



A report on

Palm Oil Value Chain Analysis in the Niger Delta



2011

Foundation for Partnership Initiatives in the Niger Delta (PIND)
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Foreword

Economic growth and prosperity are central to long-term poverty alleviation for social and environmental sustainability. The oil palm industry represents one of the most effective avenues for poverty alleviation, food security and ensuring economic stability in Nigeria. The palm oil industry has the prospects of providing employment for millions of unskilled and semi-skilled people. As demonstrated in other economies, with proper focus on production of commodities of large scale commercial values, improvement in the production of oil palm can effectively mitigate the poverty level in Nigeria and especially in the Niger Delta region.

This report provides a unique assessment of the palm oil value chain in the Niger Delta area of Nigeria and its actors of value chain functions, as well as impact on economic diversification and the environment. It was commissioned by the Partnership Initiative for the Niger Delta (PIND), as part of its program to drive pro-poor equitable growth in the Niger Delta. The study has shown that improving the local capacity of palm oil production in the Niger Delta would not only impact positively on food security and local economy but also portend huge prospects for future exports that will advance Nigeria's economy. While Nigeria is one of the world's largest producers of palm oil, it is still a net importer of palm oil owing to the inability to produce enough palm oil to meet local demand. This offers the opportunity for increasing

This study will serve as a tool to share information on the sector, to refocus attention on the potential for palm oil production and highlight the potential for boosting the Nigerian economy by concentrating on the enterprise dynamics. From the vantage point of palm oil industry in the Niger Delta area, PIND and other stakeholders in the Niger Deltacan facilitate further investments in palm oil production and in enhancing processing productivity as a veritable tool of poverty reduction and economic diversification.

Acknowledgements

Although this report is primarily based on available field data (both primary and secondary data), it also relies on the information supplied by many actors in the palm oil industry throughout the focal states of Niger Delta area and across Nigeria. Our sincere appreciation goes to several individuals who volunteered information and gave invaluable assistance. The valuable time and resources generously provided to our team of researchers have contributed substantially in ensuring the success of this study.

The authors would like to thank the several bodies of oil palm producers, marketers, public and private agencies and the staff of PIND for their contributions in the preparation of this report. We would particularly like to acknowledge the support we received from the States Ministry of Agriculture, Nigeria Institute for Oil Palm Research (NIFOR), Oil Palm Dealers Associations, Golden Oil company-Onitsha, Sudit Oil-Ibadan, PRESCO, Okitipupa Oil Palm Company (OOPC) and Smaller-holder farmers across the Niger Delta region.

The Palm Oil value Chain Analysis study benefited immensely from many individuals and institutions. While some facilitated access to relevant information and data, others provided useful contributions to ensure the quality and independence of the report.

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List of Acronyms

ACGSF	Agricultural Credit Guarantee Scheme Fund
ADP	Agricultural Development Programme
CBN	Central Bank of Nigeria
CIF	Carriage, Insurance and Freight
CPKO	Crude Palm Kernel Oil
CPO	Crude Palm Oil
EFB	Empty Fruit Bunches
e.Gen	e.Gen Consultants Limited
EWS	Extension Work Seeds
FAO	Food and Agriculture Organization of the United Nations
FELDA	Federal Land Development Authority of Malaysia
FFA	Free Fatty Acid
FFB	Fresh Fruit Bunches
FGD	Focus Group Discussion
FMARD	Federal Ministry of Agriculture and Rural Development
FOB	Free on Board
GDP	Gross Domestic Product
M&E	Monitoring and Evaluation
MPOB	Malaysian Palm Oil Board
MSME	Micro, Small and Medium Enterprise
NDA	Niger Delta Area
NDDC	Niger Delta Development Commission
NEEDS	National Economic Empowerment Development Strategy
NEPC	Nigerian Export Promotion Council
NGN	Nigerian Naira
NGO	Non-Governmental Organization
NIFOR	Nigerian Institute for Oil Palm Research
NIPC	Nigerian Investment Promotion Commission
OER	Oil Extraction Rate
PIND	Foundation for Partnership Initiative in the Niger Delta
PITC	Presidential Initiative on Tree Crops
PKC	Palm Kernel Cake
PKO	Palm Kernel Oil
POS	Palm Oil Sludge
QC	Quality Control
RBDO	Refined Bleached Deodorized Oil
SON	Standards Organization of Nigeria
SPO	Special Palm Oil
SSPE	Small-Scale Processing Equipment
TCU	Tree Crops Unit
TPO	Technical Palm Oil
UNDP	United Nations Development Programme
VEOPAN	Vegetable and Edible Oil Producers of Nigeria
VODEP	Vegetable Oil Development Programme

GLOSSARY

Crude Palm Kernel Oil: A light yellow crude oil, extracted from the palm kernels, containing mainly lauric acid.

Facilitator/facilitation: An action or individual (or group of individuals) that temporarily works to develop more inclusive, dynamic, and differentiated markets without becoming a part of the markets.

Food security: Food security exists when all people, at all times, have physical and economic access to sufficiently safe and nutritious food that meets their dietary needs and food preferences for an active and healthy lifestyle.

Market: A set of arrangements by which buyers and sellers are in contact to exchange goods or services; the interaction of demand and supply.

Market system: The multi-player, multi-function arrangement comprising three main sets of functions (core, rules and supporting) undertaken by different players (private sector, government, representative organizations, civil society, etc) through which exchange takes place, develops, adapts and grows. A construct through which both conventionally defined markets and basic services can be viewed.

Olein: Also referred to as Palm Olein is the light yellow edible oil obtained from the fractionation of Refined Bleached and Deodorized Palm Oil, which is separated in two fractions by partial crystallization. The liquid fraction is called Palm Olein.

Out-growers: A group of farmers supported with seedlings and other inputs (out-growers' scheme is usually initiated mainly by government or sometimes by other non-state stakeholders) to encourage the cultivation of oil palm as increase production of oil palm products.

Special palm oil (SPO): Premium grade palm oil with less than 5% free fatty acid (FFA) content, extracted from the mesocarp of palm fruits.

Stearin: Also referred to as Palm Stearin is the solid fraction obtained from the fractionation of Refined Bleached and Deodorized Palm Oil. It is mainly used by the food industry.

Technical Palm oil (TPO): palm oil with greater than 5% free fatty acid (FFA)

Transaction costs: the costs associated with the basic process of exchange including costs concerned with searching, screening, negotiating, contracting, monitoring and enforcing transactions.

Upgrading: In order to respond effectively to market opportunities, upgrading is the process by which business owners innovate to add value to products or services and to make production and marketing processes more efficient.

Value Chain Governance: the relationships among the buyers, sellers, service providers and regulatory institutions that operate within or influence the range of activities required to bring a product or service from inception to its end use.

CURRENCY EQUIVALENTS
(@ 31 July 2011

Equivalent <i>Nigeria Naira (N)</i>	Currency Unit <i>US Dollar (\$)</i>
N150	US\$1.00

Executive Summary

This analysis examines the potential contribution which the palm oil value chain can make to equitable growth and employment in the Niger Delta by building on the work that has already been done on sustaining faster growth in Nigeria. The study identifies the position of the economically active poor within the overall subsector and provides a preliminary assessment of the types of interventions that will help unlock the growth potential in pro-poor channels. It is intended to serve as input into PIND's intervention strategy in the development of the Niger Delta, as well as to share with any other agencies interested in promoting palm oil production.

From being the world's leading producer and exporter of palm oil in the 1960s, Nigeria has fallen to being a net importer to meet the growing domestic demand. Demand is primarily driven by the household consumers who prefer to consume the technical palm oil (TPO) because of its flavor profile, but it is complemented by an increasing demand for the special palm oil (SPO) which can then be fractionated into RBD to meet the needs of industrial processors. Though domestic production is nearly 900,000 tons, there is an estimated overall gap in Nigeria of between 150 and 300,000 tons of TPO and 200,000 tons of SPO, much of which is currently met through imports.

The main forces driving the increased demand for TPO palm oil in Nigeria include the increasing household consumption of palm oil due to increased income which leads to changing consumer consumption patterns to purchase more fast foods, and increasing demand from the primary food processing industry. At the industrial level, the secondary processors are driving demand for SPO for further refining to sell into the manufacturing industries.

Pricing of the end products reflect a significant mark-up between bulk and wholesale, 30% for TPO, as well as a significant difference between bulk SPO and bulk TPO, 17%. This latter indicates that there is greater value add for the SPO, and should include some positive incentives back to farmers to produce for palm fruit for SPO (i.e. deliver the fruit within less than 12 hours of harvest). Nigeria's palm oil is not competitive on the global markets; in fact local prices are just below the import parity price, which includes a 35 % duty. Without this protection, Nigerian palm oil cannot compete, even taking into consideration the significant margins taken by the marketing functions in the value chain.

The Niger Delta's 9 states account for about 57% of total Nigerian palm oil production. But this production is dominated by the collection of palm fruit (fresh fruit bunches) from wild groves (74% of area and about 50% of supply of FFB), followed by production from private plantations (small, medium and large farmers, 19% of area and 34% of supply of fruit) and large corporate and government owned plantations (about 7% of area 25% supply of fruit). All of the wild grove harvest is moving through traditional channels which use rudimentary technology, but there is increasing investment in smallholder production with integration into processing. Most of the private small holders, where the economically active poor dominate, are producing for the TPO market segment.

Women play an important role in the value chain, primarily in the traditional processing (very inefficient) and the marketing of palm oil (efficient). Youth are generally not involved in palm oil functions, though their preference is to serve as mill operators where they can earn a decent wage. Palm oil has developed a reputation for negative environmental impact, primarily due to the massive cutting of forests in Asia to create massive palm estates. There has been some of that in Nigeria in the past, and any solutions must be sensitive to it. However, immediate major opportunities exist around the rehabilitation of existing but non-productive estates, rather than the establishment of new estates.

Major challenges facing the palm oil sector affecting its competitiveness and potential for growth include:

- The dominant presence of the wild grove in the production system, comprised of low yielding (both in terms of FFB/tree and in oil content) Dura variety;
- The ownership structure of the wild groves does not incentivize any investment in their maintenance and upgrading;
- Very inefficient processing technologies that are extracting 25-50% of the oil content (i.e. this is equivalent to 50% of the oil is being thrown away) for half of all processed palm fruit;
- Serious management challenges around most of the large estates that were created by the government, leading to their inefficient operation, bankruptcy, aging of the trees, etc.;
- The highly fragmented relations between the actors at each functional level of channel one which provides half of all oil; and
- Serious challenges in coordination between the actors in the value chain in channels 2 and 3 to incentivize more efficient interaction and investment.

Growing the size of the overall value chain will require improving the processing efficiency, in particular at the small commercial level which processes most of the TPO, an increasing investment in re-planting and upgrading the varieties of existing palm plantations with newer higher oil content varieties, and enhanced linkages between the processors of SPO and the private farmers.

For PIND, the main targets of opportunity are concentrated in channels 1 and 2 which are dominated by small farmers and women processors. This would focus on helping processors upgrade from channel 1 to channel 2, as well as helping upgrade the private farmers to link more efficiently into channel three. Areas for immediate PIND direct interaction should concentrate on gaining a greater understanding of the challenges around incentivizing adoption of improved processing technology by small processors (in channel 2), activities for increasing production through improving smallholders' ability to access and use inputs, opportunities for linking out-grower schemes to the functioning larger estates (i.e. PRESCO), the precise status of the government owned plantations, and the role of the secondary processors in transforming the industry. At a synergistic level with its other activities, PIND should see if a linkage can be established between to enhance the use of palm kernel cake into the feed industry supplying the aquaculture value chain.

Processing Technology: The PIND Economic Development Centre (EDC) and its Appropriate Technology Centre (ATED) should interact with NIFOR to carry out a review of their different mills and the programs that they implemented to commercialize these improved technologies. This will include interacting with the local artisans who are making and servicing the majority of the local processing machines, to see what the market uptake has been for the NIFOR models, as well as the effects of copying. Addressing how this interlinked value chain ties into (or could tie in better to) the palm oil industry can lead to significant increases in efficiency.

Smallholder Access to Inputs: FFB yields on the smallholder plantations are below industry averages and could be improved with better farm husbandry - better weeding, application of fertilizers, use of herbicides, and pruning. The challenges lie in the availability of the inputs, the cost of the inputs, and the knowledge of best practices.

Interaction with Successful Large Estates: Some of the more successful large plantations, like PRESCO and Okomu Oil have experimented with out-grower schemes to increase their supply of FFB. It is important to understand their successes and failures in this regard in order to develop further

opportunities for engaging more small producers into the SPO channel. This would lead to increased coordination between the actors.

Status of the Government Owned Farms: The report has not been able to penetrate the more complex status of the government owned plantations, but there might be opportunities for expanding the access to small holders on the existing estates.

Interaction with the Secondary Processors: From the analysis it appears that the secondary processors are some of the most dynamic actors in the sector, and an increased understanding of their interests and motivation to push more value back into the production levels can create some strong allies for driving sectoral activities.

Introduction

Background

Oil palm (*Elaeis guineensis*) is one of the most important economic oil crops in Nigeria. According to World Rain-forest Movement, oil palm is indigenous to the Nigerian coastal plain though it has migrated inland as a staple crop. Cultivation of oil palm serves as a means of livelihood for many rural families and indeed the farming culture of millions of people in the country. The reference to oil palm as a crop of multiple value underscores its economic importance. Oil palm is made of essential components, namely; the fronds, the leaves, the trunk and the roots which are used for several purposes ranging from palm oil, palm kernel oil, palm wine, broom, and palm kernel cake.

As of early 1900, Nigeria was producing all palm oil sold in the world market and it was considered a dominant source of foreign exchange.¹ Up until the 1960s, Nigeria was the world's largest producer of palm oil accounting for 43% of global palm oil production. Over-reliance on traditional production methods, excessive tapping of palm trees for palm wine and the civil war between 1967-1970, are factors that contributed to Nigeria's inability to meet up with the global rise in demand for palm oil.

The Nigerian oil palm belt covers twenty-four states, including all nine states of the Niger Delta (Akwa Ibom, Abia, Rivers, Edo, Imo, Ondo, Bayelsa, Cross River and Delta). Within the oil palm belt in Nigeria, 80% of production comes from dispersed smallholders who harvest semi-wild plants and use manual processing techniques. Several million smallholders are spread over an estimated area ranging from 1.65 million hectares to 2.4 million hectares and to a maximum of 3 million hectares. The estimate for oil palm plantations in Nigeria ranges from 169,000 hectares (72,000 ha of estate plantations and 97,000 ha of smallholder plantations) to 360,000 hectares of plantations.

Many of these plantations mentioned above are the result of past attempts by the Nigerian government to establish large scale plantations, most of which resulted in complete failures. Examples of such failed efforts are the Cross River State project in 60's and of the European Union-funded "Oil palm Belt Rural Development Programme" in the 90's. This effort included the ambitious plantation of 6,750 hectares of oil palm within an area thought to be one of the largest remnants of tropical rainforest in Nigeria under the management of Risonpalm Ltd, partly owned by the government. The plantation was abandoned in 1999 and reactivated in 2003. In 2010, the government announced its intention to divest, citing the decision to privatize: "we will not put money into Risonpalm again" and that "We will only bring people who will put in their money and manage Risonpalm very well". Management of government's oil palm plantations has so far proven disastrous. The Governor of Rivers State paints the gory picture of management that has characterized government owned oil palm estates recently thus: "Government has put so much money in Risonpalm and so many people became rich out of Risonpalm by stealing the money. Now we will not put money again so that people won't steal our money anymore."

The World Bank has played an important role in the promotion of oil palm business in Nigeria. Nigeria is "the second largest recipient of World Bank palm oil sector projects, with six projects from 1975 to 2009", according to a recent World Bank report. While the results achieved included the plantation of 42,658 ha of oil palm, as well as road improvement and increased milling capacity, only one of the World Bank

¹ Matthew O. Eshalomi, Chairman, Vegetable & Edible Oil Section of Manufacturer Association of Nigeria, Nigeria Palm Oil Today and Future Outlook, Paper presented at Nigerian Institute for Oil Palm Research Workshop, January 2009.

projects is still under implementation, with the rest having gone bankrupt. As a result, many private oil palm producers eventually accessed abandoned government plantations following the leasing of such estates to private individuals. Some private owners formed limited liability companies to ensure effective management and to attract investments. Some of the plantations have younger plants/fields some of which are yet to fruit, while most of the oil palm plantations are over 30 years.

The dawn of the twenty-first century witnessed an ambitious attempt to reposition agriculture as the mainstay of the Nigerian economy and specifically to restore Nigeria's pre-eminent position as a net exporter of palm oil. The Federal government under President Olusegun Obasanjo initiated what was then called a road-map to revive vegetable oil production in Nigeria. A forum on vegetable oil production which took place in September 2000 and chaired by President Obasanjo led to the setting up of a Committee on Vegetable Oil Development Programme (VODEP). For the oil palm sub-sector, the committee set a target of planting one million hectare of oil palm in five years. It would appear the Federal Government of Nigeria is willing to revitalize oil palm production. In April 2010, the government, in collaboration with the UN's Industrial Development Organization (UNIDO) and the government of Cameroon, launched a Common Fund for Commodities "in order to improve the income generating potential of oil palm in West and Central Africa." The initiative was developed by UNIDO and funding is shared between Nigeria, Cameroon, UNIDO and the private sector.² In line with this initiative, sources at the Nigerian Institute for Oil Palm Research (NIFOR) recently agreed that "promotion of private sector participation in oil palm plantation holds the ace in effective revival of the produce business in the country." Specifically, the Director of NIFOR, Dr. Dere Okiy stated that "the land tenure system in the country" is a "limiting factor against private mass production of palm oil by individuals" and "called on local and state governments to provide land areas to oil palm farmers to encourage mass production of palm oil."

In a further bid to encourage local production of palm products to satisfy local demand, importation of bulk crude and refined vegetable oil was prohibited in 2001. In response to this ban and consequently increasing demand for local product, there has been some increase in private sector investments in the development of new oil palm plantations and the expansion of existing ones. Smallholdings and out grower schemes were also being promoted by the Federal and State Governments.

Within this background of lost ground and failed attempts to revitalize the palm oil industry in Nigeria, this analysis of the palm oil value chain will explore the major opportunities for growth of the value chain and practical ways to address the challenges facing increasing local production and using the value chain as a driver of pro-poor benefits in the Niger Delta.

Reasons for Selecting the Value Chain

The decision to choose Palm Oil as a value chain commodity for analysis was taken at a PIND workshop earlier in the year. Representatives of the Nigerian offices of the World Bank, USAID, DFID, Ministry of Niger Delta Affairs, PIND and NNF attended the workshop. The three criteria developed on choosing palm oil centered on (i) identifying growth potential, (ii) potential for broad and inclusive impact on the poor and (iii) feasibility.

Palm oil is indigenous to the Niger Delta. Palm trees grow in abundance and have the potential to generate significant economic and social development in the Niger Delta. Palm oil is the main vegetable

² <http://allafrica.com/stories/201004290225.html>

oil produced and consumed in Nigeria with prospects of providing income and economic development to a large number of the rural poor of the Niger Delta.

Palm oil production remains a major vocation in many communities. It involves hundreds of thousands of poor producers and tens of thousands of poor processors. It provides income for many farmers and their dependents. This connotes that an efficient and strong palm oil sector in Nigeria will enable the poor to be part of the solution to poverty challenge through provision of employment and a means of livelihood. There are numerous ways in which oil palm production could be deployed to boost employment opportunities for the people.

Palm oil is very important as an income generator for women. In most cases, women are in charge of processing the oil palm fruits into red palm oil and of selling the product in the local and even national market.

This study is aimed at providing a clearer understanding of the structure of the industry, the different types of actors involved and their roles in channeling palm oil into the end markets. It will lead to basic interventions that would help alleviate rural poverty in the Niger Delta Area to enable PIND pinpoint relevant activities for the Palm Oil value chain in a manner that is market driven and sustainable based on value chain assessment approach that would provide five main outcomes, namely:

- General overview of the markets for goods and services in the palm oil value chain
- Identification of the major opportunities for growth in the industry
- Analysis of constraints to growth, in particular for the poor, in the palm oil value chain
- Identification of market solutions that address the constraints
- Intervention strategy to develop the markets for the needed services.

Research Methodology

The Niger Delta is at the heart of Nigeria's oil palm belt with abundant wild groves and numerous small-holding Oil Palm farms as well as functional estate plantations. The study was carried out in four focal states of the Niger Delta, namely; Akwa-Ibom state with 31 local government areas and a population of 3.9 million; Edo state with 18 local government areas and a population of 3.2 million; Ondo state with 18 local government areas and a population of 3.4 million; and Rivers state has 23 local government areas with a population is 5.1 million.

The study combined a review of secondary materials, interviews with key stakeholders, primary research through surveys and focus group discussions.

Both primary and secondary data were collected for this study. The primary data were collected from all key actors in the Palm Oil value chain map by the use of either structured validated questionnaire designed to obtain relevant information regarding Oil Palm production, or Focus Group Discussion (FGD) with the aid semi-structured questionnaire to collect qualitative data from palm oil processors, wholesalers and retailers of palm oil respectively. While the end users of palm oil data were collected through key informant interview or semi-structured interview.

A survey was carried out using a multi-stage sampling method, based the selection of the sample on a combination of two or more sampling methods.

The first stage use geographic concentration. In line with Agricultural Development Programme (ADP) delineation there are 2 ADP zones in Ondo state while each Zone has 2 ADP Areas. One zone was purposively selected from where large quantum of palm oil being produced. In the case of Akwa-Ibom state, one LG from each of the three senatorial districts were purposively selected for the according to the guidance of Community Development Programme Scheme. In Rivers state 3 LGAs were purposively selected according to the ADP directives. In case of Edo state non-random sampling (purposive & quota sampling) was used to make an explicit choice based on value judgment.

The second stage was a stratified sampling method. The oil palm farmers were stratified on the basis of technology used, that is, small-scale, medium-scale and large plantation producers. The third stage of the multistage sampling method was a random sampling of the respondents using the lottery method.

Semi-structured questionnaires were administered to twenty-five oil palm farmers in Ondo state while FGD tool was used at Rivers and Akwa-Ibom states to randomly selected small-scale and medium-scale palm oil producers; but key informant interview was conducted on two large plantation holders in each state to elicit information on the Palm Oil production with the help of trained enumerators under close supervision. The data collected were analyzed using simple statistical method.

The findings from the study were presented in a validation workshop to sector specialists and actors on July 20. The findings were largely accepted and further input was gathered for the report.

Palm Oil Market in Nigeria

Products

While many products emanate from the oil palm trees – palm oils, palm wine, wood by-products, the focus of this research is on the oil products and their direct by-products. Three dominant products are Technical Palm Oil (TPO), Special Palm Oil (SPO), and Palm Kernel Oil (PKO), with palm kernel cake and sludge as significant by-products that can be put into the feed industry.

There are 17 characteristics which are used to define and grade palm oil in order for it to be internationally traded. Dominant among them are the levels of free fatty acid (FFA), followed by dirt, iodine value, and other contaminants. The minimum requirement for SPO is an FFA of less than 5%, which can be consumed or used in products such as creams or further refined for soaps and bleaches. Oil which does not meet the quality grades of those characteristics is qualified as TPO, with an FFA>5%, and is mainly used for food consumption.

In Nigeria, there has been limited transformation and uses of the primary or secondary products oil palm for either food or non food applications. In developed economies, however, palm oil is used in the manufacturing of many foodstuffs including many industrial applications as can be seen in the Box below:

Figure 1: Food and non-food uses of palm oil products

Food uses	Non – food uses
Cooking Oil Deep Frying Oils Margarines and spreads Bakery fats Cocoa butter alternative fats Confectionary fats Ice cream fats Infants nutrition fats Other food applications	Cosmetics and personal care Soaps Candles Pharmaceuticals Lubrications and Grease Surfactants Industrial Chemicals Agrochemicals Coatings Paints and lacquers Electronics Leather Biodiesel

Source: Unleashing Agricultural Development in Nigeria through Value Chain Financing, Working Paper November 2010

Findings from the study have shown that there is a market for mainly 3 major oil palm products in Nigeria:

- (1) Low quality TPO palm oil for traditional use for direct sale as unprocessed oil.
- (2) High quality SPO for use in the processed food industry and produced by large mills and often refined.
- (3) Palm Kernel Oil which has been growing in demand over the years for the industrial market.

The potential market for palm oil is realistically focused on the domestic market for the foreseeable future as Nigeria is a significant net importer of palm oil for both food and industrial uses. The domestic food market focuses on the TPO, which is consumed by households and commercial enterprises (Hotels and Restaurants) for use in food preparation. In Nigeria, the volume of oil required in the traditional food market is three times more than the requirement in the industrial market, so the household traditional market is therefore the major determinant of supply deficit in Nigeria. Palm oil with free fatty acid between 5 - 30% is acceptable in this market due to the varied requirement for Nigerian cuisines. The traditional market is served by small scale producers of palm oil which account for more than 70% local production (650,000 tons).

SPO always sells at a higher price than TPO and supplies the industrial market, which utilizes the high quality crude and refined palm oil and fractions (olein and stearin) as raw materials for their products: soaps, frying oils for noodles, bakery fats, etc. Though SPO oil has a higher value, there is a constant tension between SPO and TPO as the latter is in constant easily accessible demand and is easier to process than SPO.

Palm kernel oil (PKO) is another palm oil product that has been increasing in demand over the years. The demand for PKO has also risen over the years following its usage in manufacture of artificial cream fillings, soap, cosmetic and personal care products as well as emulsifiers in the food processing and pharmaceutical industry and the production of toiletries, tobacco, alkyd resins, paints and varnishes, cellophane, explosives, polyurethane etc. Palm kernel cake (PKC) is another product used as livestock feed.

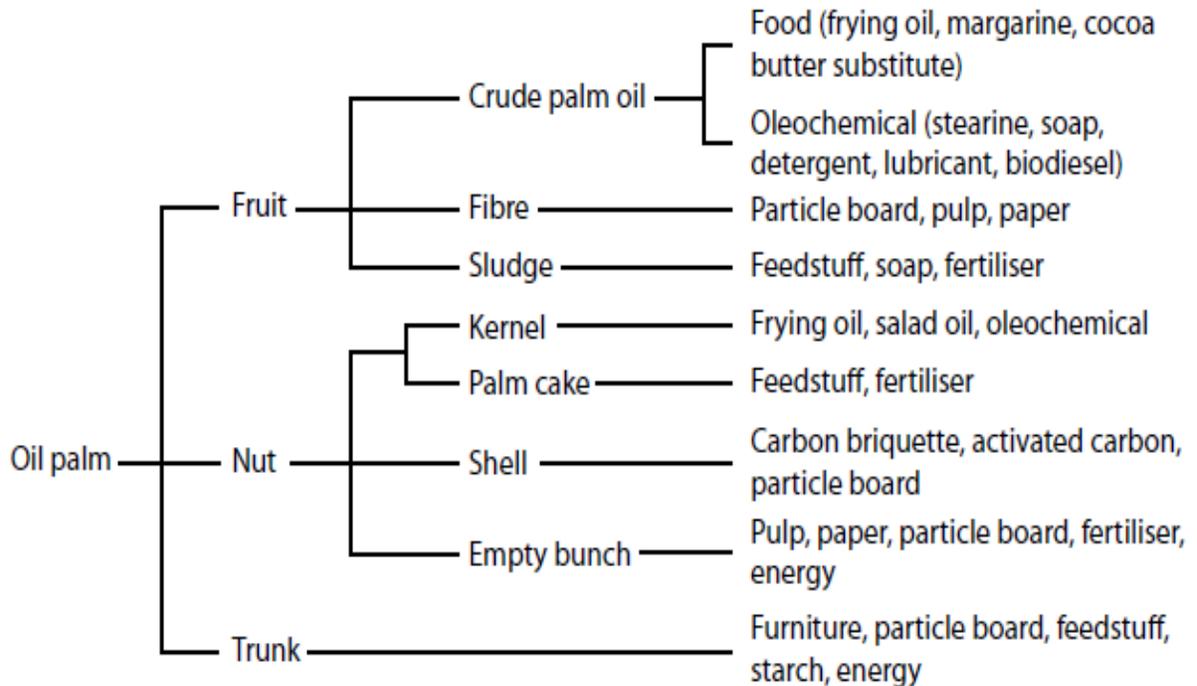
SPO and PKO can be further refined into Refined Bleached Deodorized Oil and Refined Palm Kernel Oil, respectively. These are the end products that are further fractionated into Olein and Stearin, which are the end products used in the food industry.

Additional Products

Apart from palm oil, palm kernel and palm kernel oil which are the main products of the oil palm, the tree and the processing wastes generated when the fruits are processed to obtain palm oil and palm kernel have several uses. The sludge is used in making traditional soaps and fertilizer and the PK cake is used widely as an input into the feed industry and for fertilizer. The processing wastes namely: empty bunch refuse, fibre, shell, sludge and mill effluent constitute about 74% – 76% of the total mass of the oil products.

In addition the other parts of the palm tree (trunk, leaves, fibre) have broad uses, while the bunch refuse, and by-products from the oil processing (fibre, shell, sludge) can be used as fuel for the mills, making briquettes to substitute for fuel wood,

Figure 2: Uses of the oil palm tree



Source: Abia State Palm Oil Value Chain Development Project Abia State, Nigeria, 2010

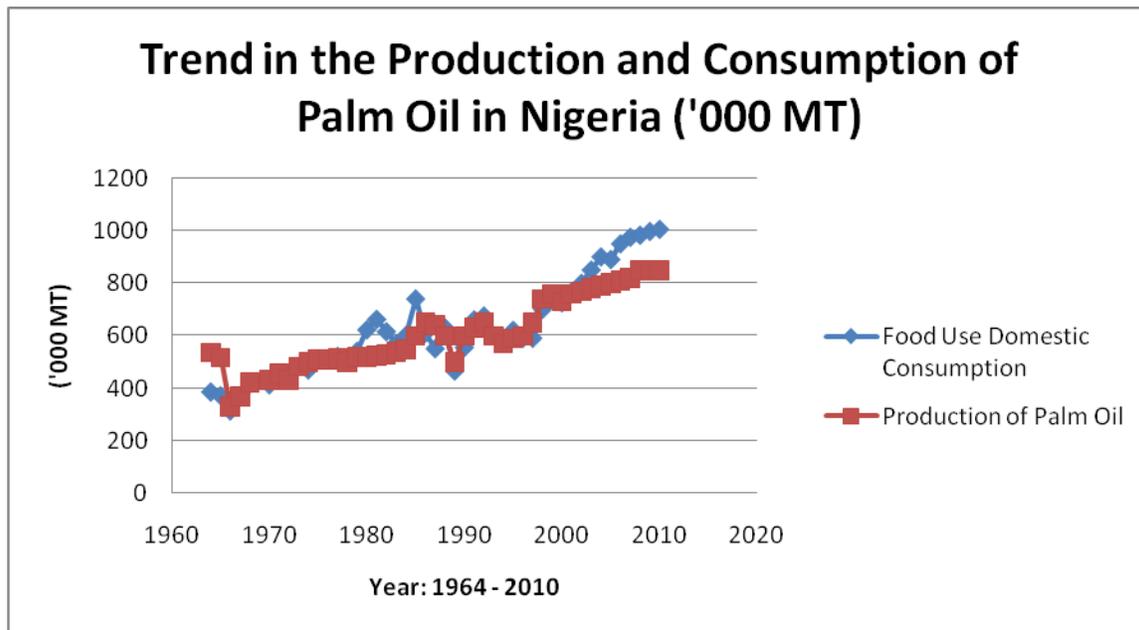
Total Consumption (Demand) Of Palm Oil Products in Nigeria

In the 1950s and 1960s, Nigeria was a leader in the world palm oil market. The production of palm oil exceeded the domestic consumption and the excess was exported to the world palm oil market. The fortunes of Nigeria palm oil production, however, changed adversely as a result of three major factors, namely the discovery of crude petroleum deposit in commercial quantity, over reliance on traditional palm oil processing techniques, and the effects of Nigerian civil war which was pronounced in Nigeria's oil palm belt. Thus, the oil palm sub-sector of the economy was neglected and relegated to the background while crude oil exploration and exploitation took the centre stage. Consequently, Nigeria lost its pride of place as a world leader in palm oil production to Malaysia and Indonesia. So, the trend has been that of increasing domestic consumption not matched by a rather slow growth in production.

The Trend in the Demand and Supply of Technical Palm Oil (TPO)

From 1964 to 2010, there has been rising production (supply) and consumption (demand) of palm oil in Nigeria. However, in the last 10 years, demand has grown faster than the supply, leading to an increasingly widening gap. It is difficult to assess the specific gap because of incomplete statistics, but according to the USDA in their analysis based on estimated production and import figures, the shortfall in supply (the supply gap) is about 150,000 MT of palm oil per annum, as per figure 3.

Figure 3: Trend in production and consumption of palm oil in Nigeria



Source: United States Department of Agriculture

Although the formal estimated gap is about 150,000 MT per annum (excluding palm kernel oil), there is also likely to be significant informal importation of palm oil (including SPO) from neighboring West African countries. Omoti, 2009, presents the following analysis which suggests that the demand – supply gap is currently estimated between 500,000 MT to 600,000 MT per annum.

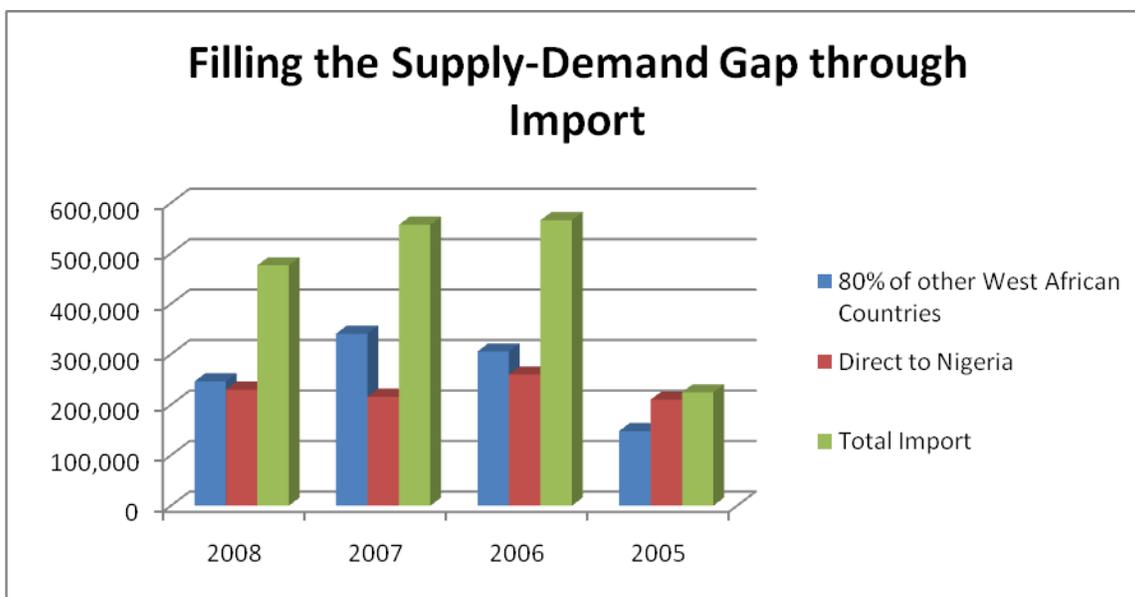
The Oil World (2008) estimates the average per capita “disappearance” or domestic consumption of vegetable oils & fats in Nigeria for food and non-food uses to be about 12.3 kg in 2007. With a population of 140 million by the 2006 census, Nigeria would require annually 1,722,000 tons of vegetable oils & fats to meet the national requirement for food and non-food uses. From the analysis of the sector, total palm oil and palm kernel oil production per annum is currently at most about 741,800. The Oil World (2008) puts the current 2005–2008 estimates of groundnut oil, soya bean oil and cotton oil production – the other major vegetable oils produced in Nigeria as 325,750 tons, 50,325 tons and 19,700 tons annually respectively. Added to the palm oil and palm kernel oil production obtained from the current sector analysis, this would give total current annual vegetable oil production in the country as 1.138 million tons. Thus with an annual total domestic vegetable oil requirement of about 1,722,000 tons, there is a supply and demand gap of about 585,000 tons annually, which from the available statistics is being met from importation (the ban on bulk crude palm oil importation into the country was recently lifted in September, 2008) as well as smuggling across the borders³.

The Oil World (2008) gives the total palm oil importation into Ghana, Togo, the Republic of Benin and Nigeria as ranging from 394,900 metric tons in 2005 to as much as 663,000 tons in September/October of 2008 only while from MPOB Statistics (2008 & 2009) the Malaysian palm oil export to Ghana, Togo and the Republic of Benin ranged from 402,312 tons in 2006 to 563,763 tons in 2008 (see Table 1). Because of the low population of Ghana, Togo and Republic of Benin, it is likely that more than 80% of the palm oil

³ Oil Palm Sector Analysis In Nigeria by Dr. Umoru Omoti, 2009

imported into these countries is destined for informal trade to Nigeria. If we use the Oil World figures which includes importation from other countries and if this is added to the about 61,000 tons of tallow imported into Nigeria annually, this would give a total importation of palm oil & fats into Nigeria of about 418,920 and 637,400 from 2005 to 2008. The cost of importation of this quantity of palm oil and tallow at a landed cost of about N160, 243.3 and N100, 878.7 per ton for palm oil and tallow respectively in 2008 would amount to about N98.514 billion.

Figure 4: Trends in imports: official and unofficial



Therefore, the current demand domestic supply gap is more likely to be about 450,000 MT per annum, and is filled by imports (including captured and non-captured imports). Of this figure, import of TPO is estimated at about 300,000 MT, while the balance of 150,000 MT is estimated to be SPO import.

Drivers of Demand

The increase in the demand for both SPO and TPO is driven by a number of factors. In the domestic market, TPO drives the overall demand for food oil consumption as TPO accounts for about 80% of total palm oil production in Nigeria. The Nigerian consumer has a distinct preference for the tangy flavor in TPO due to the higher FFA content. When matched with the steadily increasing population, the demand for TPO is increasing. In addition, there is an increasing consumption of fast foods in the urban areas in Nigeria driving demand for more products manufactured with TPO.

In the case of SPO, palm oil traders indicated that the supply of the product is negligible due to inability of the small millers to meet industrial quality, quantity and timeliness of delivery. The situation has not facilitated access to industrial markets and added value. Ironically, however, the demand for SPO is rising at increasing rate. The major factor that stimulates increasing trends in demand is the use by industrial manufactures of products such as noodles, biscuits, soaps etc.

Demand for SPO within the geographical cluster (Ondo, Rivers and Akwa Ibom) rose to 202,038 MT in 2010 while supply only stood at 76,502MT in 2010, resulting in a deficit value of 125,536MT. This deficit represents an opportunity for processors to enter the market, especially if the demand continues to rise. The finding further shows that consumption is not met by supply during the on and off peak seasons. Local palm oil production meets less than 50% of industrial users' raw material needs while the average market price of locally produced palm oil double international price (USDA, 2003). Manufacturers are therefore importing cheaper oil to meet their needs. This provides loss opportunities for local producers, predominantly the rural poor, who could benefit from supplying industrial processing equipment.

Demand for oil palm product is based largely on price, quality and delivery with minimal considerations given to environmental aspects. The demand of TPO by household consumers is increasing due to growth in population which normally leads to growth in consumption. The palm oil in the rural areas is N240/litre while urban households are paying N260/litre from retailers.

The foremost food products companies in Nigeria that are major buyers of SPO/PKO or SPO/PKO products are:

- De-United Industries (manufacturers of market leading Indomie noodles),
- May&Baker (manufacturers of Mimi noodles),
- Honeywell foods (manufacturers of O-noodles),
- Chikki Foods (manufacturers of Chilkki noodles),
- UAC Foods (general food products and users of palm olein and palm stearin)
- Sumal Foods (special oil blends)
- Nasco Foods (buyers of palm stearin)
- Unilever (general users of palm stearin)
- Consolidated Foods (general users of palm stearin)
- Okin Biscuit (users of palm stearin as ingredient for biscuit making)
- Standard Biscuit (users of palm stearin as ingredient for biscuit making)

Competitiveness: Total Imports, Volume and Value of Vegetable Oils Landed Price (CIF)

Because of a huge local supply gap, Nigeria is now a net importer of palm oil. In a bid to encourage local production of palm products to satisfy local demand, importation of bulk crude and refined vegetable oil was prohibited in 2001. Thus, no official data exist for importation of palm oil products since then. For the (5 years period) before the ban (1997-2001) imports of palm oil dipped from 119,000 MT in 1997 to 70,000 MT in 1998 and then rose to 185,700 metric tons in 2001. The ban on imports increased the price of oil and led to new investments in the industry. However the ban was lifted in 2008 and its effects on the palm oil market have been detrimental to the effect that the price of local palm oil has decreased over the past couple of years, mainly due to an increase in imported cheaper crude palm oil.

Table 1: Estimates of True Imports into Nigeria, including Informal from ECOWAS States

COUNTRY	PERIOD/QUANTITY OF PALM OIL IMPORTED (TONNES)							
	Oil World	MPOB	Oil World	MPOB	Oil World	MPOB	Oil World	
	SEPT/OCT, 2008	2008	2007	2007	2006	2006	2005	POPULATION
GHANA	144,000	114,162	152,900	106,034	148,000	105,782	111,100	23,382,848
TOGO	64,000	106,242	63,000	104,944	64,000	119,304	46,000	6,100,000
BENIN REPUBLIC	225,000	343,359	210,000	251,596	170,000	177,226	27,800	8,791,832
SUB-TOTAL	433,000	563,763	425,900	462,574	382,000	402,312	184,900	
80% SUB-TOTAL	346,400	451,010.4	340,720	370,059.2	305,600	321,849.6	147,920	
NIGERIA	230,000	14,335	216,000	1,099	260,000	1,028	210,000	140,000,000
Nigeria + 80% Sub-Total (Re-exported into Nigeria)	576,400	465,345.4	556,720	371,158.2	565,600	322,877.6	357,920	
Tallow Imported into Nigeria Annually	61,000		61,000		61,000		61,000	
Total Imports of Palm oil & Tallow into Nigeria	637,400		617,720		626,600		418,920	

Source: *Oil Palm Sector Analysis in Nigeria* by Dr. Umoru Omoti, 2009

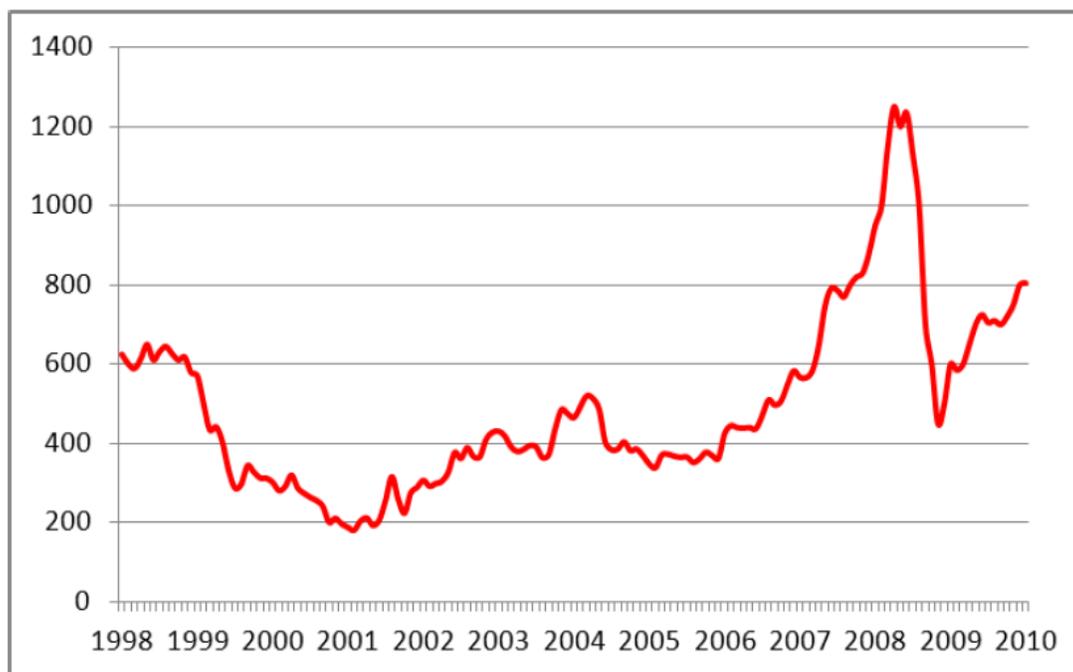
In the case of the demand for SPO, which has led to the importation of refined and crude palm oil by large scale users from Malaysia and Indonesia, the prevailing price in the Nigerian market is driven by the landed cost of imported crude palm oil.

Palm Oil Pricing

Global palm oil prices are also rising significantly, doubling in the last year to levels of over US\$1,042/mt as of June 2011 for Malaysian benchmark grades of crude oil. The forecast is for continued rises boosted by demand for use in manufactured food and other products, as well as from the bio-diesel sector as global crude oil prices soared. The drivers of the price rises are clearly quite different.

The effect of these two trends has been a narrowing of the competitiveness gap as measured by the difference in prices. The current price premium is around 45% over the international price. The narrowing is probably the result of unofficial imports through neighboring countries and mounting price resistance at home. Nigeria remains uncompetitive because of its low productivity and ineffective coordination of its value chain amongst the key players.

Figure 5: Palm oil price history and trend line (CIF Rotterdam, USD/ton)



Source: Abia State Palm Oil Value Chain Development Project Abia State, Nigeria, 2010

Presently the domestic price of palm oil in Nigeria is rising rapidly. Indicative figures suggest the price of crude palm oil (ex-local processors) has risen by around 67% in the past couple of years to approximately US\$1,300/mt.

When comparing the cost of domestic oil to the cost of imported oil, we see that the landed price is approximately 60% higher than the FOB price in SE Asia due to a variety of costs and duties, the principal one being the 35% import duty. Therefore, Nigerian palm oil has a large price umbrella under which to it can operate. This makes it uncompetitive internationally, but does provide room for expanding domestic production. The build-up of landed cost from the point of export in SE Asia is shown below.

Table 2: Build Up of Landed Cost of Imported Palm Oil (2009)

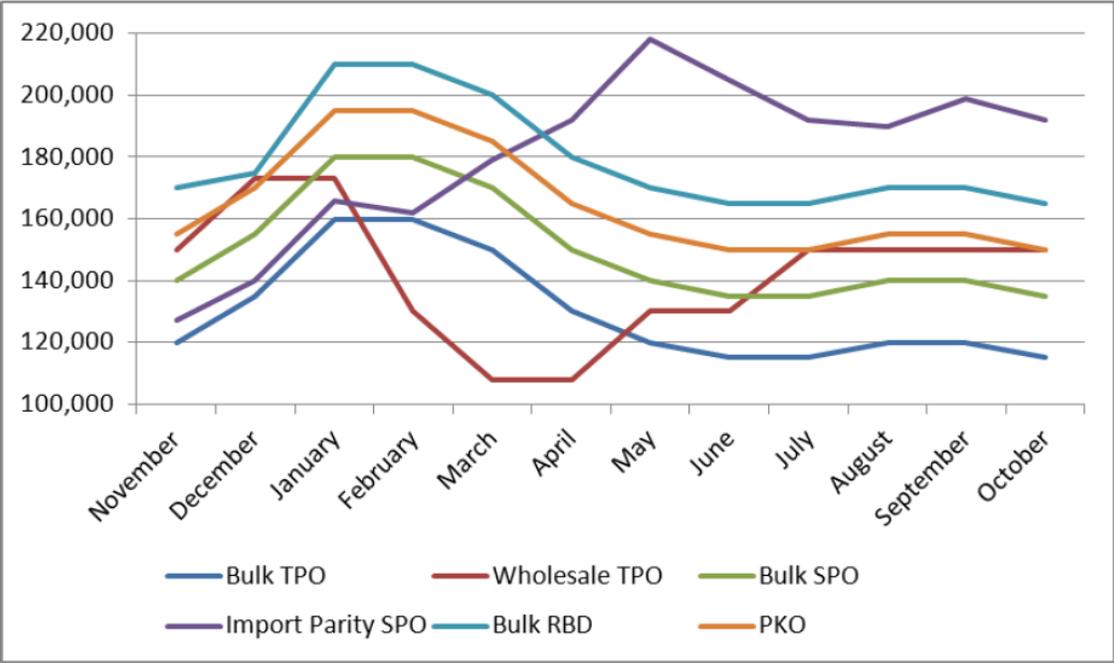
Product cost	Price (\$)	Comments
FOB Malaysia	650.00	(equivalent to \$700 CIF Rotterdam)
Sea Freight	80.00	0.30% of FOB +Freight
Insurance	2.19	
Landing Costs		
CIF Lagos	732.19	35% of CIF
Import Duty	256.27	7% of Import Duty
Surcharge	17.94	1% of FOB
CISS Fee	6.50	0.5% of CIF

ECOWAS Charge	3.66	5% of CIF and all charges
VAT	50.83	2.50% of CIF plus VAT
Clearing Agent	19.58	
Finance cost	67.93	
Brokers fee	10.00	
Road Transport	11.11	(Naira 1.5m for 30 ton tanker)
Total Cost	1, 176.01	

Source: Abia State Palm Oil Value Chain Development Project Abia State, Nigeria, 2010

Figure 6 presents the prices for the different end products (Bulk TPO, Wholesale TPO, SPO, Bulk RBD, and PKO) along with the import parity price. One notes the combination of effects over time on the prices from seasonality, as well as the global prices. In the first half of 2009, the import parity price for SPO was significantly higher than the domestic prices. We also denote the clear differences in mark-ups between bulk TPO and wholesale TPO, and between bulk TPO and bulk SPO (about N20,000/ton). PKO is the most expensive of the oils, but the RBD (made from SPO) is about N30,000/ton more expensive.

Figure 6: Prices of oil palm products in Nigeria 2008-2009



Source: Abia State Palm Oil Value Chain Development Project, 3rd quarterly report

Palm Oil Production in Nigeria

Palm oil production starts with the trees that are producing fruit, the harvesting of the fruit, and then the processing of the fruit. Nigeria has two main palm production systems, the wild grove and the planted farms, with the wild grove producing about 80% of total fruit for processing. The varieties under production are a critical function of the long term productivity and competitiveness of Nigerian palm oil industry.

Three varieties of Oil palm are available in Nigeria; namely Dura, Pisifera and Tenera. The preferred variety among palm oil farmers in Nigeria is the highbred Tenera which is a crossbreed of the Dura (female) and the Pisifera (male). Tenera seedlings are produced by the Nigeria Institute for Oil Palm Research (NIFOR) and commonly referred to as the extension work seeds (EWS).

Table 3: The Characteristics of the Three Fruit Varieties of the Oil Palm

DURA	PISIFERA	TENERA
Thick-shell	Shell-less	Thin-shell
Thin-mesocarp	Mainly monocarp	Thick mesocarp
Viable embryo	Unviable embryo if present seed sterile	Viable embryo
Large kernel	Very small kernel and sometimes no kernel in most fruits	Good size kernel
Contains very small quality of oil	The oil content of the fruit is the highest among the three fruit forms	
Unimproved	Unimproved	Improved

Source: NIFOR Oil Palm Production Manual

In terms of comparison, the fruit of the Tenera variety contains 25% oil, by weight, and the Dura variety 18%, so the same amount of Tenera can yield 30% more oil than the equivalent fruit of the Dura.

Despite the attraction which the petroleum industry has generated in the last forty years, agriculture remains the mainstay of the Nigerian economy; contributing almost 40% of GDP in comparison with petroleum and gas which contribute 25% of the GDP. The government has started many initiatives, with funding from the World Bank and others to try to stimulate the agricultural sector, especially palm oil production. However, despite many initiatives of the government, there has been only small growth in the oil palm sector in the last decades. Some private investors like PRESCO are, however, striving to improve oil palm production through plantation expansion and the encouragement of out-growers development in both Edo and Delta states. As in most parts of the major oil palm belt of Nigeria, oil palm production in the Niger Delta is carried out in three production systems viz:

- Large estate plantations,
- Medium and small holder plantations with many of the small holder systems intercropped with food crops and sometimes other cash crops
- Semi/natural groves.

Total area under oil palm cultivation in the Niger Delta Area (NDA) is estimated to be somewhere between 1.5 and 1.8 million hectares in 2008 , which include wild grows of very low palm density. Hence, NDA can be said to account for 57% of the national oil palm area. Of the total, only 372,558 hectares constitute organized plantings of oil palm (of which 267,183 hectares are said to be owned by medium/small farmers while 105,375 hectares are of large estate plantation), the rest being wild groves.

Table 4: Estimated Area under Oil Palm in the Different Production Systems on a State Basis in the Niger Delta

S/N	State	Wild Groves	Medium & Small Holders	Estate Plantation
1.	AKWA-IBOM*	240,000	32,277	3,095
2.	EDO*	50,000	24,542	28,147
3.	ONDO*	85,000	10,143	16,169
4.	RIVERS*	91,655	57,000	16,300
5.	CROSS/ RIVERS	240,000	29,577	26,207
6.	DELTA	60,000	13,730	6,246
7.	ABIA	150,000	29,765	4,589
8.	IMO	106,690	67,690	3,410
9.	BAYELSA	39,000	2,459	1,212
	TOTAL	1,062,345	267,182	105,375

Source: Omoti, 2009 & Field Data, * denotes states where fieldwork was carried out

Given that the wild harvest tends to yield about 1.5 tons of FFB/ha, while the plantations yield on average 5 tons/ha, it is likely that the total production of FFB is in the order of 3.5 million tons per year. With oil extraction rates averaging 15% on the estates and 10% on the traditional, it is likely that the total production of oil in the Niger Delta is in the realm of 400,000 tons of oil per annum, with about 75,000 tons of SPO and 325,000 tons of TPO4.

The Traditional System

In the traditional system, palm trees are part of the productive landscape. In many cases, natural palm groves are the result of long-term resource management, where forest areas have been cleared for other agricultural production, but leaving a number of well spaced palm trees that allows both types of production. In other cases, palm trees have been planted as community or family palm stands as part of agroforestry systems. The palm fruits are collected from the trees and are later processed locally into red palm oil. In some cases, the process is totally manual, while others include the use of mechanical pressing units, operated manually. The palm kernels are converted manually into soap or other products, while the tree sap is collected –both from standing or cut down trees- for the production of palm wine.

In the traditional system, most of the palm nuts still come from the wild groves, which are harvested by individuals and then sold for processing. The wild trees are of the Dura variety, are very old, and have a very low yield (less than 1.5 tons of FFB/ ha). Most trees are owned by someone other than the person who harvests the trees. Production practices are rudimentary with no application of fertilizers, and limited weeding. Added to this, the traditional processing methods in use by the processors are mostly artisanal, using mortar and pestles, with a production capacity of 20 litres a day, yielding extraction rates of 9% (less than half of the oil content of the Dura fruit).

Many of the commercially oriented farmers who are developing their own farms have bought small, more modern processors, with a capacity of 250 kg per hour and can reach an extraction rate of 12% of the oil.

⁴ Authors' estimate.

Combining the low oil content and the rudimentary processing, the wild harvested has a very low overall productivity rate (about one fourth that of a properly functioning large estate growing Tenera with modern mills). Total yield of oil in the traditional system for TPO is likely in the range of 335,000 tons per year.

The Industrial System

Globally, the industrial system is based on monoculture plantations, where the land only produces palm fruits for industry. Although there are some differences between the colonial and post-colonial model, the system remains basically the same. In most, if not all cases, land has been taken away from local communities with little or no compensation; biodiverse ecosystems (mostly forests) are destroyed and substituted by large areas of palm monocultures; working conditions (slave or forced labour in colonial times) become near slavery or low-paid labour in the modern system. In two aspects, the modern system is even worse than the old one: extensive drainage of the land and widespread use of agrochemicals, both impacting on local water resources. This was partially the case in Nigeria up through the early 2000s, but it can change.

In many cases, government or corporate-owned plantations are complemented with smallholders' plantations promoted by the large plantation owners, usually under a contractual system where smallholders agree to sell their production to the company's processing unit. Processing of the fruits into oil palm and other secondary products is centralized in large-scale mechanized industrial plants. The resulting oil is usually considered by the local population as having lower quality than that produced manually in the traditional way.

The ages of the trees in a significant proportion of existing oil palm plantations in Nigeria has gone beyond 30 years and productivity is on the decline. This poses a threat to the availability of adequate quantities and quality of FFB for processing. In this regard, the systematic planting of new plantations of improved tenera cultivar, especially of shorter height, to replace ageing palm groves of the dura variety, as well as access to capital for the acquisition of improved processing equipment, would result in meeting the increasing demand for raw material and improved processing efficiency. The resuscitation of such inoperative oil palm estate as Apoje Tree Crop Farm might also serve as an incentive for smallholders to increase their ownership of smallholder plantations, either for self-processing, or to supply larger mills with the raw material. Other triggers/drivers for increased cultivation and income from oil palm include increases in world vegetable oil prices, biofuel production, emerging technologies (including processing equipment) and equipment fabrication, oil palm research, support for smallholder oil palm producers, especially using the out-grower approach, as well as access to land and capital.

Processing in the industrial channels can produce SPO, if the FFB is delivered to them on time. Total production of SPO in the Niger Delta is likely in the range of 65-70,000 tons, when considering the linkages between the medium and large farmers with their outgrowers.

Cost of Production for a Start Up Plantation

The Palm Oil value chain investigation team carried out cost production analysis using variable inputs cost with Ondo state as a case study. The analysis is shown in the Table 5 below:

Table 5: Analysis of the Cost of Production and Profitability during First Five Years of a New Plantation

Farming Activities	Yr 1	Yr 2	Yr 3	Yr 4	Yr. 5
	=N=	=N=	=N=	=N=	=N=
Production Cost					
Land Clearing/preparation	15,000	Nil	Nil	Nil	Nil
Seedlings	7,500	1,500	Nil	Nil	Nil
Digging	15,000	3,000	Nil	Nil	Nil
Transplanting	7,500	1,500	Nil	Nil	Nil
Weeding/slashing (x2)	20,000	20,000	20,000	20,000	20,000
Fertilizer application	17,500	17,500	27,500	27,500	27,500
Wire gauze and wiring for protection	20,000	Nil	Nil	Nil	Nil
Pruning	Nil	Nil	3,000	3,000	3,000
Harvesting	Nil	Nil	5,760	7,440	18,000
Haulage from stands to central platform	Nil	Nil	Nil	1,000	1,000
Sale of FFB	Nil	Nil	7689	24,800	60,000
Processing	Nil	Nil	Nil	Nil	Nil
Sale of palm oil	Nil	Nil	Nil	Nil	Nil
Sale of Palm kernel	Nil	Nil	Nil	Nil	Nil
Return on Investment	(102,500)	(43,500)	(48,571)	(34,140)	(9,500)

Assumptions:

**In year 3, only 80% of the survived stands will fruit*

**Expected yield of 2 ffbs per plant*

**In year 4, 90% of survived stands will fruit and 80% of supplied stands will fruit*

**Total quantity of ffbs will be $72 \times 3 = 216$ plus 32 from supplied stands = 248*

From a smallholder's perspective, since much of the labor that is costed out (weeding, harvesting and pruning) will be provided by himself, the plantation starts to yield a positive return to labor in the 5th year.

Women and Palm Oil Production in Nigeria

Palm oil is very important as an income generator for women in Nigeria. In most cases it is women who are in charge of processing the oil palm fruits into red palm oil (channel 1) and of selling the product in the local and even national market (Channels 1-3). The processing of the fruits into vegetable oil is most commonly carried out by women (See Box 1 below):

The study, estimates that there are above 37,000 traditional processors local/traders in the Niger Delta and women make up a large share of this number, although, this is not a definitive figure to show the involvement of women in the processing of palm oil in the Niger Delta region. It is also inferred that gross income earnings in oil palm production is reasonable enough to encourage women's participation in the business, according to a recent BBC report on palm oil production. The harvest from a handful of trees takes 48 hours to process "the amount of kernels will get us one full jerry can of oil, that's about 20 litres," that will be sold for 3,000 naira (\$20; £14).

Box 1:

The red palm oil is a common ingredient in the cooking of almost every type of dish prepared in Nigeria. Akwa Ibom state, a coastal state in south eastern Nigeria is one of the areas where oil is produced in large quantities, mainly by women. The processing of the fruits into vegetable oil is most commonly carried out by women. It begins with harvesting the ripe fruits which grows in clusters weighing between 20-30 Kilos. The women work communally in groups of 2 or 3. 10-20 bunches of ripe fruit from the palm tree are cut and gathered. The harvested fruits are then cut into smaller clusters and sprinkled with water, and then, covered with thick jute bags or banana leaves to aid fermentation and make it easy for the seeds to be picked easily from its spiky stalks.

Two or three days after, the seeds are picked, washed and packed in to iron drums and boiled. This process is tedious. Fire kindled from gathered fire-wood is usually prepared a night before and at intervals, rekindled to keep the fire cooking constantly hot. As early as 4 or 5 a.m. the boiled seeds whose fleshy pericarp has become soft and tender are scooped with a small basket or sieve bowl into an earth dug-out mortar, which has been fitted with a metal drum. The boiled seeds are then pounded with a wooden pestle to separate the fleshy pericarp from its hard kernel seeds.

The next stage involves scooping this mixture onto a flat trough or onto the ground which had been covered with banana leaves. The kernel seeds are then separated from the fibrous mash. This is then scooped into a cylindrical hollow press. The wrench is then turned slowly and gradually, as this is being done, the extracted oil from the holes in the press is guided through a duct at the bottom of the press into a large bowl, trough or container. This process is carried out several times until oil is drained from the marshy mixture.

The next stage is carefully draining the oil into containers; in doing so, the women are careful not to allow dirt, fiber or other foreign matter into the oil. The finished product if in large quantity may be further stored in larger metal drums awaiting buyers who come to buy them off these women and transported to other towns. If the oil is not so large in quantity they are then taken to the local market for sale; either way, the Akwa Ibom woman earns her money. Though the process is tedious, the oil is top quality if processed by an experienced producer.

Source: Excerpted from "Oil Women of Akwa Ibom State" by Patrick B. Akpan

The Value Chain Analysis

Structure of the Value Chain

Value Chain Analysis is a tool that facilitates investigation of business activities in terms of new value-adding opportunities in relation to existing values with regards to sourcing of factors of inputs, production, processing and delivery of the finished product (Eme, 2008). According to Frank Hartwich et al (2010), the potential for the development of agricultural value chains in Nigeria is 'substantial and promising, both from the supply and demand perspectives (sufficient natural resources as well as large domestic market opportunities for export). Value chain development has become a reliable tool for stimulating sustainable agricultural investments. An agro value chain consists of a series of activities that add value to a final product; beginning with raw material production, linking with processing, getting the final product, marketing, sale to the end user or consumer and after waste disposal. The value chain analysis, however, starts from the perspective of the end market, to determine the products they want and how the greatest value can be shared down the chain as the actors work to produce those products.

The Oil palm value chain cuts across regions of Nigeria. The production of Oil palm oil is found predominantly in the southern part of Nigeria; particularly in the Niger Delta region. Location specificity is not the major determinant of value chain. Rather, value addition is determined by the bulkiness of the product, availability of labor and the various inputs and resources; namely costs of transport and distribution, the markets and consumers. While oil palm production and primary processing take place in the Niger Delta, the bulk of the secondary processing, as well as the markets and end users of palm oil products are outside the region, particularly Lagos and Northern part of the country.

Actors in a value chain operate under certain constraints and opportunities which include availability and access to resources, intra and inter firm linkages, availability and use of knowledge and technology, and markets. In addition, the availability and quality of support services in forms of transport, storage and finance can combine in determining the costs and returns at every stage and ultimately defines the profit margins as the product moves along the chain. This assessment provides useful insights into understanding of the markets, understanding of the structure and operation of the value chain and in developing a vision and strategy for the growth of the value chain.

Description of Functions and Actors

The Palm Oil value chain was analyzed with a qualitative approach and complimented with quantitative study which involves mapping the pattern of value-added distribution along the chain; measuring profitability, productivity and production capacity; and comparing the performance of a firm, value chain, or value chain actor against its competitors.

As we develop the strategy for long term growth of the value chain, with a specific focus on inclusion of the poorer members of the community, we must understand the different types of actors at each level of the value chain and the incentives that drive them if we are to target the behavior change necessary for a better functioning value chain.

The main functions in the value chain for Oil Palm are production, primary processing, secondary processing, aggregation & wholesale, retailing and consumption. The main actors in the system are

harvesters of wild groves, small, medium and large private farmers, estate plantation owners, processors, traders/wholesalers, retailers and consumers (household, commercial and industrial users).

Production

As in most parts of the major oil palm belt of Nigeria, oil palm production in the Niger Delta is carried out in three production systems:

- Large estate plantations,
- Medium and small holder plantations with many of the small holder systems intercropped with food crops and sometimes other cash crops
- Semi/natural groves.

Medium/Small Farm Areas - $1 \leq 100$ hectares. This category is sub-divided into three in line with baseline survey, that is, small scale farms, medium scale farms and large scale farms.

Estate Plantation Areas - ≥ 100 hectares. This category is also sub-divided into three that is, small estate plantation, medium estate plantation and large estate plantation.

This study reveals the structure of oil palm production as follows:

Farm Areas

- **Wild-groves:** Owners of land lease out the trees to individuals to harvest the fruits. There is no investment by the owners and the variety is Dura. The average yield is estimated at 1.5ffb tons/ha/year.
- **Small Scale Farmers:** Owners of 1-10 ha of planted palm and mostly Tenera variety. Some are inherited and some are new. The use of manual labor and proper spacing of plants are common practice with this group. Generally most of the small holder farms visited were poorly maintained in terms of weeding, slashing, fertilizer application. Most of the farmers interviewed slash their farms twice a year. They rarely carry out ring weeding and where this is done it is carried out only once a year. In many cases pruning is usually done only during harvesting. Hence, inappropriate fertilizer or chemicals are common in this structure. The average yield is 3ffb tons/ha/year.
- **Medium Scale Farmers:** Owners of 10 and 25 ha using manual production technology. The average yield is also 3 tons FFB/ha/year.
- **Large Scale Farmers:** Owners of 25 and 100 ha with adoption of small mechanization and herbicides application. The average yield is 5 tons FFB/ha/year.

Estates

- **Small Estates:** The area under cultivation per holding in this group is between 100 and 1000 ha and owned by individuals and cooperatives. There is a reasonable level of mechanization but timely application of fertilizer remains a challenge owing to availability. The average yield is 5 tons FFB/ha/year. Some of the functional holdings in this group in NDA are as follows:

○ Okada Wonderland	125 hectares
○ Satum Farms	475 hectares
○ Iyare Oil	500 hectares
○ Augustine Efionayi	500 hectares
○ Obotme Oil Palm	350 hectares

- **Medium Estates:** The area under cultivation in this group is between 1,000 and 5,000 ha per holding. These are owned by corporations or State governments and most of the corporations are linked to a medium sized mill. The average yield is 5 tons FFB/ha/year. Some of the functional holdings in this group are as follows:
 - A & Hartman 4,000 hectares
 - Aden Rivers 1,050 hectares
 - Ore-Irele Oil Palm Plc 3,103 hectares
 - Investment Holding Company Irele 1,220 hectares
 - Investment Holding Araromi 1,271 hectares

- **Large Estates:** The area under cultivation per holding is greater than 5,000 ha and some are integrated into large scale processing. It was not possible to obtain records of fertilizer application for the estates. The average yield is 5 tons FFB/ha/year. Some of the functional holdings in this group are as follows:
 - Okitipupa Oil Palm Plc (OOPC) 10,468 hectares
 - Okomu Oil 10,000 hectares
 - PRESCO 9,841 hectares
 - Obasanjo Farms 8,670 hectares

Inputs

Only a small percentage of the oil palm production invests in inputs into the productive process, primarily the larger estates and the small and medium scale farmers who have actually planted new trees.

The Palm Oil value chain inputs comprise of sprouted seeds and seedlings, fertilizer, herbicides and insecticides (chemicals). However, the availability, affordability, skilful and proper combination of these inputs determine, to a large extent, the productivity of the oil palm plantations as revealed in the analysis of each of the inputs below.

- **Seedlings:** As noted in the discussion on production, the variety is critical. The recommended new variety is Tenera, and NIFOR is the main supplier of this variety to nurseries and large estates for production. NIFOR has a significant supply of plants that it can sell to farmers, but the demand for their uptake has decreased since 2008 (see annex 2 for a more in-depth discussion on the issues surrounding supply and demand for seedlings). One of the main concerns has been that farmers are not certain that they are actually getting the variety of palm tree that they are purchasing. There has been a steady decrease in the demand for seedlings since the government lifted the ban on imports of vegetable oil.

The market for sprouted seeds/seedlings is characterized by many buyers and very few suppliers. The buyers range from the very smallholder farmers to very large estate-holder farmers. While NIFOR is the main suppliers of sprouted seeds/seedlings, other sources of sprouted seeds/seedlings are the large scale oil palm companies such as Presco Nigeria Plc. There are other informal suppliers, as well, who sell adulterated sprouted seeds and farmers who source sprouted seeds from other farmers for transplanting.

The cost of a seedling is about N150, but government subsidized programs have been providing them at N50 per seedling. While this makes a difference to the farmer at start up, it is really a marginal savings. Table 5 demonstrated that seedlings are only between 5% (if subsidized) and

15% (if not subsidized) of the first year of investment in getting a farm started. Considering the long term nature of the investment (30 years), and the importance of the variety on yield and oil content, it would be advantageous for farmers to purchase higher priced seedlings for which they are certain of the variety.

- **Fertilizer:** Fertilizer is another major input in the palm oil value chain. Different types of fertilizers are required at different stages of growth for palm trees. Productivity declines without the appropriate application of fertilizers to the palm tree. However, farmers at all levels (except the best functioning large estates) have difficulty accessing the fertilizer (a combination of availability and the cash to purchase it).

The price of fertilizer depends on the type and sources of supply. The current market price of a bag of fertilizer sells for between N4, 500 and N5, 500. Government's allocation is subsidized and distributed to farmers through the ADP (in most states) at N2,750 per bag, but availability is scarce. The number of bags of fertilizer which a farmer buys in a year depends on the ages of the palm trees and the size of the holdings. In most cases, 2 and 3 bags of fertilizer are applied per hectare.

The activities of contractors and middle men involved in the distribution of fertilizer to farmers add to the frustrations experienced by farmers. While the middlemen and contractors reap huge benefits through loopholes in fertilizer distribution, the result is that farmers either do not see the fertilizers or that the fertilizer is sold in the market at very high prices. Thus, government subsidies on fertilizers only create opportunity for price arbitrage by contractors and middlemen.

- **Chemicals (herbicides, insecticides, etc):** Herbicides are used to combat weeds in the plantation, while insecticides are used to control insects. However, less than 5% of farmers interviewed apply insecticides in their farm. More than 50% of these farmers are willing to adopt integrated weed management technique which entails the application of herbicides along with cultural weed control.

The demand for herbicides by oil palm farmers is fairly high in the target states. Over 94 % of farmers said they would like to use herbicides, but alluded to their high cost which makes it difficult to afford. However, over 60 % of these farmers use herbicides sparingly in integrated weed management technique while the remaining 40 % carryout inter-cropping methods in combination with cultural weed control to combat weed problems.

Poor quality of herbicides is a constraint, considering the influx of adulterated herbicides in the market. A good number of farmers have lost money and endangered their farms due to the use of fake or adulterated herbicides which could only be detected after application. Owing to poor quality of herbicides, most farmers prefer inter-cropping as a strategy for combating weeds in the farm.

Production on the Farms

For the wild grove harvesters, one of the major constraints is that they are rarely the owners of the trees. Therefore they have a disincentive to invest in them by applying inputs, weeding, and pruning. This lack of incentive to them to invest does have an impact on the overall yield of those trees.

The small and medium scale farmers who have planted their own trees can have difficulty purchasing the inputs needed.

The effect of the poor management on large government estates is highlighted in the performance of Okitipupa Oil Palm Company (OOPC), when compared to the performance of PRESCO PLC, under foreign management. Table 6 shows that OOPC's harvested production is almost non-existent (165 – 225 kg/ha) when compared to PRESCO (6.6 - 7.4/tons/ha). This difference in performance is attributed to the old age of OOPC's plantation, poor management, and financial challenges which are preventing it from re-investing and planting new trees. It might also reflect the fact that much production is being siphoned off to private farmers and processed under channel 2.

Table 6: Comparison between Efficient and Inefficient Large Estates

CRITERIA	2007		2008		2009	
	OOPC	PRESCO	OOPC	PRESCO	OOPC	PRESCO
Total FFB ton	1,313.1	67,653.0	1,597.9	81,591.0	1,794.6	65,297.0
Mature area, hectares	7,993	NA	7,993	7,786	7,993	7,786
Immature area, hectares	NIL	NA	NIL	1,562	NIL	2,055
Total planted area hectares	7,993	9,106	7,993	9,348	7,993	9,841

Source: Data collected at the field

Ongoing/Present Effort

The Nigerian oil palm industry lacks adequate plantation culture and also operates under a land tenure system that limits smallholders' access to enough arable land. If these problems are adequately addressed, oil palm cultivation and consequently palm produce will effectively increase with attendant earnings for large and small scale farmers.

Field surveys indicate the increasing age of the farmers involved in palm oil productions. In Ondo state, 85% of the respondents are 40 years and above with 95% having more than 10 years experience in Oil palm production. In Rivers state, the survey showed that most farmers are married between the ages of 45 and 60 years and are educated up to secondary school level. In Rivers, youth only show interest in mill operations because they believe that this is the most lucrative piece of the business; the mill operator earns N150 per drum which cost N250 at the mill, and the mill owner earns the remaining N100.

In contrast to the large estate plantations (especially OOPC) with age of palms over 25 years, the smallholder Oil Palm farms are much newer, with 60% of trees below 10 years in age, demonstrating that there has been lots of investment in smallholder commercial farming due to market incentives in the early 2000s. The average hectares of cultivated oil palm are 8.15 per farmer. Despite that the majority of the respondents are in an age bracket that favors sedentary farming with commitment and zeal, a couple with good farming experience is confronted with a series of bottlenecks militating against their plan expansion of the business.

Akwa-Ibom State has a declining growth rate trend of yearly cultivation from 2006 to 2010 because the interest of farmers continues to dwindle due to the policy inconsistency of the State's Ministry of Agriculture. A yearly average of 3 new ha planted by farmer as at 2006 has dwindled to less than 2 ha as of 2010.

What stands out from the data in table 7 is that larger farms created by the government are not being maintained, or have shut down completely. This can offer an important opportunity for increasing the productivity of existing palm plantations, without opening up new land.

Table 7: Status of Large Government Palm Estates in Akwa Ibom

S/N	Name of Plantation	Local Govt Area	Hectares Acquired	Hectare Planted	Year of Planting	Ownership	Mill Type & Capacity	Remarks
1.	Akwa Palm Industries Limited	Esit Ekid, Mbo, Urue Offong, Oruk Anam	1500	1248	1993–2001	AKSG	Sspe 10 Tons Per Day	Plantation Abandoned
2.	Obotme Oil Palm	Ini	750	350	1964	NIFOR/FGN	Sspe 0.25/Day	Functional
3.	Nnedu Farms Limited	Ibesikpo/Asutan, Okobo, Ibiono	80 15 45	80 15 45	2000 2005 2006	Nnedu Farms	Stork 1.5 Tons Per Hour	Dura/ Tenera Planted, Palms Not Maintained
4.	Presbyterian Farms Ltd	Itu	1000	900	1965	Presbyterian Farms	Nil	Not Maintained
5.	Nysc Farms	Nsit Atai	100	100	1975	NYSC Farms	Sspe 0.25 Tons/Day	Maintained
6.	NALDA Farms	Ikpe-Urue Offong, Essien Udim	120 37	120 37	1994 1994	Ikpe Co-Operative Society Community	Nil Nil	Not Maintained Not Maintained
7.	NIFOR Substation Ibesit	Oruk-Anam	246	200.4	1951-1965 1977-2000	NIFOR		Well Maintained
TOTAL			3,893	3,095.4				

Source: UNIDO, 2011

Harvesting of Oil Palm Bunches

The quality of oil produced and the standard of tree hygiene achieve depends to a great extent on the correct timing of harvesting. The correct time to harvest bunches is when the fruits become loose and can be dislodged. Experience has shown that if there are about 2 – 3 loose fruits at the base of palm, then bunch are sufficiently ripe to harvest. If harvested earlier than this, the fruits will be under ripe and will not have reached full oil content before fruit processing and extraction. If harvested too late, the free fatty acid (FFA) content of the oil which affects the quality will increase; in addition, bunch rot problem may occur. During harvesting and transportation of bunches, bruising of the fruits should be avoided. Bruising leads to an increase of free fatty acids in the oil and therefore reduced quality.

The operation of harvesting may be divided into the task of cutting the bunch from the tree, collecting the loose fruits which drop from the harvested bunches and transportation to the milling site. The method used for cutting the bunch from the tree depends on the height of the palm. With young palms in the first one to five years of harvest, bunches are cut with an iron chisel blade mounted on a short pole. When the palms become taller and are above arm's height, the harvesting hook mounted on a short pole is used. In case of very tall palms the use of the rope method for climbing and cutting the fruits bunches is practiced. Carrying the harvested fruit from the tree base to the collecting point is another costly task in the operation of harvesting because of the fields must be well maintained and the base of the palms ring weeded. The harvested fruit bunches are thereafter evacuated to the mills for processing using tractor drawn trailers of tippers or any other appropriate vehicles, when available. For harvesters of wild groves, this might be bicycles or backpacks.

Processing

Oil extraction is a complex process. The variety of technologies in use varies by production system.

- In the traditional TPO markets, most of the palm oil is produced by women using the rudimentary mortar and pestle mentioned above. These achieve rates of extraction of about 25% of the available oil in the fruit, so there is lots of lost yield.
- More advanced small farmers have started their own processing using mini-improved processing units (such as those from NIFOR)⁵. These semi-mechanized integrated small-scale processing equipment (SSPE), have been improved considerably since their initial introduction. They will use a digester, press, and a small engine. They cost about N1 million, and capture about 2/3 of the available oil (12% for Dura).
- Medium scale processors are able to process about 0.5 tons FFB/hour, and the equipment has screening machine, boiler, digesters, press, clarifier, and generator. These are able to produce SPO, and employ about 10 personnel to operate. They require a good source of water and can generate a 13-14% yield of oil (equivalent to 50-70% of available oil).
- Large scale processors can handle more than 1 ton of FFB/hour (attached to estates with large mills) may process up to 60 tons of fruit/hour, with yields of 15-18% of oil from the fruit (equivalent to 75% of available oil in the tenera variety).

Oil extraction from fruit follows the same basic steps in either case:

1. Steam sterilization of bunches (inactivates lipase enzymes and kills microorganisms that produce free fatty acids, reducing oil quality).
2. Stripping fruit from bunches.
3. Crushing, digestion, and heating of the fruit.
4. Oil extraction from macerated fruit (hydraulic pressing).
5. Palm oil clarification.
6. Separating fiber from the endocarp.
7. Drying, grading, and cracking of the endocarp.
8. Separating the endocarp from the kernel.
9. Kernel drying and packing.

The product of step 5 is termed crude palm oil (CPO), which can be either TPO or SPO. In order to produce the more advanced products (RBDO), it must be refined to remove pigments, free fatty acids, and phospholipids.

Baseline survey of processing mills in Akwa-Ibom state reveals that the defunct Eastern Nigerian Government and the Nigerian Palm Produce Board established palm oil mills most of which have been abandoned and vandalized. Less than 10% of the mills established in the past are still functioning.

It is clear that for the TPO sector, poor quality of the milling technology is leading to large losses in oil (or unrecovered potential oil). While NIFOR has been performing research and designing new machines, it

-
- ⁵ New models with increasingly high extraction efficiency and requiring less labor input have also been developed. These include the:
 - NIFOR large, with throughput capacity of 0.5-1.0 tones (Fresh Fruit Bunch/ Hour (FFB/HR),
 - NIFOR medium, with throughput capacity of 0.25-0.5 tones FFB/HR and
 - NIFOR mini, with throughput capacity of 0.1-0.25 tones FFB/HR (Oyaide, 2004).

is local artisans who manufacture and maintain most of the machines that are in use. A deeper analysis of the milling machinery value chain to understand the strengths and weaknesses of the NIFOR machines, the challenges the artisans face in incorporating them and the challenges in driving the uptake of the new technology among the small to medium processors. At a cost of N1 million, the machines are not expensive, and if a machine with 500 kg per hour of through-put could increase the oil yield by even 3 percent, it would pay for itself in the first year.

Secondary Processors

The main raw materials of secondary processors are SPO and Palm kernel nuts / PKO. Palm kernel oil, even though it comes from the same fruit, is very different from the oil obtained from the rest of the fruit. It is semi-solid or solid at room temperatures and when eaten it produces a soft-taste sensation, similar to cocoa butter. This makes palm kernel oil popular among chocolate lovers (Fedapalma, 2009). It is also used as a substitute for cocoa and fats found in milk and in cream made from sugar, biscuits, cakes and margarines. It is also used when baking cakes, croissants and bread to give the products added volume, a soft texture that make bread last longer. These companies are secondary processors of SPO:

- Golden Oil Industries Ltd, 15A harbour industrial Estate, Onitsha
- Envoy oil Industries Ltd, PokoBros Avenue, Onitsha
- Sudit Oil & Chemical Ltd, Ibadan
- Presco PLC, Obaretin Estate, Km 22 Benin / Sapele road, Benin-city

The first three companies are the end-users of SPO, while PRESCO is an oil palm company involved in production of SPO for secondary processing into value added SPO before selling the excess. The quantity of SPO needed for these companies' yearly operations could not be met by local production, hence making them to operate below capacity of installed plants. Table 8 below shows deficit of SPO by these three companies:

Table 8: SPO Locally Supplied to Secondary Processors, along with Estimated Additional Demand

Year	Golden Oil			Envoy Oil			Sudit Oil & Chemical Ltd		
	QUANTITY DEMAND	QUANTITY LOCALLY SUPPLIED	DEFICIT	QUANTITY DEMAND	QUANTITY LOCALLY SUPPLIED	DEFICIT	QUANTITY DEMAND	QUANTITY LOCALLY SUPPLIED	DEFICIT
2008	14,000	2,800	11,200	10,000	3,200	6,800	31,111	14,000	17,111
2009	21,000	4,200	16,800	12,000	4,000	8,000	32,000	16,000	16,000
2010	37,200	9,300	27,900	12,000	5,000	7,000	32,727	18,000	14,727
TOTAL	72,200	16,300	55,900	34,000	12,200	21,800	95,838	48,000	47,838

Source: Field data, 2011

From the above, Golden Oil had been operating on the average 22.5% of installed capacity while Envoy Oil had been operating on the average of 35.9% installed capacity on the basis of local supply of SPO (the major raw material). Sudit Oil on the other hand has operation capacity between 45-55%. Golden Oil had policy of non-importation of SPO because the plants have been configured into extracting/refining of PKO and Soya oil. Envoy Oil on the other hand, engages in importation which boosted its capacity utilization to 55% since 2009. Findings however reveal that the imported SPO was cheaper but sub-standard in quality according to Sales/Logistics Manager of Envoy Oil. However, Sudit Oil refines oil in large quantities for De-United Foods who source palm oil locally and internationally. De-United refines oil once a month on average, and refines between 1000 & 2000 tons of oil. The sources of the SPO purchased locally by the two companies are summarized in Table 9 below:

Table 9: Sources of Locally Produced SPO

Sources	Golden Oil	Envoy Oil	Sudit Oil & Chemical Ltd
Major:	-Okomu Oil Plc -Ondo Wholesalers ⁶ -Atlas Farm, Delta	-Okomu -Presco	- De-United Foods -Ondo Wholesalers
Minor:	Presco	-Obasanjo Farm, Calabar -Real Oil Farm Calabar	

Source: Field data, 2011

The major products of these companies, since they are not the end markets themselves, are contained in Table 10 along with the target end markets.

Table 10 : Products from SPO

Products	Golden Oil Target Markets	Envoy Oil Target Markets	Sudit Oil
Rbdpo	-Indomie -Noodle Companies	-De-United -May & Baker	- De-United Foods
Stearin	-Biscuit Manufacturers	-Nesco, -Unilever -Standard Biscuit	-Biscuit Manufacturers
Olein	-Local Markets Fibros	-Domestic Users -Industrial Users	
Ffa	-Soap Manufacturers In Lagos & Kano	-Local Soap Producers -Scartite Industry Ltd	- Al Canal Soaps Ngr Limited - Other Soap Industries

Source: Field data, 2011

In terms of pricing, findings reveal that acquisition cost in 2010 of SPO at Okomu Oil was N220,000 per ton. Meanwhile SPO from PRESCO was N5,000 lower than other prices, anytime it was available over the last two years. There are also seasonal variations of price. Taxes and Police extortion often made the cost to rise to N230, 000 per ton before arrival at company site. Those wholesalers who supply to the company would wait for laboratory verification of their product for quality control before offloading. In case of Sudit Oil the crude SPO acquisition cost ranged between N180, 000 – N230, 000 per ton (depending on season).

PRESCO: Presco was the fourth known company who engaged in the secondary processing of SPO into three major products as shown in the table below:

Table 11: PRESCO's Major Oil Palm Products

Year/Products	2008	2009
SPO production tones	15,930	13,494
CPKO production tones	623	598

⁶ The Ondo wholesalers are primarily selling SPO purchased from OOPC informally, which is not allowed to sell directly since it is in receivership

Sales RBDO tones	7,675	11,297
Sales Olein tones	5,172	4,590
Sales stearin tones	1,660	1,272

Source: Presco News, 2009/2010 editions

Marketing

The mode of market exchange in which productive agents are embedded is largely impersonal in traditional societies using traditional techniques of production and often subject to high levels of uncertainty due to the equally uncertain nature of relational contract. The 'extent of market' or 'size of market' refers not to a geographic area or large population but purchasing power, 'the capacity to absorb a large annual output of goods'. Traditionally customers are seen as the end users of palm oil, be they institutional buyers or retail purchases. The purchasing policies and decisions are based largely on price, quality and delivery with minimal considerations given to environmental aspects.

The supply of TPO, SPO and PKO to the end consumers or end-users is carried out through local and foreign sources. The local source is characterized by three main actors namely; palm oil dealers, secondary processors and automated processing plants owners. There are also three main groups of end-users: 1) household consumers of TPO, 2) commercial users of TPO and 3) industrial users of SPO, SPO value added products & PKO.

As noted in chapter 2, palm oil in Nigeria is used mainly for home consumption. Bleached and refined palm oil is used in the manufacture of margarine and for confectionary, ice-creams, soap, and filled milk or cocoa butter substitutes. Palm kernel oil is used for the manufacturing of artificial cream fillings, soap, cosmetics and personal care products as well as emulsifiers in food processing and pharmaceutical industry and the production of toiletries, tobacco, alkyd resins, paints and varnishes, cellophane, explosives, polyurethane etc. Palm kernel cake is used as livestock feed.

Crude Palm Oil Aggregation and Wholesaling

Generally, there are four categories of traders for TPO, each having a place in the existing value chain:

- **Community Palm Oil Dealer Associations:** This group buys palm oil in bulk on a regular basis for known dealers / merchants (who usually reside in Lagos, Ibadan, Onitsha, Aba & parts of northern Nigeria). The community palm oil dealer associations' purchases palm oil in plastic jerry cans of 20 litres; in drums of 200 litres each or in tankers from plantation estate owners. Many co-operative societies engaged in palm produce marketing, mostly buying of palm oil from the smallholder farmers and selling it in urban cities. The Akwa Ibom State Government is currently building three palm oil depots in Essien Udim, Ibesikpo Asutan, and Ukanafun Local Government Areas for bulk storage of palm oil.
- **Peddlers:** This group operates at the oil beaches and buys from farmers and millers and sells to oil dealers, making a living largely from commissions. They form a strong union or association to create strong barriers between the dealers and smallholders. They buy CPO from smallholders during the market day and hand it over to the dealers on a commission basis. Usually, peddlers do not have capital for the business but negotiate with the buyers and the farmers. Often they have graduated to become major CPO dealers with strong link to the markets in northern Nigeria.

- **Oil Merchants:** This group exists in Akwa-Ibom and members are usually of eastern origin. They have strong links with markets in the northern cities or Lagos. Oil merchants travel to Aba which served as CPO assembling markets (oil beach) and Women progressive mill, Ika, Akwa-Ibom state on fortnight basis depending on the season. Some of the merchants have established a procurement network with the local traders and middlemen and they bulk in drums of 200 litres each. They then deliver to different offloading points at distant northern states of Sokoto, Kano, Kaduna, Bauchi, Plateau and Niger, or in Western Nigeria. They own and operate distribution stores and have good distribution network either in retailers, wholesalers or industrial markets.
- **Speculators:** This group buys and stores the produce during the period of high supply and later sells to major dealers at a profit during the period of scarcity. Farmers themselves oftentimes serve as speculators; retaining oil from their own production and storing it at home until cash is needed for things such as school fees and medical costs. Profit margins depend on the price differential between TPO in the low and high crop periods (Abia report, 2011).

The pricing of palm oil is seasonal. Table 12 shows that prices can nearly double between peak production season (when prices are lowest) and the off season. Given these price swings, the value of SPO maintains its value at a higher level during the peak season, since its use is more standardized.

Table 12: Palm Oil Prices per 20 litre Can in Rivers State

S/n	Category of Actor in the Value Chain	Season	Average Selling Price per 20 litre Can		Average Price (N)
			Low	High	(L + H)/2
1	Farmer/Processor	Peak	N1,500.00	N2,500.00	N2,000.00
		Off	N2,500.00	N4,000.00	N3,250.00
2	Wholesaler/Dealer	Peak	N1,800.00	N3,000.00	N2,400.00
		Off	N3,000.00	N5,500.00	N4,250.00
3	Retailer	Peak	N2,000.00 (N100/litre)	N3,000.00 (N150/litre)	N2,500.00
		Off	N3,600.00 (N180/litre)	N6,000.00 (N300/litre)	N4,800.00

Source: Study Team Survey of market prices in Abua, Etche and Elele markets (2011).

Using average price progression from one category of actor to another, the graphic below shows the margin earned by each category of actors. Middle men (traders) appeared to benefit more from the palm oil business due to inefficiencies resulting from weak value chain coordination.

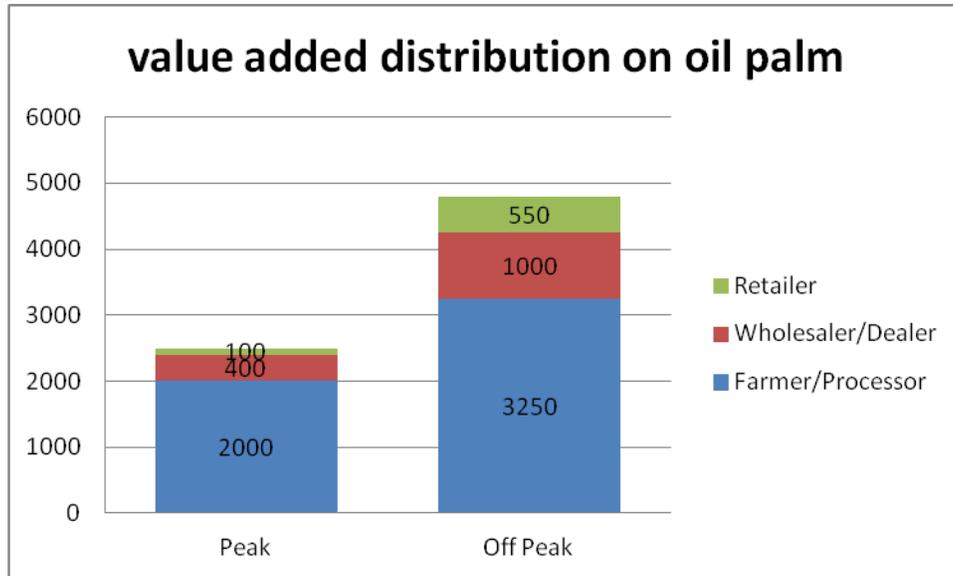


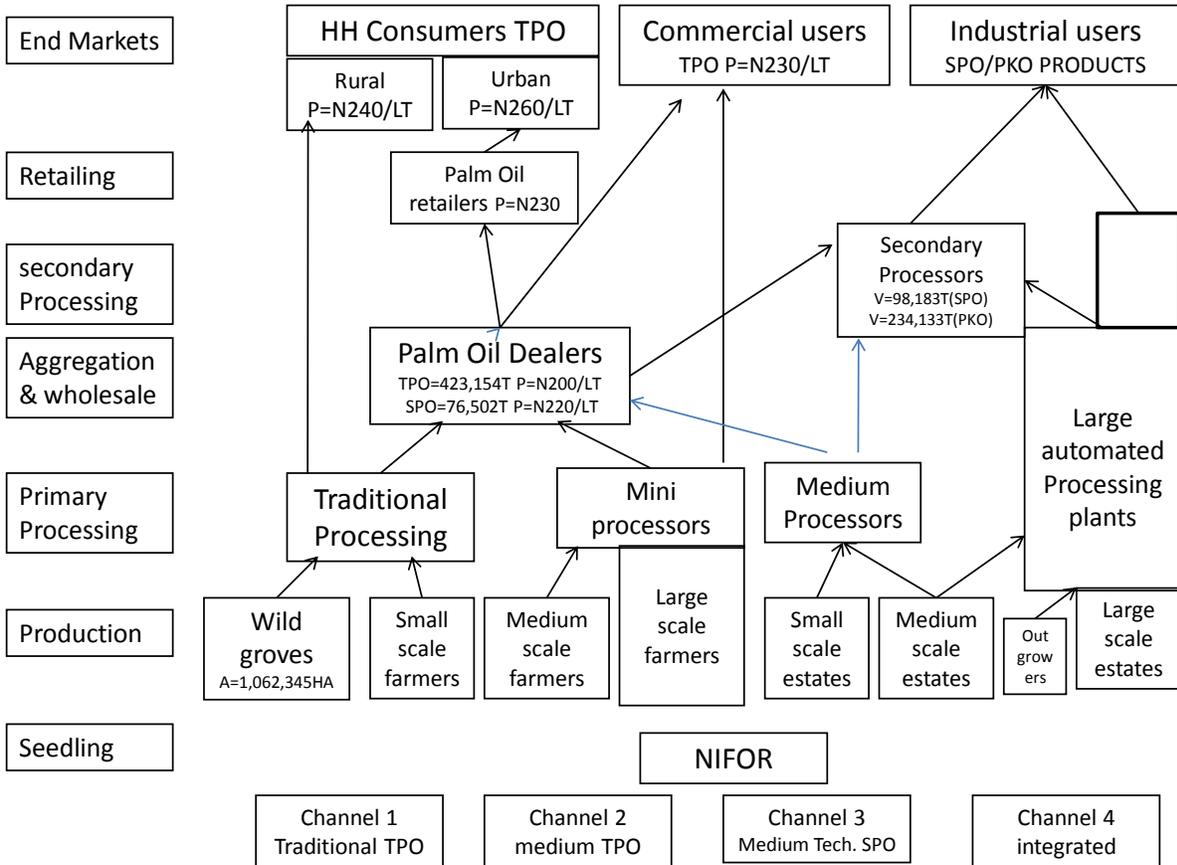
Figure 7: Average price build up and per system actor

The graphic above shows that, during the peak season in 2011, farmer/processors made on average N2000 per 20 litre of palm oil. Wholesalers made N400 per 20 litre can, and retailers made N100 per 20 litre of palm oil. In the off-season period, farmers sold palm oil at N3,250/20 litre, wholesalers made N1,000/20 litre, while retailers made N550/20 litre.

Discussion by Channels and Governance Structures

The Nigerian palm oil processing industry is made up of two key identifiable actors namely the formal large scale producers and the informal small-scale producers much in the same way that we have smallholder farmers and large plantations. The informal group is made up predominantly of small-scale, cottage and family/community level crude oil processors that specialize in the production of crude red palm oil. The distinguishing factors between the palm oil value chain channels were based on primary product and production technologies, the processing technologies, the linkages between the actors and the markets they serve, highlighting four distinct channels. Figure 8 visually depicts the various actors and their relationships along the value chain.

Figure 8: Value chain map for palm oil in Nigeria



Channel 1 – Traditional TPO

Channel 1 is the largest of the four channels, but it is shrinking. It is dependent on the wild grove harvest, the least productive source of FFB, and tens of thousands of small processors. It has no barriers to entry and low costs to start up. The traditional production technique is the most widely used within the oil palm producing rural areas. Structurally, this category of producers is made up of several thousand actors each producing between 40 and 200 litres per household in the course of the production season with free fatty acid not less than 15%. In this channel the end markets / end-users are food vendors, hoteliers and households. Recent findings show that the channel is shrinking due to very weak vertical coordination and with little horizontal linkage between traditional processors and mini processors in detriment to the channel.

Women play a significant role in oil palm processing in channel 1, though they employ inefficient, laborious and time consuming traditional methods that lead to low yields and poor product quality.

The channel is highly fragmented with tens of thousands of actors and can be characterized by a transactional market system between each functional level. The large numbers of actors and the highly

fragmented nature of the relationships make this a difficult channel in which to work. In fact, given the extremely low productivity of the channel, it is primarily a survivalist industry at the production and processing side, with many benefits being captured at the marketing levels.

Channel 2 – Medium Technology TPO

Channel 2 is driven increasingly by farming techniques (commercially oriented) and by an improved processing technology for crude palm oil. The channel is comprised of the larger private producers of FFB who are integrating vertically into processing using more efficient processing technologies. Channel two is attracting the more commercially oriented actors from Channel 1 to upgrade and move into a more productive segment. The use of semi-improved processors otherwise called mini processors which can handle a higher throughput per day and extract larger percentages of available oil, is driving the channel. Issues with the timely delivery of the FFB mean that the main products are crude palm oil with free fatty acid content of greater than 5% but less or equal 15%, but these are the highly demanded products. The end markets are both household consumption and industrial to certain extent.

The field survey revealed that this channel is growing rapidly because most of the new entrants in the business in the last seven years are in this category. Many actors in the traditional TPO channel are also migrating into this channel, because some of the traditional processors are witnessing upgrading into mini processing which is less laborious and time consuming with better extraction rate.

In this channel, TPO normally changes hands at least three times en route the end market, but the larger farmer/processors drive the incentives in the channel. This is becoming the dominant channel in the Oil Palm value chain, believed to be currently handling more than 50% of all of the Oil Palm that is processed and marketed. It has not less than one thousand of processors around the Niger Delta Area.

Channel 3 – Medium Technology SPO

This represents an intermediate technology between the semi improved processing and the expensive modern methods. The majority of the oil palm estate owners are the key actors leading to the production of crude palm oil with less or equal to 5% FFA generally referred to as Special Palm Oil (SPO). The channel has different actors in all of the functions from input supplier, producer, processors, wholesalers, retailers, and end-users so the vertical coordination is complex. The channel is growing gradually due to high demand for the product in Nigeria.

Channel 4 - Integrated

Channel four is comprised of the large estates with vertically integrated through processing (though there are some contract out growers) with fully automated processing plants. Some of the companies, like PRESCO, take the product all the way through to the fractionated Oleins and Stearins, while others sell their SPO to the secondary processors for fractionating.

Two companies in this channel are currently at the fore front in the production of SPO. These companies are PRESCO & Okomu Oil both located in Edo state. Other actors in this channel are OOPC, Okitipupa & Investment Holding Company Plc, Irele located in Ondo state, Agro Ideals located in Akwa-Ibom state and Obasanjo Farms located in Cross-River state.

This channel is the model being used by the largest industries in the world from Malaysia and Indonesia, which are able to control the production of the fruit, the timing of its delivery to the mills, and the access to the end markets.

Sectoral Dynamics

The most steadily growing channel is the medium technology SPO channel (Channel 3), which delivers high quality crude palm oil primarily to secondary processors.

Traditional TPO (i.e.) Channel 1 has been fairly stagnant for a number of years as the supply of FFB is limited by the wild grove harvesting. The vast number of participants in channel 1 makes it difficult to achieve greater efficiency.

The Channel 2, medium technology TPO is also growing rapidly as the medium and larger farmers are investing in improved technology to provide more TPO into the strong demand.

Channel 4 requires significant investment and growth to build on the opportunity to take market share from imports. This channel offers strong potential. However, moribund state owned estate plantations need to be completely privatized with significant new investment to propel the growth of the channel.

We are seeing a strong interest from the secondary processors (in Channel 4) to drive the increase of supply of quality SPO so they can produce more RDO for the manufacturing industries. This is the product with the highest value add in Nigeria, so it offers an important opportunity for the economy overall. But more importantly, the secondary processors seem to be good business investors with the capital to drive the necessary investments to grow the supply of FFB and oil.

Major Constraints in the Value Chain

From the analysis of the markets and the dynamics within the sector, there are important opportunities to both increase the supply of TPO and SPO into the markets. The highest value end market opportunity lies in supplying the high demand SPO to secondary processors and/or industrial users. But this will require a significant expansion of the commercial production of palm fruit by either medium to large scale farmers or estates, which will be able to deliver the fruit to the mills in the requisite 12 hour delay to guarantee the low FFA. This requires significant coordination, as well as the right incentives for the farmers.

A number of different factors present challenges to providing the right incentives for reaching end market opportunities. The relationships between the actors within the different channels are critical. The relationships could either be the vertical linkages (coordination between different functional actors) or the horizontal linkages (relationships between actors within the same function). These relationships, as well as the governance structures within the channels, will provide incentives or disincentives for proper collaboration that can lead to a more efficient channel that benefits all actors within the value chain.

In terms of enhancing Nigeria's overall competitiveness in palm oil production, table 13 provides a nice summary of the issues that Nigeria's industry faces, especially in comparison with that of Malaysia.

Table 13: Comparison of the Oil Palm Industry between Nigeria and Malaysia

Characteristic	Nigeria	Malaysia
DOMINANT TECHNOLOGY: Farm-level	-smallholder production with traditional processing majorly -Farm-level Oil palm inter-cropped with other food crops; -dominance of low oil yielding semi-wild varieties with little or no modern inputs	large-scale plantations with modern mills Intensive monoculture; high degree of specialization; HYVs and modern inputs
Processing	Manual; low volume; low extraction rate (20-50%)	Well-integrated; capital intensive; high extraction rates (90%)
Management Structure	Decentralized management, processing and marketing	Single management control
ENVIRONMENT: Production Structure	80% of national production from Smallholders	Over 90% of production from large scale plantations
Research	Public research (NIFOR) only	Collaboration between public (PORIM) and private research
Institutions	Separate land and tree tenure system, Land Use Decree of 1978	Consolidated land holdings; vertical integration; quality control standards
Supporting Infrastructure	Negligible; some government mills or plantation	Nurseries, credits, refinery mills, established trading system
COORDINATION: Inputs	Little use of modern inputs and extension service	Provided internally (e.g. seedlings from own nursery) or from markets
Output Market	Previously controlled by monopoly marketing board; market liberalization in 1986	Vertical integration; contracts; markets; PORLA provides market information, standards and quality control
PERFORMANCE: • Productivity • Quality of Oil • Adoption of Modern Inputs • Access to Information	Low High fatty acids; for local use only Low Slow	High Export Quality High Fast (partial internal flow)
Impact on Environment	Low	High

Source: Ladé, 2007

While the Nigerian oil palm industry has considerable potential to regain competitiveness and respond to the immediate domestic opportunities, it will be seriously challenged to compete internationally without a radical transformation of the industry. The immediate objective should be to meet the local demand, since the country boasts of a large domestic market, and to focus on improving local processing quality standards. Once this is achieved, the country will be well on its way to maximize its competitive advantage and to compete effectively with Malaysia and Indonesia domestically.

Another issue for consideration is the high FFA level of locally consumed palm oil. Although high oil containing high FFA is the preference of the domestic population as a result of its odour and taste, it raises serious public health concerns, and as such calls for measures to help educate the masses on the

risks involved in the consumption of high levels of FFAs oil. In addition, the overall low quality with high iron content (residues from oil machines) might also endanger the health of the poorest who consume the lowest quality oils available (Ladé, 2007).

Value Chain Dynamics

Trends and Drivers

The Global Trend

Palm oil has emerged as a significant commodity that contributes to the expansion in world's production and consumption of edible oils and fats. From a production level of 1.6% and a consumption level of 6% in 1976, global palm oil production and consumption has grown to 28% in 2009 to become the world's largest produced and consumed oil (MPOB, 2010). Palm oil recorded its fastest increase in global production and consumption due to the significant contributions by Malaysia and Indonesia. The technological advantage of palm oil over other oils and fats, especially soybean oil, is the main driver of this increase. The table below shows the trend in world production of major edible oils and fats.

This steadily increasing global demand has incentivized many countries to invest in and develop highly competitive industries. As seen in table 13, Malaysia's industry is almost the opposite of Nigeria's. It is dominated by large plantations producing the highest yielding trees (in terms of tons of FFB/ha) and producing the highest yielding fruit (up to 30% oil content). Nigeria's production system is approximately two times more expensive than Malaysia and Indonesia. For Nigeria to compete with the products coming from Malaysia and Indonesia, it will still need to greatly increase its productivity.

Drivers of Change in the Palm Oil Value Chain

- Technology in processing palm oil is driving change at the processor level. There are more efficiency in production and attended profits in using better equipment. However, over-scaling of mills leads to losses, which compel some processors to close down their mills.
- Management capacity for state-owned large plantations and factories is weak. Ineffective and inefficient management leads to improper plantation maintenance which also results in the closure of state-owned estates.
- Increase in the population of households, fast foods, hotels, restaurants and other end users of TPO is driving the increase in demand for both TPO and SPO.
- The demand for SPO is driven by increase in the number of secondary processors refining SPO into derivatives like fatty acids, olein, stearin, and other derivatives used by industrial food manufacturers.
- Lifting of the ban on import of vegetable oil reduced investment in the palm oil value chain. The market was flooded with imported vegetable oil leading to sharp decline in price of palm oil because palm oil has many substitutes like soybean oil, groundnut oil, etc.
- ECOWAS Trade regulations allow more imports into Nigeria. Therefore, the shortfall in supply is being filled with importation instead of increase in production.
- The slow growth in production (supply) is caused by a number of factors which include:
 - Poor access to working capital which limits the yields for small farmers and large estates (due to decreasing profits of the sector);
 - Poor access to arable land for expansion of existing plantations or for establishment of new estates owing to difficulties in land acquisition which remained a challenge owing to prevailing policy of land tenure system in Nigeria.

- Lack of proper coordination in the oil palm value chain which creates poor linkages among the actors within the chain and leads to inefficiency and non-competitiveness.
- Poor plantation maintenance, poor quality seedlings, high cost of inputs, low extraction rate due to crude processing techniques.
- Aging plantations with declining yield with no replanting plans.

Trends in the Channels

The Traditional TPO (Channel 1) with over 37,000 traditional processors who use traditional processing techniques (use of foot power and the mortar and pestle) and who receive the bulk of their fresh fruit bunches (FFB) from the wild, is shrinking because of the continued destruction of the wild grove for infrastructural development projects. Further, some of these traditional processors prefer the use of mini processing technology because of the drudgery involved in traditional processing techniques and its adverse health implications.

The Medium Scale Technology TPO (Channel 2) is growing with some traditional processors upgrading into mini processing technology to take advantage of the technology. Further, there is a new category of farmers and processors (including retirees, young businessmen, etc.) who are investing in mini processing mills.

The Medium Scale Technology SPO (Channel 3) is growing with some mini processors upgrading their technology and improving on their production technique to sell at better prices. The change in this channel 3 is mixed. While the channel is growing with new entrants and those upgrading their technology to produce SPO which is in high demand, the secondary processors who add value to the SPO by further refining to produce refined SPO and other palm oil derivatives such as olein, stearin, fatty acids, etc. are shrinking because of the shortage in the supply of SPO.

The Integrated Large Scale Technology SPO (Channel 4) which comprises of seven large estates and processing plants is shrinking. However, it must be pointed out that two dominant non-state-owned large palm estates (Presco and Okomu) in the Niger Delta are growing and showing great potentials, while all the state-owned large estates have closed down.

Supporting Organizations and Regulatory Framework

Given the importance of the palm oil industry in Nigeria, it has received significant attention from the government over the years, from specialized institutes to presidential initiatives to support production with international funding, to import bans and significant duty.

Support Organizations

Organizations that provide support in one way or another to the Nigerian Oil Palm Industry include:

- Nigerian Institute for Oil Palm Research (NIFOR)
- Federal Ministry of Agriculture and Rural Development
- NDDC
- UNIDO
- UNDP
- DFID
- National Accelerated Industrial Crop Production Programme
- Palm Oil Registration and Licensing Authority
- Vegetable Oil Development Programme
- Oil Seeds Association of Nigeria (OSAN)
- Vegetable and Edible Oil Producers of Nigeria (VEOPAN)

State Owned Agencies or Government Counterparts

Two institutions from these above, stand out as key players in the sector over the past decade.

The Nigerian Institute for Oil Palm Research – NIFOR: NIFOR is the dominant institution in support of the palm oil industry. It is charged with all research on palm varieties, identification and propagation of the best varieties of palm plants, and research into the best technologies for processing the fruit into oil. While it has provided a lot of valuable insights into the industry it has been limited in its ability to actively promote its assets in the sector due to low levels of funding.

One critical weakness of the Nigeria's science and technology institutes (STI) is poor funding of innovation activities. Financial allocation to Universities as well as Research and Development Institutes (RDI) - has declined over the years compared to growing national revenues and in relation to other activities. Financial allocation to NIFOR and actual funds available for a period of over a decade is shown in the table 14 below. The fund made available represents only a fraction of the ideal funding requirement (total \$1,450,000) which demonstrate poor government funding and consequences for research activities in Nigeria in contrast with Malaysia for instance. Consequently, there is lack of facilities and financing to move the research to the concluding stages. In addition, where significant research results had been concluded, with evidence of possible utility of the process and product, demand by the end-users is usually in short fall.

Table 14: NIFOR Capital Budget Estimates and Releases, 1992 – 2003

Year	Estimate (N)	Amount Approved (N)	Amount Released (N)
1992	49,200,000	1,712,000	1,712,000
1993	58,000,000	5,100,000	5,100,000
1994	52,800,000	5,178,000	5,178,000
1995	116,800,000	6,756,200	6,756,200
1996	433,514,000	21,150,000	6,756,200
1997	463,568,000	21,150,000	21,150,000
1998	221,824,000	33,300,000	25,283,333
1999	199,180,000	24,000,000	17,000,000
2000	890,890,000	55,000,000	33,630,000
2001	705,500,000	74,390,000	52,073,000
2002	872,865,500	311,994,060	0
2003	872,865,500	36,921,000	0
Total	4,937,007,000	596,651,260	174,638,733
% of Estimate	100%	12.08	3.54

Source: NIFOR; Exchange rate \$1 = N150

As PIND undertakes its support of the Palm Oil sector, NIFOR offers the opportunity to be a strong partner, especially on the technology front in conjunction with the Appropriate Technology Centre.

World Bank: The World Bank has played an important role in the promotion of oil palm business in Nigeria. Nigeria is “the second largest recipient of World Bank palm oil sector projects, with six projects from 1975 to 2009”, according to a recent World Bank report. While the results achieved included the plantation of 42,658 ha of oil palm, as well as road improvement and increased milling capacity, only one of the World Bank projects is still under implementation.

Privately Owned

Fertilizer Distributors: Only a fraction of the fertilizer that is needed to maximize oil palm production in Nigeria is currently available. The federal government’s programs for subsidizing and distributing fertilizers have disconnected the private suppliers from farmers. Even though private firms do the importing and transport, these firms recognize that the federal and state governments are their main clients, not the farmers. Even though private providers have, in the past, reached out to farmers directly, they no longer do so. In the course of this study, a respondent made an analogy of the private input delivery system; like pruning a tree so drastically that it has no branches or network to reach the rural areas. There is a strong feeling that if the policy environment changed, the system will work better. There are however three or four firms that are interested in expanding their outreach. One of such firm is Notore which manufactures and marketing fertilizer especially Urea in Nigeria and is planning on developing a strong distribution network to provide an excellent building block for fertilizer and input distribution in Nigeria targeting farmers directly.

Private Sector Managed Estate Plantation: PRESCO and Okomu Oil are the driving force in bridging the gap of SPO production in the near future. The findings shows that twenty (20) of such companies will definitely push Nigeria back to global reckoning in the production of SPO.

Regulatory Framework

A number of studies have been undertaken to assess the general investment climate in Nigeria. The Doing Business Reports published annually by the World Bank and IFC ranks Nigeria's performance against other countries across 10 indicators of government regulations that affect business activities. Nigeria ranked 94th out of 155, 108th out of 175, 108th out of 178 and 118th out of 181 in the years 2006, 2007, 2008 and 2009 respectively.

Table 15: Rankings of Nigeria between 2006 and 2009

	2006	2007	2008	2009
Hiring and firing workers	27	56	28	27
Getting credit	38	83	79	84
Protecting investors	42	46	49	53
Closing a business	61	72	92	91
Paying taxes	91	105	121	120
Starting a business	105	118	86	91
Dealing with licenses	117	129	161	151
Enforcing contracts	119	66	89	90
Facilitating international trade	139	137	143	144
Registering property	152	170	176	176
Overall Ranking	94	108	108	118
No of Countries Covered	155	175	178	181

Source: World Bank Doing Business Reports, 2006, 2007, 2008 and 2009

The World Bank's Doing Business in Nigeria 2008 report acknowledged that in 2006/7, notable improvements in the business environment were recorded because of reforms resulting from faster business registration and stamping procedures, decentralization of Corporate Affairs Commission (CAC) and Stamp Duty offices, the establishment of Integrated Tax offices and One-stop investment centres. The report attributes the reasons for faster business registration particularly to the online registration procedures adopted by the CAC for name searches and filing of documents and the establishment of state offices of CAC in every state. However, it noted that certificates of incorporation are still being issued in Abuja.

Price Liberalization

Until few years ago, the government was involved in price regulation such as marketing boards. The government in recent past decided to liberalize the market, so prices now depend on supply and demand locally and internationally. Within this context, however, there is currently a 35% duty on the import of palm oil, providing the local industry with significant protection.

Roundtable on Sustainable Palm Oil (RSPO)

Due to the vast applications of palm oil, the fact that it is not genetically modified and that it has the highest yield per hectare of any oil or oilseed crop, there are environmental pressures to expand production in tropical countries where it can be grown. Due to the expansion of palm plantations in the world, questions arise concerning deforestation, animal extinction and peat land destruction. Some analysts say that palm plantation and expansion are having negative impacts on environment although

contrary argument also subsists to the effect that palm plantation is able to maintain biodiversity and preserve the flora and fauna.

The Roundtable on Sustainable Palm Oil (RSPO) is a non-profit organization established in 2004 to respond to this concern and also to legitimately promote the production of sustainable palm worldwide in an economically viable, environmentally and socially appropriate manner (*K.T. Tan et al, 2009*). The RSPO identified eight principles and criteria that must be fulfilled by palm oil companies in order to be certified as sustainable palm oil producers, namely: (1) management transparency (provide adequate information regarding environmental, social and legal issues related to the company), (2) comply with local and international laws and regulations, (3) ensure long-term economic and financial viability (must have management planning and achievable financial goals), (4) the whole operating procedures must be documented, implemented and monitored, (5) Companies must behave responsibly with regards to conservation of natural resources and biodiversity, (6) companies must support their employees and communities affected by palm plantation and palm oil mills (transparent and open methods for negotiations about compensation for land usage to enable communities to express their views and opinions and workers must be paid with no less than minimum standard salaries), (7) undertake social and environment impact assessments before establishing new planting areas and (8) commitment towards continuous improvement in key activity areas(*K.T. Tan et al, 2009*).

Through a traceability System, the RSPO's principles and criteria certify that the palm oil is produced according to sustainable production criteria, and issue the RSPO Supply Chain Certification. Traceability offers the assurance that certified products have originated from certified sustainable source which ensure buyers throughout the supply chain that the product they source is coming from certified and sustainable production sources. This enables them to make credible sustainability claims to all relevant stakeholders (*UTZ Certified – Traceability System Guide, 2009*). Currently there are 152 ordinary members of RSPO comprising palm growers, palm oil processors and traders, consumer goods manufacturers, retailers, banks and investors, environment NGOs and social NGOs (*K.T. Tan et al, 2009*).

ECOWAS

ECOWAS trade liberalization which has promoted importation of high quality sprouted nuts without hindrance.

Vision for the Growth of the Palm Oil Value Chain

Major Opportunities for Economic Growth

Palm oil is an important economic commodity of national and international importance. In the early 1960s, Nigeria was a net exporter of palm oil contributing up to 43% of the global palm oil production. Even though palm oil production has sluggishly increased to about 850,000 MT per annum as at 2010, the gap between production and consumption is widening as consumption is growing more rapidly than production. Thus, the country has become a net importer of palm oil in the last 10 years. Nigeria is importing an ever increasing amount of palm oil to meet the yearning supply gap, which is currently about 300,000 MT per annum.

The gaps between the production and consumption (shortage of supply) of TPO and SPO which are currently filled by imports provide the greatest opportunity for growth in the palm oil value chain. Thus, there is strong growth opportunity for domestic production of TPO and SPO.

Considering the amount of palm oil that is being imported into Nigeria and the significant end market value of the imports (roughly N60 billion), the vision for growth of the palm oil value chain is to replace 50% of palm oil imports with increased production of technical palm oil by 100,000 MT per annum and special palm oil by 50,000 MT per annum within the next 10 years.

Much of this growth can come from the channels 1 and 2, where most of the poor active. In order to achieve this vision of import substitution, significant investment will have to be made by private operators in channel 2 (medium-scale technology TPO) and channel 3 (medium-scale technology SPO), migrating processors from the very low productivity of the traditional processing, to the far more efficient processing. Achieving this will require greater understanding of the enterprise dynamics and the factors incentivizing small farmers to increase their investments, especially the market linkages.

Investment in these two channels will increase the effective hectares planted by smallholders as well as improving the efficiency of processing technology leading to higher yields and greater production. In addition to the investments in the two channels mentioned above, the following measures must be taken in order to maximize growth opportunity in the oil palm value chain:

- Increase involvement of the private sector in the production of sprouted seeds and seedlings. In addition to increased funding for NIFOR, private sector investment in the production of sprouted seeds and seedlings of high yield tenera should be encouraged to meet demands for planting materials from smallholder farmers.
- Re-dynamization (or privatization) of state-owned plantations, to take advantage of the tens of thousands of under exploited land already under production. Care must be taken before any investments to drive additional expansion into virgin land.
- More efficient coordination of the value chain to make farm inputs available and affordable to farmers (especially, smallholder farmers).
- Capacity building for farmers, processors and local artisans who fabricate the local mills.

Constraints to Growth

Even though the palm oil value chain shows strong potential for growth, it is constrained by the following factors:

Farm Level

- **Proliferation of Adulterated Seeds and Seedlings:** The Nigerian Institute for Oil Palm Research (NIFOR) is the only research institute with the mandate to carry out research, develop and produce sprouted oil palm seeds and seedlings in Nigeria. However, some smallholder farmers expressed difficulty in accessing sprouted seeds and seedlings from NIFOR due to the problem of location of NIFOR and proximity of its outstations (nurseries) which are far away from many smallholder oil palm farmers. Over the years, the absence of regulation on the marketing of sprouted seeds and seedlings has created the opportunity for the informal sales of adulterated, low-yield sprouted seeds and seedlings at lower prices to the detriment of unsuspecting farmers. Some farmers planted seedlings harvested from old plantations with a decline in the productivity of the palms. In all these situations, palm oil production has been adversely affected.
- **Inadequate Capital for Science and Technology Investment:** NIFOR has the capacity to produce about 10 million sprouted seeds per annum. However, due to poor funding over the years, the Institute has been producing below 50% capacity. Besides the adverse effect of poor funding on the production of sprouted seeds and seedlings, further research for improvement in the value chain is constrained. However, before NIFOR should investigate producing more seedlings, the demand for new plants must expand considerably.
- **Access to Fertilizer:** Farmers (especially smallholder farmers) who account for about 80% of domestic palm oil production lack access to chemical inputs (fertilizer). Because of the inefficiency in the value chain structure resulting from the absence of value chain coordination, fertilizer neither gets to farmers at the right time nor at affordable price. Fertilizer importation into Nigeria is controlled by the Federal Government under import license. Consequently, the productivity of the plantations is lower than it would have been if fertilizer was available to farmers and applied at the right time in accordance with proper agronomy practices.
- **Limited Access to Land:** The land tenure system constrains access to land for the establishment of new plantations both by smallholder farmers and large estates. As it stands, it will be difficult to have new large estates in the country, because such estates will span over several communal lands with the associated socio-economic challenges in the Niger Delta. This is not an immediate problem as the initial activities should focus on the improvement of the existing land under production before expanding into new areas. The land tenure associated with the wild groves, however, when linked to the harvesting practices, limits the incentives to improve production in this major area of production.
- **Continuous Destruction of Wild Grove:** Developmental projects by both the public and private sectors have often resulted into destruction of the wild grove from which the bulk of fresh fruit bunches are harvested, thereby reducing the production of palm oil. This is an environmental issue, which particularly affects the poor, who rely on the harvesting of fruit from the wild groves as their source of revenue.
- **Poor Managerial Ability:** Poor management ability was the bane of all the government-owned large estates that have closed down in the last 10 years. However, the problem of poor maintenance of the farm and its negative impact on plantation productivity was common to both small and large farms

- **High Cost of Labour:** Labour cost for weeding, slashing, pruning, and harvesting is very high, especially to the smallholder farmers. The result is that labour is hired when the farmer is able to pay for them. Sometimes, the ripped bunches are wasted before they are harvested. Appropriate forms of mechanization, improved use of herbicides, and better management of the trees can reduce the need for expensive labour.
- **High Cost of Transportation:** The poor state of farm and feeder roads and the high cost of diesel combined to increase the cost of transportation to farmers. Thus, the cost of haulage services, that is moving the fresh fruit bunches (FFB) from the stands to the farmer's mill or selling platform is high. For farmers that sell fresh fruit bunches (those that do not process), it compels them to sell their FFB at the central gathering point in the farm. In some communities, the feeder roads are so bad that farmers use motor cycles to haul the FFB home.
- **Aging Palms:** Most of the existing plantations are more than 30 years old and without replanting plans. The productivity of this category of plantations is lower than the younger plants.

Processor Level

- **Lack of Proper Scaling of Milling Technology:** The lack of proper scaling of locally fabricated milling technology adversely affects the extraction rate and volume of palm oil production. Most of the available mini-processing mills are fabricated locally by local artisans without proper scaling, which results in high level of palm oil waste or low oil extraction rate.
- **Poor Repair and Maintenance of Mills:** Frequent break downs of milling technology and the scarcity of equipment parts are the major constraints to processors. The inability of processors to access spare parts of milling machine for repairs is the bane of the processing technology. So, some processors factories are replete with abandoned or non-functional milling equipments.
- **Inadequate Capital:** A complete set of mini processing mill (NIFOR MINI) costs about N1, 000,000 to procure. The locally fabricated milling equipments cost about N500, 000 to procure and many of the processors are using the locally fabricated technology. However, due to technical inefficiency associated with the locally fabricated mill, many processors would want to switch over to a more improved, properly scaled processing technology, but are limited by inadequate capital.
- **Under-Capacity Utilization:** The supply of SPO has continued to lag behind the demand in the last 10 years. Currently, the supply of SPO from primary processing is less than 50% of the effective demand by the secondary processors, compelling secondary processors to operate well below 50% of their installed capacity. Some of them are currently adapting their technology to process other vegetable oils like soybean. Similarly, at the primary processing level, most of the processors in channels 3 and 4 are operating at low levels of capacity utilization due to difficulties with supply of FFB.

Dealer/Retailer Level

- **Decline in Price:** Palm oil (TPO, SPO) has very close substitutes (like soybean oil, groundnut oil, etc.) which compete with it and determine its prices in the domestic market. In Nigeria, the ban on importation of vegetable oils caused prices of palm oil (TPO and SPO) to rise reaching its peak in 2007 at N280, 000 and N300, 000 per ton for TPO and SPO respectively. However, prices crumbled with the lifting of the ban in 2008. Currently, the prices of TPO and SPO in the market are N200,000 and N220,000 respectively per ton. Thus, dealers experienced loss of margin due to the lifting of the ban on the importation of vegetable oil.

- **Inadequate Capital:** Wholesalers and retailers are constrained by inadequacy of working capital to finance large volume purchases to enjoy economies of scale. While wholesalers require credit facilities to increase bulk purchases and with reduced carrying costs, retailers require credit facilities to enable them access other palm oil markets outside their neighbourhood.
- **High Transportation Cost:** High cost of transportation due to poor state of the roads is one of the constraints facing the traders. Although the traders try to pass on the cost to the consumers, not all the costs are passed on. Thus, they experience marginal loss due to high cost of transportation.

Upgrading Opportunities

There are opportunities and incentives for upgrading in the area of production and processing technology. These opportunities include:

Opportunity for Technology Upgrade

Technology is the driving force for the desired changes and growth anticipated in the value chain channel. There is growth opportunity in introducing properly scaled locally fabricated technology to minimize waste and improve oil extraction rate. The cost of setting up a mini-processing technology is about N1million and with the provision of credit facilities, many actors can come in to take advantage of the technology. It is estimated that extraction rate will improve from the current 12% to 15%. By increasing the yield by one quarter, the industry will gain efficiency.

PIND Activities

PIND brings two elements that can stimulate the uptake of improved processing technologies that can have an immediate impact on the overall yield of oil from the existing production. The Economic Development Centre (EDC) and its Appropriate Technology Centre (ATED) should interact with NIFOR to carry out a review of their different mills and the programs that have been implemented to commercialize these improved technologies. This will include interacting with the local artisans who are making and servicing the majority of the local processing machines. Diagnosing the enterprise dynamics and the opportunities improving the commercialization of improved technologies will lead to market driven solutions to address how this interlinked value chain ties into (or could tie in better to) the palm oil industry can lead to significant increases in efficiency.

Opportunity for Production Upgrade

Currently the production gap (excess of consumption over production) is about 300-500,000 MT per annum. It is estimated that the gap in TPO is 200,000 MT per annum, while the gap in SPO is 100,000 MT per annum. This gap is currently filled by imports amounting to about N60 billion per annum. To achieve 50% import substitution through production upgrade within the next 10 years (i.e. from 850,000 MT per annum to 1,000,000 MT per annum) will require the following:

- Increasing the domestic production of fresh fruit bunches from 8.5 million MT in 2010 to 10 million MT in 2020 The additional 1.25m MT of fresh fruit bunches (ffb) is estimated to produce 150,000 MT of palm oil using an average of 12% extraction rate.
- Increase the rate of rehabilitation of existing establishment of new plantations and revive closed state-owned large estates. At an average yield of 5 metric tons of FFB per hectare of improved varieties, it

is estimated that about 250,000 hectares of renewed or new mature plantations will be needed. This would imply replanting 25,000 hectares every year for the next 10 years.

- This will require the production of about 6 million sprouted seeds and seedlings per annum (at 150 seeds per hectare and allowing for 80% survival rate). NIFOR already has the capacity to produce about 10 million sprouted seeds per annum. Other private sector producers of sprouted seeds and seedlings (for instance, Presco Plc) can take up the production of the balance.

PIND Activities

Focus on addressing improved productivity of existing smallholder farms either through improved access to inputs or through rehabilitation and replacement of the non-productive trees. Increased productivity can come from better farm husbandry (application of fertilizers, herbicides, proper weeding, and pruning), but there are a host of challenges which will take more careful analysis if PIND is to address them better than others have (in most cases have not) in the past. Solutions can be linked to better understanding of the market incentives for the access to the inputs, why they are not available and how to improve availability using private traders.

Access can often be improved by improving linkages and coordination between the actors in the value chain to enable access to embedded services or structured financial solutions. Therefore closer links to the existing large estates should be developed and opportunities for outgrowers explored. PIND has already established the Delta State government's interest to develop linkages to generate more employment opportunities for youth, so the coordination and linkages could turn into a public-private partnership.

An immediate way to increase productivity, without bringing new land under cultivation is to rehabilitate the existing plantations which have already had their negative impact. Given the extent of the farms to be upgraded, there is the potential for a linkage into further uses for the palm trees to be taken out, to turn that into a profitable venture to finance the replacement operation. This will also take some further research.

Immediate Next Steps for PIND

a. Conduct a scoping study in a narrow geographic area to identify a practical cluster around which to pilot PIND activities. Early indications are that Rivers State and Imo State will offer a good mix of privately owned farms with estate plantations to drive development initiatives. The scoping study will have the following priorities:

- Analyze the processing technology value chain which supplies the improved processing units into channel 2. This will generate a greater understanding of the mini processing technologies, how they are manufactured, who purchases them and how they can be made more efficient. This analysis will incorporate ATED staff to look at the processing technologies.
- Scoping on mini and medium processors (farmers) to develop a greater understanding of their use of the technology, how they supply their mills and the challenges and incentives that exist for the producers.
- Investigating the potential from privatization to redynamize specific geographic areas.
 - Identify newly privatized firms
 - Identify farm locations
 - Identify reasons behind selling
 - Interview new owners

Appendix

Annex 1: Market Research Tools Used During the Study

PALM OIL VC FUNCTIONS	NIFOR	PRESCO	ONDO	AKWA-IBOM	RIVERS
INPUT (SPROUTED NUTS/ SEEDLING)	KII: SEED UNIT NURSERY UNIT	SECONDARY DATA (PUBLICATIONS)	KII: TCU & WECA, ADP	KII: -CPDS COORDINATOR	SSI: ADP & FARMERS
PRODUCTION (OIL PALM / FFB)	-	SECONDARY DATA OBSERVATION	SSI: - OPC SURVEY: -SME (IKOYA, IJU-ODO) -FARM VISITATION ALONG SAPELE- IKOYA	FGD: -SEMEs (IKOT-ITOK, ITOKO, IKOT-OSSOM -FARM VISITATION	FGD: -ETCHE -ABUA
PROCESSING OF FFB (PALM OIL)	KII: ENGINEERING UNIT	SECONDARY DATA (PUBLICATION)	SSI: OPC MILL AT OKITIPUPA MEDIUM MILLAT OKITIPUPA	SSI: -LARGE MILL:AGRO IDEAS INT. LTD. BEAK-EKPE -OIL PALM DEPOT – IKOT-ANNUNG (OBSERVATION)	SSI: MINI MILL AT ELELE
WHOLESALING	-	-	FGD: OIL PALM DEALERS ASSO – OKITIPUPA	FGD: WOMEN PROGRESSIVE MILL, IKA - PALM PRODUCE DEALERS BEACH, UMUAFORUKWU, ABA	FGD: LAGOS PALM OIL DEALERS
RETAILING	-	-	FGD: PALM OIL SELLERS ASSOCIATIONS AKURE & OGBESE	FGD: PALM OIL SELLERS, CLIFFORD, ABA NEW MKT	
SECONDARY PROCESSORS	SSI: BIOCHEMISTRY UNIT	SECONDARY DATA: - NESTLE NIG PLC, - CHIKKI FOODS IND. LTD. - FIESLAND FOODS - WAMCO NIG. PLC. - OK FOODS CO. LTD.	SSI: -SUDIT, IBADAN -GOLDEN OIL, ONITSHA -ENVOY INDUSTRIES, ONITSHA -SOAP MAKER HOUSEHOLDS, FOOD VENDORS HOTELIERS	SSI: -HOUSEHOLDS -FOOD VENDOR HOTELIER SOAP MAKER	

Field Activities in Action



Chika at NIFOR nursery



Survey questionnaire at Ikoya, Ondo state



Small-scale processing mill at Okitipupa



FGD with Palm Oil dealers at Okitipupa



KII at Okitipupa OPC



FGD with Women Progressive Mill, Ika, Akwa-Ibom

Annex 2: Market for Seedlings

Three varieties of Oil palm are available in Nigeria; namely *Dura*, *Pisifera* and *Tenera*. The preferred variety among palm oil farmers in Nigeria is the highbred *Tenera* which is a crossbreed of the *Dura* (female) and the *Pisifera* (male). *Tenera* seedlings are produced by the Nigeria Institute for Oil Palm Research (NIFOR) and commonly referred to as the extension work seeds (EWS).

The characteristics of the three fruit varieties of the oil palm

DURA	PISIFERA	TENERA
Thick-shell	Shell-less	Thin-shell
Thin-mesocarp	Mainly monocarp	Thick mesocarp
Viable embryo	Unviable embryo if present seed sterile	Viable embryo
Large kernel	Very small kernel and sometimes no kernel in most fruits	Good size kernel
Contains very small quality of oil	The oil content of the fruit is the highest among the three fruit forms	
Unimproved	Unimproved	Improved

Source: NIFOR Oil Palm Production Manual

The Market for Sprouted Seeds/Seedlings

The market for sprouted seeds/seedlings is characterized by many buyers and very few suppliers. The buyers range from the very smallholder farmers to very large estates-holder farmers. While NIFOR is the main suppliers of sprouted seeds/seedlings, other sources of sprouted seeds/seedlings are the large scale oil palm companies such as *Presco* Nigeria Plc. There are as well other informal suppliers who sell adulterated sprouted seeds and farmers who source sprouted seeds from their farmers for transplanting.

NIFOR Annual Report (1999: p31) identifies four Deli *duras*, seven Nigerian *duras* and 12 *teneras* that were self-fed for establishment of a 20ha seed garden that was expected to have the capacity to produce 7m seeds per annum (pa). Most of NIFOR's current seed production is from the second cycle of breeding. According to NIFOR Annual Report (1999: pp 166-167), 15,585 man-day is required for producing, 1,497,417 sprouted seeds. The corresponding figure for 2000 is 21,802 man-day for 2,256,092 seeds (2000: pp 61-62); the figure for 2001 is 28,429 man-day for 4,886,769 seeds (2001: pp78-79). These statistics illustrate over-dependence on NIFOR's seedlings by farmers. Although NIFOR's seedlings are considerably cheaper compared to others, the non availability of NIFOR's seedlings is identified as a major incentive for the growing rate of adulterated seedlings in Nigeria. High demand for quality seedlings has also led to the importation of seedlings by some of the large commercial plantations from Republic of Benin and Cote D'Ivoire. Although NIFOR seeds are much cheaper, large scale farmers prefer imported seedlings owing to proliferation of adulterated seedlings in Nigeria. The challenge pose by the problem of adulterated seedlings is the need to ensure that Nigerian farmers have access to quality seedlings that meet international standards (e.Gen Consultants, 2011). The graph below shows seed sales over the last five years:

Table 4.2: NIFOR Seed Sales (2004 – 2008)

Year	2004	2005	2006	2007	2008
Seed Sales	3,103,317	1,671,326	1,718,100	1,460,768	2,684,053

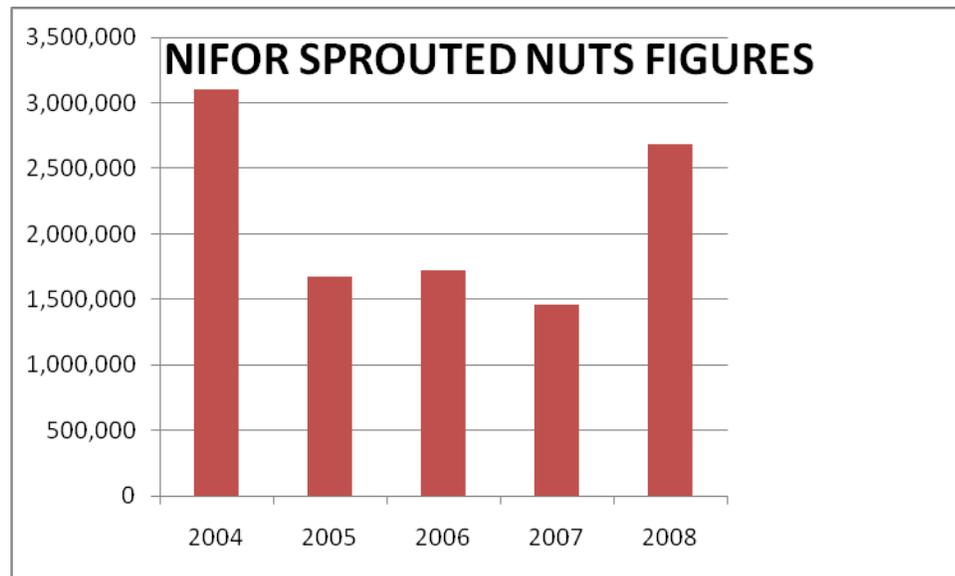


Figure 1: NIFOR Sprouted Nuts Sales

Demand

Demand for sprouted seeds/seedlings as dictated by new plantings (where seedlings are ordered for planting) was quite high in 2004 and 2005 but drops sharply in subsequent years. In 2000–2005, the government of Rivers State made available 200,000 oil palm seedlings to farmers across the state to rehabilitate and develop the oil palm farms. The oil palm seedlings were sold to the beneficiaries at a highly subsidized rate of N50 per seedling. Also during the same period Rivers State government procured and distributed 100,000 mature oil palm seedlings from NIFOR and distributed to farmers' co-operatives and individuals. During the same period also, the National Accelerated Industrial Crops Production Programmes (NAICPP) initiated by the Federal Government made available 3,000 seedlings to oil palm farmers in the Rivers State (Omoti, 2011). The intervention led to the establishment of about 2000 hectares of oil palm in the Rivers state.

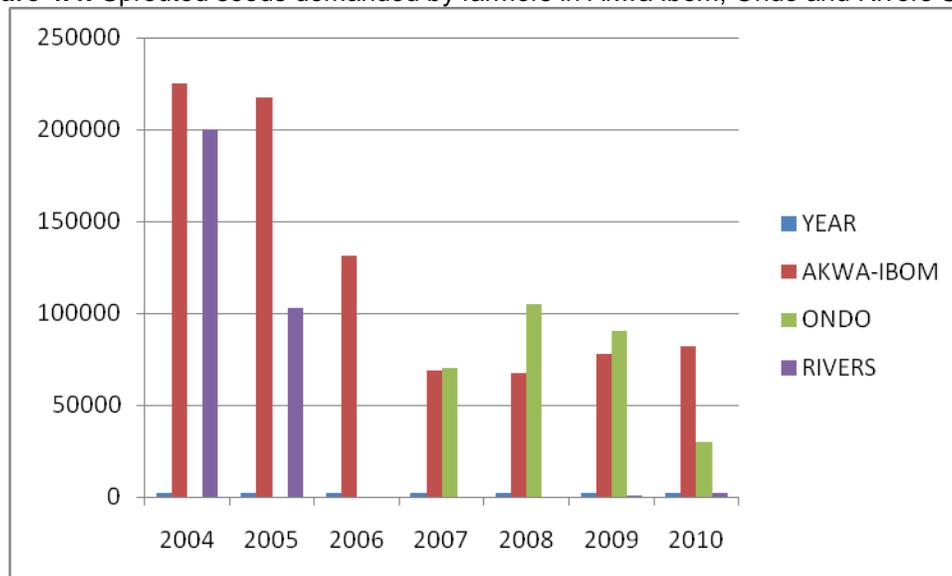
However, the demand for sprouted seeds/seedlings appears to be declining in recent year when government has become the major driver of demand. This declining pattern is depicted in the table and graph below.

Table 4.3: Sprouted Seeds/Seedlings Planted By Farmers in the 3 Target States

Year	Akwa Ibom		Ondo		Rivers	
	Planted Ha	Seedlings Planted	Hectares Planted	Seedlings Planted	Hectares Planted	Seedlings Planted
2004	1,500	225,000	N/A	N/A	2,020	200,000
2005	1,450	217,500	N/A	N/A		103,000
2006	875	131,250	N/A	N/A	-	-
2007	461	69,150	470.04	70,506	-	-
2008	448	67,200	698.23	104,734	-	-
2009	520	78,000	601.63	90,244	3.3	500
2010	546	81,900	200.35	30,052	14.4	2,166
Total	5,800.0	870,000	1,970.3	295,536	2,037.7	305,666

Sources: Field Survey Data, 2011

Figure 4.4: Sprouted seeds demanded by farmers in Akwa Ibom, Ondo and Rivers States



Source: Field Data for palm oil value chain analysis 2011

Drivers of Demand for Sprouted Seeds/Seedlings

Government policies and incentives to farmers have been the major driving forces behind the demand for sprouted nuts / seedlings as shown by the following examples in states within the Niger Delta.

- **Federal Government Policy:** Following the federal government policy in 2003, to increase the cultivation of oil palm plantations by at least one million hectares in five years, many of the state governments and large estate plantation companies in the Niger Delta region increased their support to farmers to help realize the dream of the federal government.
- **The Agricultural Programme of the State Government:** The '*Community Plantation Development Services*' (CPDS) initiated by Akwa Ibom state government focuses on three tree crops, namely, oil palm, cocoa and rubber while the state agricultural development programme (ADP) focuses on food crops. The CPDS distributed seedlings and other inputs to farmers in the state at no cost with plan to recoup government investment from the 6th year of fruiting of the palm trees at the rate of N100 per tree per year. The free supply of seeds/seedlings and other inputs plus the reimbursement for labour cost were major driver of the demand for seedling by farmers which boosted demand for seeds/seedlings in the state.
- **Incentives to Farmers:** Distribution of seedlings to farmers at a subsidized price of N50/seedling as against NIFOR's price of N150/seedling by Ondo state government was a contributing factor for the increase in the demand for seedlings.

The number of hectares planted (effective hectares) is considered as a proxy to estimate quantity of seeds/seedlings demanded:

- Record of sprouted seeds bought by the states from NIFOR (the major source),
- Sprouted seeds bought by smallholder farmers from outside NIFOR (this is difficult to quantify). For example, in Edo State, Presco Nigeria Plc responded to the 2003 federal policy on oil palm plantation cultivation by supporting out grower farmers through the provision of seedlings and other inputs to cultivate 500 hectares of palm plantation (*Presco News Magazine, 2009*).
- Sprouted seeds planted by very large farmers (e.g. Presco Nigeria Plc, Okomu Nigeria Plc, etc.) which have research departments that collaborate with international research institutes to develop their seeds.

Constraints to Demand for Sprouted Seeds/Seedlings

- **Access to Arable Land for Planting Palm Seeds/Seedlings.** Farmers' access to arable land to increase their plantation size is limited. Majority of the farmers are smallholder farmers with planted-up farmlands ranging from 1 < 50 hectares. Consequently, as available farmlands are planted up, the demand for seeds/seedlings continue to decline.
- **Inconsistency of Government Policy.** Frequent change of leadership in the ministries, departments and agencies (MDAs) has adversely affected the demand for seeds/seedlings. Due to inconsistency of political leadership and policies, oil palm cultivation seems to have been neglected as is the case in Akwa Ibom for instance where there are overgrown seedlings in the nursery not distributed to farmers. In addition, records T NIFOR indicated that the Akwa Ibom is yet to take delivery of 250,000 sprouted seeds it ordered and paid for since 2007.

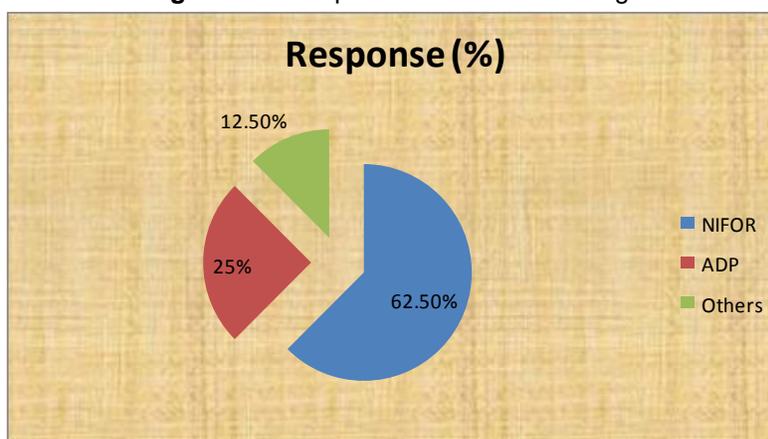
Supply of Seeds/Seedlings

The Nigeria Institute for Oil-Palm Research (NIFOR) is the sole supplier of sprouted seeds/seedlings to farmers. The sprouted seeds are sold in imported bags of 500 seeds each. Thus, it costs N15,000 to buy a bag of 500 sprouted seeds (the minimum quantity). Unsold sprouted seeds are sent to the nursery unit for planting and subsequent sales. The seed production unit has the capacity to produce between 5 – 10

million sprouted seeds in a year. Currently, the unit produces sprouted seeds in excess of demand despite operating at about 50% capacity.

- **Seeds/Seedlings Prices.** According to sources in the seed production unit of NIFOR, the actual or market price of the sprouted seed is between N150 – N200, but subsidized by the federal government and sold at N30/seed.
- NIFOR supplies sprouted seeds/seedlings to state governments, private individual farmers and large estates. Other sources of seeds/seedlings supply include large scale oil palm estates and companies like Presco Nigeria Plc and Okomu Nigeria Plc., some producers/sellers who produce adulterated seeds and sell them to unsuspecting farmers in the name of NIFOR at less than N30/seed or less than N150/seedlings. Some farmers (especially, those not aware) simply harvest sprouted seeds or seedlings from their farms and plant them. Farmers were asked to identify the sources of supply of seeds/seedlings they planted. Their responses are shown in the graphic below:

Figure 4.5: Response to Seeds/Seedlings



Sources of Seeds/Seedlings to Smallholder farmers

- In Ondo State, about one million oil palm sprouted seeds were imported from Malaysia under the Wealth Creation Agency (WECA) and planted in a central nursery at Agric Village in Ore. The venture however appears very ambitious as farmers are reluctant to buy from the agency at N100/seedling.

Supply Constraints and Challenges

- **Annual Production Targets.** Following the federal government policy in 2003 to increase cultivated oil palm plantations by one million, NIFOR gave the seeds/seedlings unit annual seeds production targets to ensure adequate supply of sprouted seeds. This accounts for the continued excess of supply of sprouted seeds/seedlings by NIFOR.
- **Availability of Resources.** The production of seeds/seedlings is very expensive and time consuming. However, government funding for NIFOR has declined over the years leaving the Institute to struggle through the years.

- The situation is compounded by the fact that NIFOR sells at the selling prices fixed by the federal government (i.e. N30/seed and N150/seedling) far below the cost prices. Thus, NIFOR must continue to depend on federal government funding to survive.
- **Supply of Adulterated Seeds/Seedlings:** to unsuspecting and ignorant farmers at ridiculously very low prices has poses a challenge to the quantity of good quality seeds/seedlings that can be supplied to the market NIFOR has to grapple with unfair competition.

Annex 3 – Markets for Inputs

Fertilizer

Fertilizer is another major input in the palm oil value chain. Different types of fertilizers are required at different stages of growth the palm trees. Productivity declines without the appropriate application of fertilizers to the palm.

The Demand for Fertilizer

The demand for fertilizer among the various categories of oil palm farmers is very high and is always in excess of the supply. Therefore, fertilizer market is characterized by many buyers and very few sellers.

- **Drivers of Demand:** The major driver for the demand for fertilizer is the need to revitalize soil nutrients lost as a result of continuous usage over the years. Thus, without fertilizer application, the yield from the palm trees will be very poor.
- **The Price of Fertilizer:** The price of fertilizer depends on the type and sources of supply. The current market price of, a bag of fertilizer sells for between N4, 500 and N5, 500 in the market. Government's allocation is subsidized and distributed to farmers through the ADP (in most states) at N2, 750 per bag. The number of bags of fertilizer which a farmer buys in a year depends on the ages of the palm trees and the size of the holdings. In most cases, 2 and 3 bags of fertilizer are applied per hectare.

Constraints to Demand

- The price of fertilizer at the market is very high (at more than N5, 000 per bag) and almost out of the reach of smallholder farmers. Consequently, farmers buy the quantity they can afford and not necessarily the right quantity for their farms. This adversely affects farm productivity and by extension the income to farmers from palm oil production.
- Another major constraint has to do with the non-availability of fertilizer at the right time. There is 'the right time' for fertilizer application to palm plantations. Investigation revealed that fertilizer is usually not available to farmers at the right time. This, the demand for fertilizer is dampened by the sense of uncertainty surrounding its availability and affordability.

The Supply of Fertilizer

In Nigeria, government is the major supplier of fertilizer to farmers. Allocations are made to State Governments on pre-determined criteria for onward distribution to farmers in each state of the federation. However, some fertilizers find their way to the open market either from middle men and contractors who have access to the allocations to some states or through direct importation by the private sector.

Constraints and Challenges to the Supply of Fertilizer

- Fertilizer Importation. Efforts to produce fertilizer locally did not yield the desired results as the National Fertilizers Company of Nigeria (NAFCON) was run down by bad management and taken over by NOTORE which recently NOTORE commenced the production of Urea which sells for N5, 200 in the market. Apart from Urea which is produced in the country, other types of fertilizers are imported into the country. In view of the constraints, there is acute shortage of the appropriate fertilizers for Oil palm productivity NPK 12:12:17 + 2MgO.
- The activities of contractors and middle men involved in the distribution of fertilizer to farmers add to the frustrations experienced by farmers. While the middlemen and contractors reap huge benefits through loopholes in fertilizer distribution, the result is that farmers either do not see the fertilizers or that the fertilizer is sold in the market at very high prices. Thus, government subsidies on fertilizers only create opportunity for price arbitrage by contractors and middlemen.

Chemicals (herbicides, insecticides, etc)

Herbicides are used to combat weeds in the plantation, while insecticides are used to control insects. However, less than 5% of farmers interviewed apply insecticides in their farm. More than 50% of these farmers are willing to adopt integrated weed management technique which entails the application of herbicides along with cultural weed control.

- **Demand for Herbicides:** The demand for herbicides by oil palm farmers is fairly high in the target states. Over 94 % of farmers alluded to the high cost of fertilizers which makes it unaffordable. Further, over 60 % of these farmers use herbicides sparingly in integrated weed management technique while the remaining 40 % carryout inter-cropping method in combination with cultural weed control to combat weeds problem.
- **Drivers of the Demand for Herbicides:** Oil palm plantation requires weeding at least twice in a year and entails a lot of labour days and cost. Currently, daily labour rates range from N500 to N1, 000 depending on the location and terrain. Because of the relatively high cost of labour in some areas, farmers prefer the use of herbicides to hired labour.
- **Constraints to the Demand for Herbicides:** Poor quality of herbicides is a major constraint considering the influx of adulterated herbicides in the market. A good number of farmers have lost money and endangered their farms due to the use of fake or adulterated herbicides which could only be detected after application. Owing to poor quality of herbicides, most farmers prefer inter-cropping as a strategy for combating weeds in the farm.



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