interactive web-based tool on private standards developed by the T&SD program of ITC.

What is IFOAM Basic Standards

The International Federation of Organic Agriculture Movements (IFOAM) is a membership-based organization that develops standards for organic agriculture and implements specific projects that facilitate the adoption of organic agriculture, particularly in developing countries.

The IFOAM "Organic Guarantee System (OGS)" is based on two main components: the IFOAM Basic Standards (IBS) and the Accreditation Criteria – together called "The IFOAM Norms". To date, Standards Map offers info on the IFOAM Basic Standards (IBS) only.

On 31 January 2011, IFOAM opened a consultation period on the first draft of the "IFOAM Standard" and on the "Common Objectives and Requirements of Organic Standards (COROS)".

The IFOAM Family of Standards contains all regulations and private standards approved by IFOAM. The "Family" was launched with all organic regulations older than 5 years of implementation, equivalent regulations and private standards of IFOAM Accredited Certification Bodies. Other standards will be approved on the basis of applications and of their equivalence with the Common Objectives and Requirements of Organic Standards (COROS).

What products are covered by the standard system

The IFOAM norms cover a wide range of products including crop production, livestock, wild products, processing, fiber processing, and aquaculture among others.

What are the key features of the standard system

- The IFOAM Principles for Organic Agriculture are:
 - Principle of health;
 - Principle of ecology;
 - Principle of fairness;
 - Principle of care.

- The IFOAM Basic Standards provide a framework for certification bodies and other organizations to develop their own standards that may take into consideration additional or more specific criteria.
- The accreditation of certification bodies is carried out by the International Organic Accreditation Service (IOAS) which operates independently from IFOAM.

IFOAM facts and figures [see annex](#)

- IFOAM counts 849 members in 118 countries.
- IOAS has accredited 36 certification bodies around the world.
- World standards and IFOAM publications available on IFOAM website – bookstore.

Support

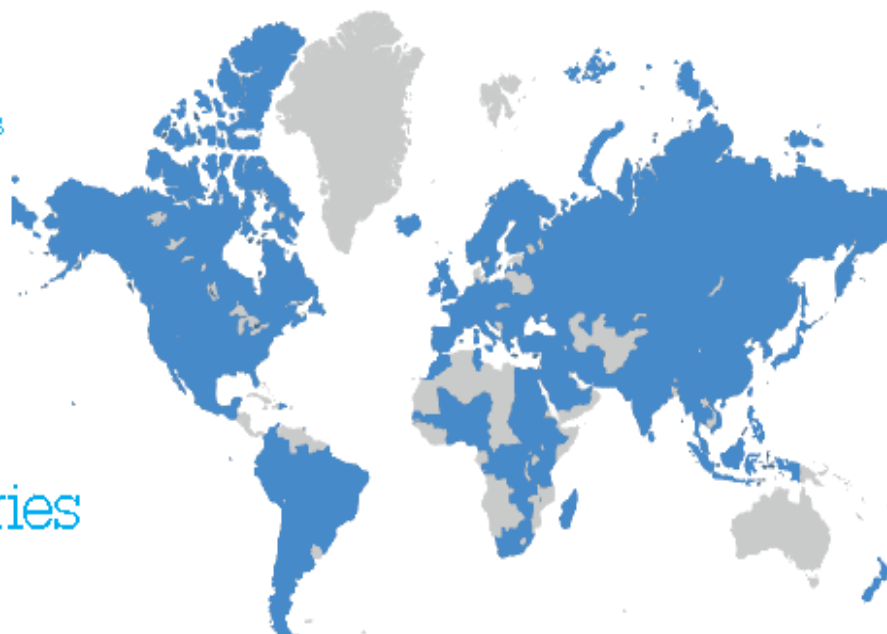
IFOAM offers a range of support services, including on-line courses, materials and documents as well as in the field capacity building and training activities. IFOAM has also developed an on-line training platform that facilitates the access to specific information and training modules.

IFOAM Contact Details

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headoffice@foam.org
www.foam.org

The IFOAM Basic Standards system is applicable to producers in the following countries and regions

Detailed maps displaying countries where certification / verification is currently operational and countries where certified products / services are sold can be generated on ITC's Standards Map website.



113 countries

ASIA Azerbaijan, China, India, Indonesia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Lebanon, Malaysia, Mongolia, Myanmar, Nepal, North Korea, Pakistan, Palestine, Philippines, Saudi Arabia, Singapore, South Korea, Sri Lanka, Syria, Taiwan, Thailand, Turkey, United Arab Emirates, Vietnam **AFRICA** Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Democratic Republic of the Congo, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Niger, Nigeria, Republic of the Congo, Senegal, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe **AUSTRALIA & OCEANIA** New Zealand, Samoa **CENTRAL AMERICA AND CARIBBEAN** Dominican Republic, Guatemala, Trinidad and Tobago **EUROPE** Albania, Armenia, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Macedonia, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Montenegro, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom **NORTH AMERICA** Canada, Mexico, United States of America **SOUTH AMERICA** Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru

How to join IFOAM

- Step 1:** Identify the certification body(ies) that operate in the region/country of interest (<http://www.icas.org/xlistifo.pdf>).
- Step 2:** Register to a certification body operator and review the specific requirements associated with that certification body in that local context.
- Step 3:** Perform a self-assessment against the certification requirements and provide the results and background documents to the certification body (<http://www.icas.org/certbod.htm>).
- Step 4:** Inspection is performed by the certification body, which will assess compliance with the standard requirements.
- Step 5:** When the outcome of the inspection is positive, the organic certificate is delivered. The certificate is valid for a maximum period of 5 years, subject to annual surveillance audits.

What areas does the IFOAM Basic Standards system cover

The following table provides an overview of IFOAM Basic Standards principles and requirements and related compliance policies covering social, environmental and economic areas applied in production, processing and trade.

Explanation of Standards Map: Interpretation of compliance policies in the IFOAM Basic Standards system:

Immediate Requirement: The IFOAM Basic Standards for Organic Production and Processing – called the IFOAM Norms – are the basis for IFOAM Organic Guarantee System. Accordingly, those criteria are presented in Standards Map as "Immediate requirement" with full and immediate compliance required.

Recommendation: The criteria that are part of the IFOAM Norms General Principles are presented in Standards Map as "Recommendation", for which compliance is encouraged but not necessarily required in a medium or long-term period of time.

	Environment	Social	Economic
Immediate requirements	<p>Soil</p> <ul style="list-style-type: none"> Soil conservation/erosion Soil quality Soil related nutrients and fertility <p>Forest</p> <ul style="list-style-type: none"> Protection of forests against logging and/or burning Conversion of forests to other uses <p>Chemicals</p> <ul style="list-style-type: none"> List of prohibited chemicals List of authorized chemicals Integrated Pest/Crop Management (IPM/ICM) systems Synthetic inputs <ul style="list-style-type: none"> Fertilizers Pesticides/herbicides Natural inputs <ul style="list-style-type: none"> Fertilizers Pesticides/herbicides Equipment and training on chemical use Storage/disposal/waste Management of chemicals Weed control <p>Biodiversity</p> <ul style="list-style-type: none"> Use of local seeds Genetically Modified Organisms (GMOs) <ul style="list-style-type: none"> Prohibition Management system Risk prevention Conversion of primary land use <p>Animals</p> <ul style="list-style-type: none"> Healthy and humane treatment of the stock Animal breeding Feeding, including type, handling and method Use of medicines <p>Waste</p> <ul style="list-style-type: none"> Waste management – collection, treatment, disposal Pollution management Composting Fire / explosive use <ul style="list-style-type: none"> Restricted based on certain conditions 	<p>Work/labor rights</p> <ul style="list-style-type: none"> Conditions of work <ul style="list-style-type: none"> No forced labor (LO29&106) Child labor prohibited (LO182) Condition of employment <ul style="list-style-type: none"> Equal remuneration (LO 100) Workers' empowerment <ul style="list-style-type: none"> Freedom of association (LO 87) Collective Bargaining (LO98) No discrimination at work (LO) 	<p>Administration and management</p> <ul style="list-style-type: none"> Internal Control System management <p>Continued on next page.</p>

Sources: Standards Map, Market Analysis Tools, International Trade Centre and the IFOAM Basic Standards, <http://www.ifoam.org>. For more information, visit standardsmap.ifoam.org or send us an e-mail: standardsmap@ifoam.org.

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	Environment	Social	Economic
Immediate requirements	<p>Water</p> <ul style="list-style-type: none"> Use in areas of scarcity/high risks <p>Other</p> <ul style="list-style-type: none"> Harvesting/post-harvesting practices Food irradiation 		
Recommendation	<p>Biodiversity</p> <ul style="list-style-type: none"> Habitat and/or eco-system Wildlife Rare density/diversity Unique culture density/diversity Set aside land Ecological niches <p>Waste</p> <ul style="list-style-type: none"> Packaging of products in value chain <p>Water</p> <ul style="list-style-type: none"> Defined use/management strategies Reduction of water through prevention Reuse of materials to reduce waste Recycle water Disposal of grey waters and run off 	<p>Social/human rights</p> <ul style="list-style-type: none"> Promotion/Enhancement of education Promotion/Enhancement of medical care Housing and sanitary facilities in place Gender Issues <ul style="list-style-type: none"> Women's rights at work Culture/religion rights (LO 169) Indigenous rights <p>Work/Labor rights</p> <ul style="list-style-type: none"> Condition of work <ul style="list-style-type: none"> Safety at work (LO 134) Safety equipments and emergency kits Access to safe drinking water Condition of employment <ul style="list-style-type: none"> Contract/labour policies and practices <ul style="list-style-type: none"> Written contracts Leave days clearly specified Pension and social security benefits 	<p>Administration and management</p> <ul style="list-style-type: none"> Criteria for quality management Quality management best practices Product quality specifications Health and safety issues