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A REPORT ON THE EFFECT
OF THE NAIRA'S
DEVALUATION ON THE
AGRICULTURAL VALUE
CHAINS IN THE NIGER
DELTA

Foundation for Partnership initiatives in the Niger Delta
& Market Development (MADE) in the Niger Delta



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About PIND

The Foundation for Partnership Initiatives in the Niger Delta (PIND) was established by Chevron in 2010 with a mission to build partnerships for peace and equitable economic development in the Niger Delta region of Nigeria. The objective of these partnerships is to reduce poverty and increase socio-economic benefits by implementing interventions that address the root causes of conflict and poverty in a localized and sustainable manner, resulting in stability and equitable increases in employment and incomes of individuals in nine target states: Rivers, Bayelsa, Delta, Abia, Akwa Ibom, Cross River, Ondo, Edo, and Imo. PIND works to reduce poverty by acting as a catalyst for systemic change in the Niger Delta through four interrelated and interdependent program areas: Economic Development, Peace Building, Capacity Building and Analysis and Advocacy.

For more information on PIND, please visit: www.pindfoundation.org

About MADE

Market Development Programme for Niger Delta (MADE) is funded by DFID/UKaid, to facilitate nonoil, private sector led economic growth. The MADE programme uses market systems development (M4P) approaches to design systemic and sustainable interventions that generate pro-poor and inclusive growth in nine Niger Delta states: Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers. The goal is to facilitate increases in incomes for at least 150,000 poor people, of whom 50% must be women. The MADE programme does this by facilitating change and improving performance, sustainability, and pro-poor growth in the Fisheries Market by: Selecting and working in sectors in which poor men and women are actively engaged; Motivating market actors to change their behavior in a sustainable and catalytic way and; Facilitating access to new knowledge, information, services and/or technologies to small/medium-scale farmers and entrepreneurs.

List of Acronyms

ABP	Anchor Borrowers Programme
CBN	Central Bank of Nigeria
CGAL	Contec Global Agro Limited
CPO	Crude Palm Oil
DFID	UK Department for International Development
DISCO	Electricity Distribution Company
DOC	Day old chicks
ECOWAS	Economic Community of West African States
FEPSAN	Fertilizer Producers and Suppliers Association of Nigeria
FFA	Free fatty acids
FFB	Fresh Fruit Bunches
FMARD	Federal Ministry of Agriculture and Rural Development
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
HQCF	High quality cassava flour
KG	kilogramme
MADE	Market Development in the Niger Delta
MPR	Monetary Policy Rate
MT	metric tonne
NBS	Nigerian Bureau of Statistics
NCD	New Castle's Disease
NPK	Nitrogen Phosphorous and Potassium
NVRI	National Veterinary Research Institute
OCP	Office Cherifienne des Phosphates
PFI	Presidential Fertiliser Initiative
PIND	Foundation for Partnership Initiatives in the Niger Delta
PKO	Palm Kernel Oil
SPO	Special Palm Oil
SSPE	Small Scale Processing Equipment
TPO	Technical Palm Oil

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Executive Summary

This study examines the effects of the Nigerian currency's devaluation and related government trade restriction policies on four key agricultural value chains in the Niger Delta region. These value chains—palm oil, cassava, aquaculture, and poultry—are focal points for the Chevron funded Foundation for Partnership Initiatives in the Niger Delta (PIND) and the DFID funded Market Development in the Niger Delta Programme (MADE). The study examines the market responses within and across the value chains to the income and substitution effects that arose following the price shocks from naira's devaluation and depreciation of the currency since 2014. The study: identifies opportunities and challenges for market actors in these value chains; shows how established market structures are shifting; and examines the implications for current and future PIND and MADE interventions.

As the global crude oil price fell from above \$100 per barrel in early 2014 to below \$30 per barrel by the beginning of 2016, Nigeria's oil revenues and foreign exchange reserves dropped. The decline in reserves exerted pressure on the naira against the dollar, and meant that the Central Bank of Nigeria (CBN) was unable to defend the naira's peg to the dollar. Following this turmoil, the CBN devalued the naira twice between November 2014 and February 2015. However, even with the two devaluation efforts, pressure on the naira continued, as shown by a widening spread between the official and parallel exchange rates, eventually forcing the CBN to float the naira in June 2016.

To reduce imports and conserve its diminishing foreign exchange reserves, the CBN banned access to foreign exchange for 41 items including rice, poultry, and palm oil products. Additionally, the Government of Nigeria increased import levies on these goods and other agricultural products, and even banned some imports entirely.

This study looks at the income and substitution effects in the value chains following the rise in prices and costs that followed devaluation of the naira and trade restriction policies. The effects of the devaluation on the agricultural value chains are based on the responses in the chains that can be characterised as either income or substitution effects or a combination of both. The effects are not the same, in nature or in depth, across or within the value chains. Consequently, the study shows that the dynamic income and substitution effects caused by the devaluation are creating ongoing changes to established market structures.

The devaluation has also led to significant increases in costs of major inputs over the last two years, which influence costs across all the value chains. Energy prices, including power and diesel, are largely driven by foreign exchange cost elements, and are a significant cost component for processors along the palm oil, cassava, and aquaculture value chains, and for some primary producers in the poultry value chain. The cost of credit has also increased sharply since the naira's devaluation as the CBN increased interest rates to curb rising inflation. This has constrained actors in the agricultural sector as they have found it increasingly difficult to obtain credit to expand their operations. Agricultural inputs, such as fertilizers and crop protection products, which are of special interest to PIND and MADE, have also become more expensive. In addition to price increases, farmers are experiencing difficulties accessing these products as local production capacity is currently inadequate.

In the palm oil sector, the study shows increased demand for both technical palm oil (TPO) and special palm oil (SPO) as imports of refined palm oil are banned while crude palm oil imports are subject to

combined import tariffs of 35 percent, and are invalid for official foreign exchange access. The increase in demand has led to increased prices for palm oil and the fresh palm fruit, which has been higher than the increase in prices that producers and processors have faced when purchasing inputs. The biggest challenge in the palm oil value chain is that producers have been unable to increase supply quickly enough to meet the increased demand, leading to low capacity utilization by processors who are unable to purchase enough fresh fruit bunches to operate at full capacity.

In the cassava value chain, price increases for fertilizers and crop protection products have raised costs for farmers, while processors have faced increased energy costs. However, the devaluation has also led to higher cassava demand, and therefore higher prices. Demand from the food sector has increased as the price of imported rice, a major substitute for cassava food products, more than doubled between 2015 and the beginning of 2017, and official imports have dropped by about 2 million tonnes since the devaluation. Meanwhile, demand on the industrial markets has also increased as industrial consumers turn to cassava products such as cassava starch and cassava chips as substitutes for imported inputs. Even with the increased industrial demand, the price for cassava on the food market is still higher than on the industrial market, leading producers and processors to allocate even more cassava to producing cassava derivatives for the food market. This study found that the price increases that market actors in the Niger Delta receive for their products is higher than the increase in input prices, meaning that the naira's devaluation has been positive for most actors in the cassava value chain.

In the aquaculture value chain, farmers have faced large price increases for imported and locally produced fish feeds. Local feed companies have seen their costs raised following increases in the prices of imported inputs such as fish meal and maize. This has caused the firms to turn to local alternatives such as cassava chips and grits to reduce production costs. However, prices for locally produced feeds have not increased by as much as for imported feeds leading to shift in demand for locally produced feeds¹. The increase in the price of feed, and the reduced availability, particularly of starter feed, may have caused many weaker catfish farmers to close their ponds. Catfish prices have increased as consumers turn to it as an alternative to more expensive imported fish and poultry, meaning that the farmers who have stayed in business have seen their revenues increase. For processors, the price increase of smoking kilns has led to reduced adoption of those kilns.

Our analysis of the poultry value chain found that the devaluation, which has caused significant price increases of vaccines, resulted in a drop in the demand for preventive vaccines while there is still a constant demand for treatment vaccines, as poultry farms adjust to the increased costs of production. Although this protects margins for pharmaceutical companies, it exposes poultry farms to viral attacks and losses.

In general, we found that across all the value chains, the naira's devaluation has had the following effects:

- The competitiveness of Nigerian products compared to foreign products has increased on both local and international markets as the price of most imported products has more than doubled since 2015, while Nigeria's export prices are lower. This increase has created opportunities for import

¹ Because of the strong increase in demand, the local industrial feed manufacturers are currently operating at 100% of capacity.

substitution, particularly in the palm oil and cassava value chains, and new export opportunities.

- The devaluation contributed to increased inflation, which has caused a significant decrease in consumer purchase power.
- There has been large-scale substitution of imported goods for locally produced ones, due to the more expensive imported products. This shift has led to higher demand and higher prices for locally produced goods in these value chains.
- Input costs have increased across these value chains although not by as much as the prices for locally produced goods, meaning that producers are able to remain profitable overall. However, smallholder farmers are usually unable to afford these higher input costs, as these are upfront costs and a major obstacle for them to increase productivity. So many smallholder farmers are losing out of the potential benefits.
- In response to higher prices, producers along the value chains have increased their production. Generally, this higher production has come through increasing the area under production rather than through more productive usage of inputs. Therefore, we have seen higher production in the value chains—but no growth in productivity.
- There are early indications that the price increases witnessed in 2016 and early 2017 are attracting significant investment into production in 2017. This may lead to a significant increase in available products, in particular maize and cassava, that may bring prices down sharply. If this does happen, it may start a cycle of production increases and decreases over several years as the markets gradually return to equilibrium.
- The devaluation has led to import substitution and increased export opportunities, thereby helping to support government trade policy. But the CBN has intervened to strengthen the naira, reducing some of the gains in competitiveness that resulted from the devaluation. This exposes the inconsistency between Nigerian government trade and monetary policy, and reinforces the historical unwritten policy for a strong naira.

1. Introduction

1.1 Objective and Scope of Study

The study aims to outline the impact of the devaluation of the naira and the Nigerian government's trade restriction policies in response to pressure on the naira and its foreign reserves on the palm oil, cassava, aquaculture, and poultry value chains. A secondary objective is to highlight the challenges and opportunities these changing economic conditions present to market actors, PIND, and MADE. Additionally, the study aims to provide actionable recommendations for PIND and MADE on how the programmes can restructure existing interventions, or design future ones to mitigate the negative effects of exchange rate movements for the market actors with whom they work, and help them take full advantage of the opportunities.

This study does not carry out a new analysis of the value chains concerned but relies on previous analyses of these value chains conducted by PIND and MADE, and identifies the points in the value chains most susceptible to exchange rate movements. This report highlights the general market trends in the relevant value chain but it is not a detailed analysis of the markets concerned. General impact on current interventions and some recommendations on the direction of these interventions are shared.

The study's main objective is to show the general impact of the naira devaluation, the responses by market actors along the value chains to the income and substitution effects that followed depreciation of the naira, to unveil potential opportunities, and discuss implications for programming by PIND and MADE.

1.2 Research and Methodology

This study combined a review of existing literature on the value chains concerned, provided by PIND and MADE, consultations with stakeholders and some market actors, and independent market research and analysis.

After reviewing the previous value chain studies to understand the important linkages between market actors and identifying the points in these value chains most vulnerable to exchange rate movements, by examining imported key and critical inputs and or end products, the authors consulted with PIND and MADE staff to understand any significant changes that had occurred in the value chains since the studies were completed.

Because the focus of this study is agricultural value chains in the Niger Delta, the market research and stakeholder consultations were mostly centred on Niger Delta states. The authors of the study conducted in-person interviews with stakeholders in Delta, Edo, Rivers, and Cross River states. Given that many of the end users and actors providing support services in these value chains are in states outside of the Niger Delta region, particularly in the southwestern states, the authors also conducted interviews with industrial end users in Lagos and Oyo states. (See Appendix 9-1).

The market actors interviewed were selected to ensure that all value chains were adequately covered, and that all the linkages in the value chains were properly represented. The interviews also took geographical diversity into consideration to ensure that the study represented general market trends in the entire Niger

Delta region rather than specific situations that exist in a single state or that are faced by any particular market actor.

Data obtained from the market actors was compared with data obtained from independent market analysis, and the findings from the market research and stakeholder consultations were presented to representatives of PIND and MADE and value chain experts for verification and input. The PIND and MADE staff corrected some misconceptions and provided wider context for some of these findings. The combination of market actor interviews, independent market research, and expert consultations ensured that the data presented in this report is of a high enough level of accuracy to provide actionable and practical recommendations.

2. National and Regional Analysis of the Impact of Devaluation and Foreign Exchange Access Restrictions

2.1 Currency Movements and the Impact on the Economy

Starting in June 2014, the global crude oil price began to fall steeply as oversupply—mostly due to the shale revolution in the United States and low demand caused by slowing global growth, particularly in China—drove prices from around \$110 per barrel in June 2014 to \$30 in January 2016 (see Figure 1).

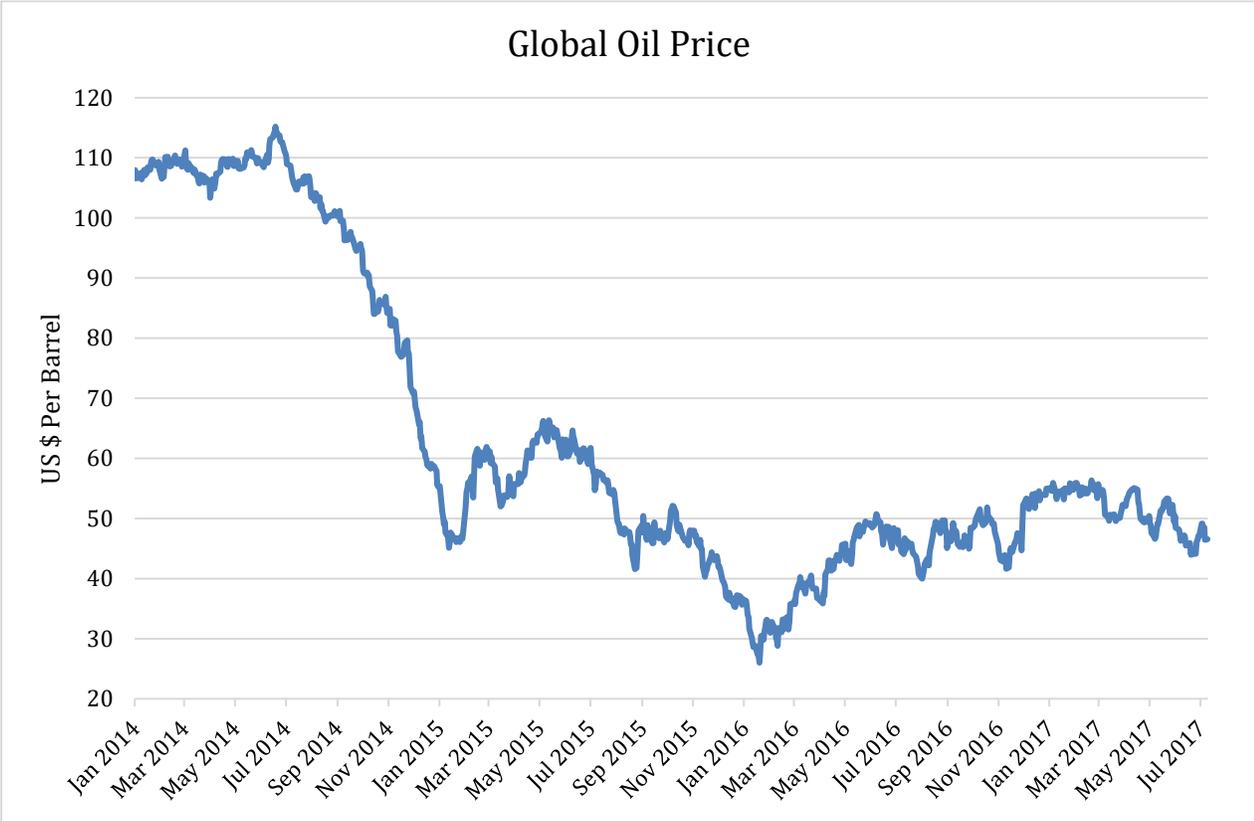


Figure 1: The global crude oil price from January 2014 to January 2017, showing a steep drop in crude oil prices beginning in mid-2014
Source: U.S. Energy Information Administration

With oil accounting for more than 70 percent of Nigeria’s exports and foreign exchange earnings, the CBN found it increasingly difficult to defend its peg of 155 naira to \$1. In November 2014, the CBN devalued the naira to 167.5 naira/\$1. However, this was not enough and by February 2015, the CBN had to devalue the naira to 197 naira/\$1. The naira sustained even bigger losses on the parallel market, the informal market made up of bureaus de change and other small operators, as its value dropped from 196 naira/\$1 in January 2015 to about 493 naira/1\$ by January 2017, a 60 percent decline in value over the two-year period.

To defend the official rate peg, the CBN found itself spending increasing amounts of its foreign exchange reserves, as other suppliers of dollars were reluctant to sell their dollars at the official rate, which they felt overvalued the naira. This effectively left the CBN as the only supplier of foreign exchange. Lower foreign exchange inflows from oil combined with the reduced inflows from other suppliers led to a forex scarcity in the country. To conserve its foreign exchange reserves, on 23 June 2015, the CBN placed 41 items, including poultry products and palm oil, on a list of items that would no longer be valid for accessing foreign exchange at the official CBN window (see Appendix A). Despite this and other similar measures, CBN gross foreign reserves fell from \$34 billion at the beginning of February 2015 to \$26 billion by 20 June 2016, at which point the CBN decided to float the naira. The naira immediately lost 30 percent of its value and in the months that followed, fell as low as 324.5 naira/\$1. The large losses the naira recorded caused the CBN, which was worried about increasing inflation, to intervene in the forex market and keep the naira stable at 315 naira/1\$, effectively reversing the float. The parallel market rate has also come down with the more stable naira since January 2017.

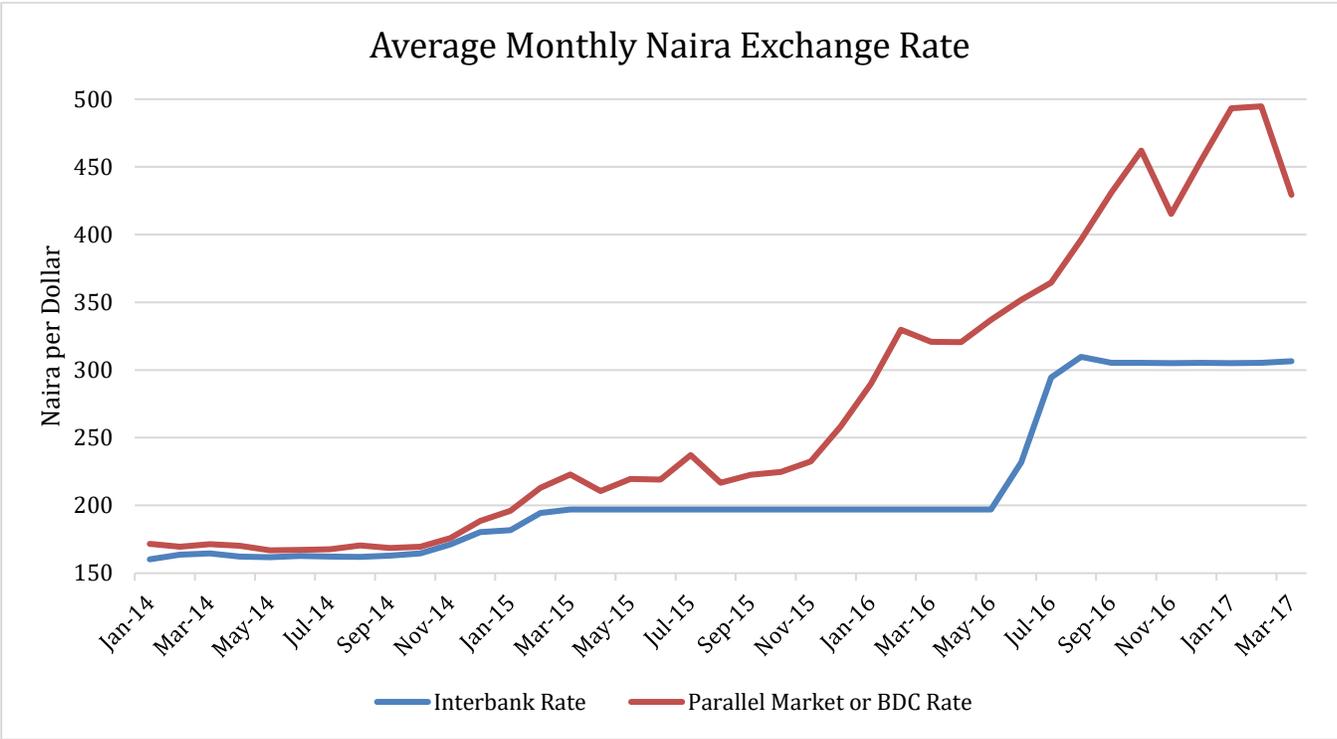


Figure 2: The average monthly dollar to naira exchange rate showing both the official and parallel market rates
 Source: Central Bank of Nigeria

A large portion of the goods consumed in Nigeria are imported, including critical inputs for food and industry, and so a 46 percent decline, and worse at the parallel market, in the value of the naira in just two years represents a 92 percent increase in the price of imports and hence a drop in the purchasing power of Nigerians. Between January 2014 and January 2017, headline inflation in Nigeria more than doubled from 7.98 percent to 18.78 percent (see Figure 3). A major reason for this large jump in inflation was the fall in the value of the naira as imported goods more than doubled in price, in naira terms. The effects were immediately felt throughout the economy as manufacturers could not import machinery and raw materials, and the country suffered a crippling fuel scarcity, as most of the refined petroleum products used in Nigeria

are imported. Partly due to the foreign currency scarcity and other related issues, growth in the Nigerian economy fell from 6.5 percent in the second quarter of 2014 to negative 2.24 percent by the third quarter of 2016.

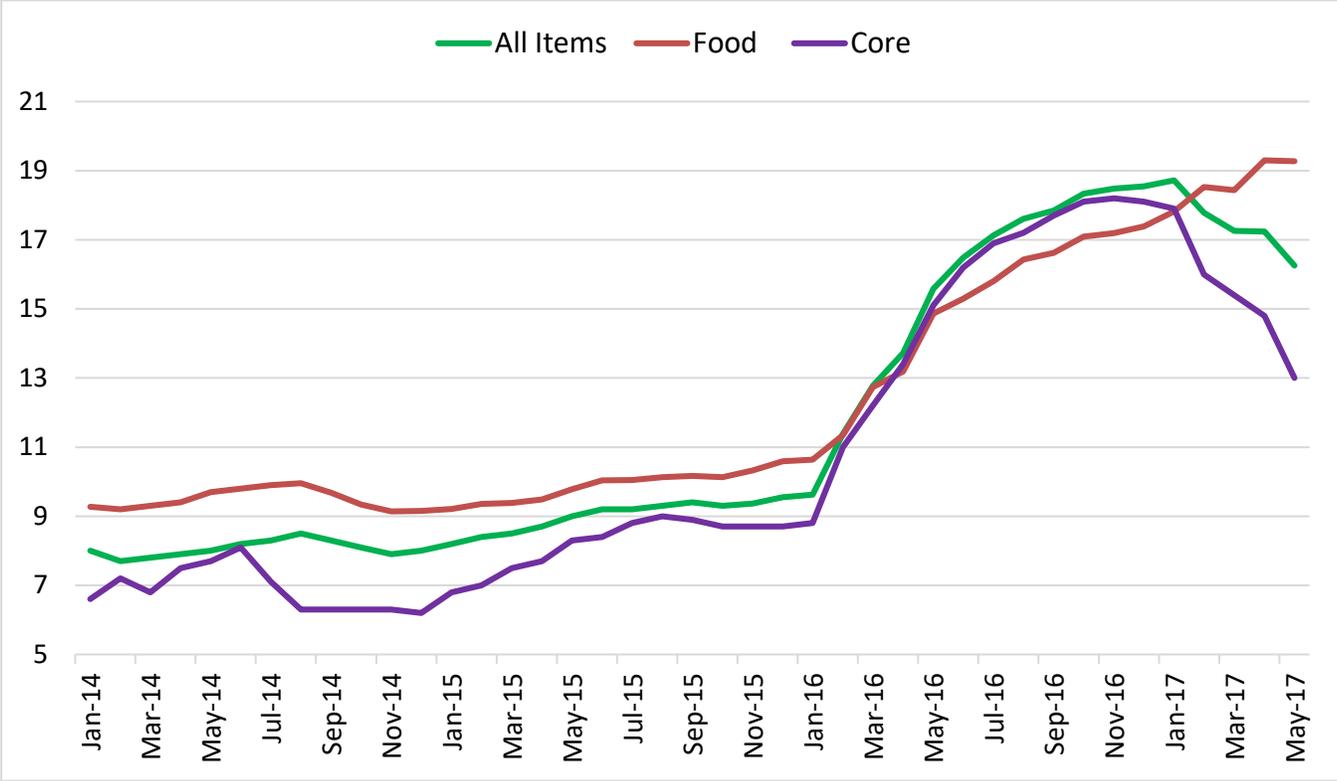


Figure 3: The monthly headline, food, and core inflation rates in Nigeria
 Source: Nigerian Bureau of Statistics

2.2 Impact on External Trade

With oil making up more than 70 percent of Nigeria’s exports in 2014, it was quite expected that the fall in oil prices and production would lead to a steep fall in the value of Nigeria’s exports. Exports fell from \$8.75 billion in April 2014 to \$2.88 billion in December 2016. Despite the severe devaluation of the naira, which has made Nigerian-produced goods relatively cheaper abroad, non-oil exports have failed to make up for the drop in oil exports. Theoretically, the weak naira should have provided an opportunity for exporters of non-oil products to increase their foreign sales. However, the data (see Figure 4) shows that non-oil exports have fallen along with oil exports. Though manufactured goods have the second largest share of exports (22 percent in the fourth quarter of 2016, compared with 4 percent for agriculture), the sector has performed quite poorly over the past two years, contracting by 1.46 percent in 2015 and a further 4.32 percent in 2016. This large decline in manufacturing output over the past two years is also reflected in the decline in manufacturing exports during the period.

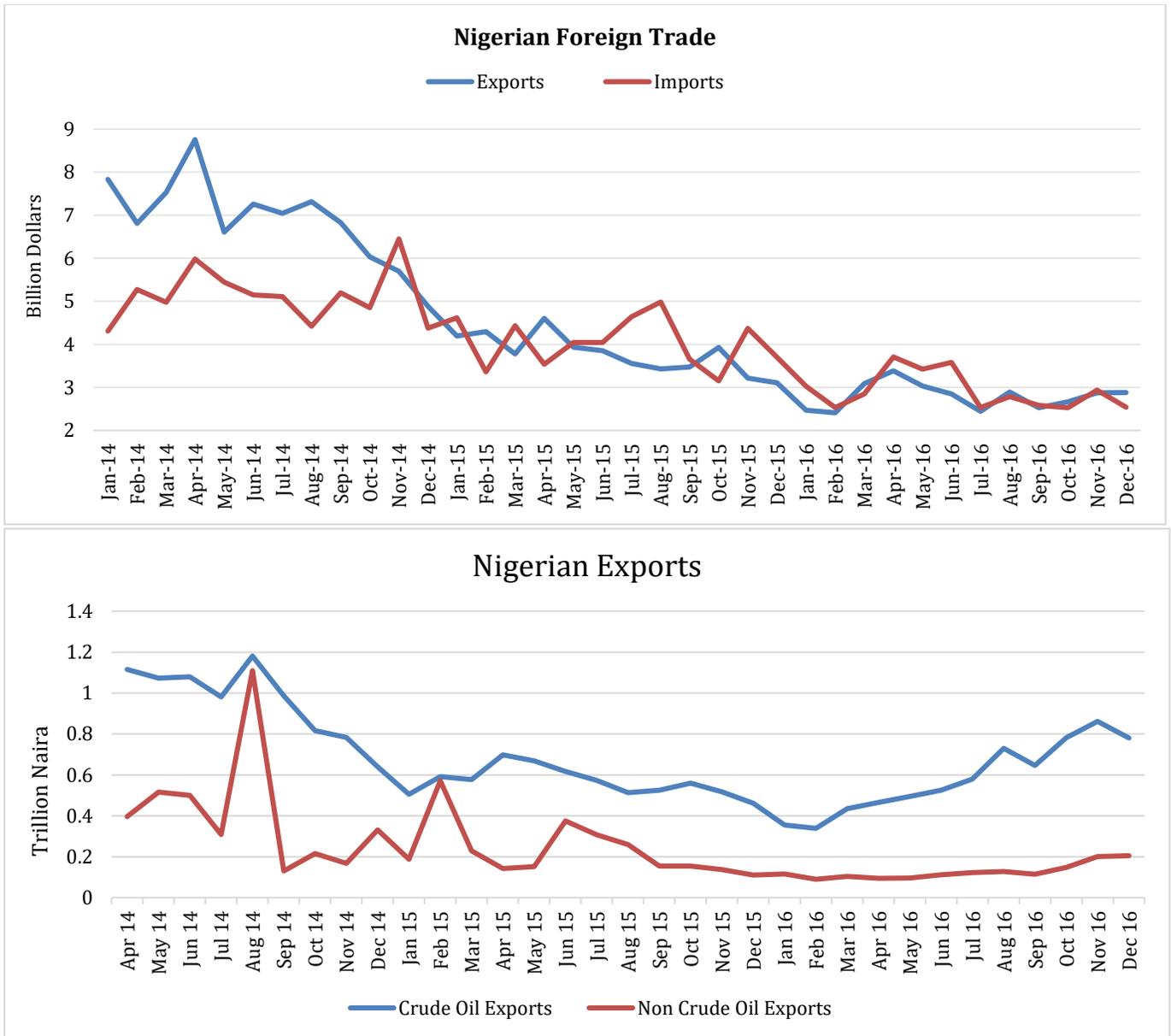


Figure 4: Nigerian total exports and imports, and crude and non-crude exports
Source: Nigerian Bureau of Statistics

Although the agricultural sector has experienced strong growth during this period, agricultural exports have not risen by much as most of the growth was for import substitution. There are two possible reasons for the disappointing growth in agricultural exports. First is the low quality of Nigerian agricultural exports, which means that most developed countries do not allow Nigerian agricultural products to be imported. The second reason is that the increase in the price of agricultural products imported into Nigeria has resulted in consumers substituting Nigerian products for imported ones. The slow growth in agricultural exports is thus due to local consumption taking up a higher proportion of agricultural production, especially given that food imports have fallen dramatically in the last two years, following the income effects from fall in oil prices.

With Nigeria's main source of foreign exchange drying up and the wealth of Nigerians massively declining in dollar terms, it was no surprise that imports also fell steeply. However, imports did not fall as fast as exports. To reduce the demands for foreign exchange needed to satisfy imports, the CBN created a list of 41 items (see Appendix 1) that would be ineligible for foreign exchange at the CBN official window. In addition to conserving forex, the restrictions on forex access were also meant to encourage the growth of some important local industries. Items on this list that directly impact subsectors which interest our programmes include rice, palm oil products, and meat and poultry products. The forex restrictions have pushed a large amount of forex demand onto the black market, which resulted in a divergence between the official and the parallel market rates.

In addition to restricting forex access for some goods and previous bans, the Nigerian government also imposed special import levies on some goods and completely prohibited imports of others (See Appendix 3 for import tariffs). As with the forex restrictions, the import tariffs and bans were also targeted at specific industries. While some of these levies or import restrictions, poultry, for instance, were in place before the naira's devaluation, Nigeria's dwindling foreign exchange earnings caused the government to enforce them with added urgency. The import prohibition list, including previously banned imports, is as follows:

- Frozen poultry meat and poultry eggs
- Pork and beef
- Refined palm oil
- Rice (importation through land borders is prohibited)

Because of the ECOWAS Common External Tariff, goods imported into Nigeria from other ECOWAS countries are not subject to import duties, although they can still be subject to import levies. However, to avoid paying the import levies, many of these goods are smuggled into the country since Nigeria's land borders are more porous than its sea ports. Our research revealed that illegal importation of frozen poultry, rice, and palm oil has reduced the effect of the import bans on these items. There are indications that customs authorities are taking serious steps to reduce smuggling across Nigeria's land borders, which could mean that the ban becomes more effective over time.

The reduction in imports resulting from the devaluation of the naira and related policies is an opportunity for local producers to increase their share of the goods sold to domestic consumers, as some of the analysis in this study shows. However, their costs have also increased as their imported raw materials have become more expensive. The devalued naira also presents an opportunity for local producers to increase their exports.

2.3 Changing Demand Patterns: Income and Substitution Effects

The devaluation of the naira—combined with the recession—has severely reduced the income of Nigerians in dollar terms. According to our estimates, Nigerian GDP per capita in dollar terms fell 47 percent, from about \$2,200 in 2014 to \$1,180 in 2016. Clearly, the effect of the naira's devaluation has been to drastically increase the prices of imported products, thereby cutting the average Nigerian's spending power. Although

the prices of locally produced goods have increased as well, as shown by the inflation figures, their prices have generally not increased by as much as imported goods.

The general increase in the price of goods and services and the inflation over the last year have generated reverberating income and substitution effects within and across the value chains in this study, consistent with predictive economic behaviour. Price increases reduce the real income of consumers (the income effect) and force people to purchase cheaper substitutes for the goods that have experienced relatively higher price increases (the substitution effect). It follows from this that even when real incomes decline due to price increases, as has happened in Nigeria since late 2014, demand for certain goods could rise if the substitution effect is stronger than the income effect. This will be seen in some of the sections on the value chains in this study.

Taking imported and locally produced goods as two distinct classes of goods in Nigeria, we would expect that as prices of imported goods have increased in recent years, customers would have switched to locally produced ones. However, given that due to the income effect Nigerians are now poorer, they could have reduced consumption of both imported and local goods instead. This study looks at the interplay of the first and subsequent levels of income and substitution effects on the dynamics of consumption (demand) in the relevant value chains.

The findings of this study show evidence of both income and substitution effects on demand within and across the value chains. In general, we found that the substitution effects outweigh the income effects for most of the products in the value chains we researched. In general, we find that even when overall demand for the product class has dropped, demand for the locally produced variety has increased. For example, as the price of foreign rice has surged in recent years, the price of Nigerian rice has risen with it, and Nigerian consumers are turning to cassava products such as garri as an alternative source of carbohydrates. This has led to an increase in the demand for garri even as the real incomes of consumers have fallen.

3. Input Analysis

To determine the effects of the naira's devaluation on the activities of the relevant actors in the subsectors we are focusing on, the study took a deeper look at how the prices and the availability of some of the inputs and substitutes for these products have changed in price. The inflation statistics give us a general idea of how prices have changed due to devaluation. However, an analysis of some specific products in each of these subsectors is needed to understand how these price changes have affected the actors in these markets.

To find the relevant price data and the drivers of the changing price dynamics, we conducted interviews with buyers and sellers of these products, as well as PIND and MADE staff, and combined this with publicly available information on commodity prices. In general, we find that prices of imported inputs have been increasing as we expected, though at different degrees. And since they are just a portion of the total cost of production, even increasing the input prices (seeds or fertilizer) has not outweighed the increases in commodity output prices or their competitiveness.

The inputs for specific value chains are considered and analysed in the chapters for those value chains. However, we find that the effects of price and availability changes of two inputs, namely energy and credit, are relevant across all the value chains, as such, these inputs are analysed independently of a specific value chain. Agricultural inputs (fertilizers and crop protection products) are an area of focus for PIND and MADE, and are the subject of various intervention programs, and so, these are considered independently as well.

3.1 Energy Costs

Energy costs have increased substantially in recent years due to increases in electricity tariffs and higher fuel pump prices. The electricity tariffs for industrial customers increased by 23 percent on average between 2015 and 2016 for customers served by Port Harcourt Electricity Distribution Company while those served by Benin Electricity Distribution Company saw their bills increase by 65 percent on average. Further increases in tariffs are planned for 2017 and 2018 as shown in the table below.

Table 1: Electricity tariffs for the Port Harcourt and Benin Distribution companies (DISCO)
Source: Nigerian Electricity Regulatory Commission

	PH DISCO Tariffs (N/KWh)	Year-Over- Year Change	Benin DISCO Tariffs (N/KWh)	Year-Over- Year Change
2015	29.58		19.89	
2016	36.19	22%	32.82	65%
2017	41.81	16%	37.94	16%
2018	42.64	2%	37.94	0%

Power supply in the Niger Delta, as in the rest of Nigeria, is intermittent and so the cost of operating generators must be considered alongside the cost of electricity, to get a complete picture of energy costs in

the region. Although it is an exporter of crude oil, Nigeria imports most of its refined petroleum products, such as petrol and diesel, so the prices of these products have increased because of the naira’s devaluation. Between February and May 2016, Nigeria experienced a period of fuel scarcity caused by the government’s inability to continue making subsidy payments to fuel importers. To solve this problem, the government increased the maximum pump price from 87 naira to 145 naira—a 66.7 percent increase—in May 2016. Most processors in the region use diesel to power their generators and the diesel price, which is less tightly regulated than the petrol price, has increased sharply since June 2016 (Figure 5).

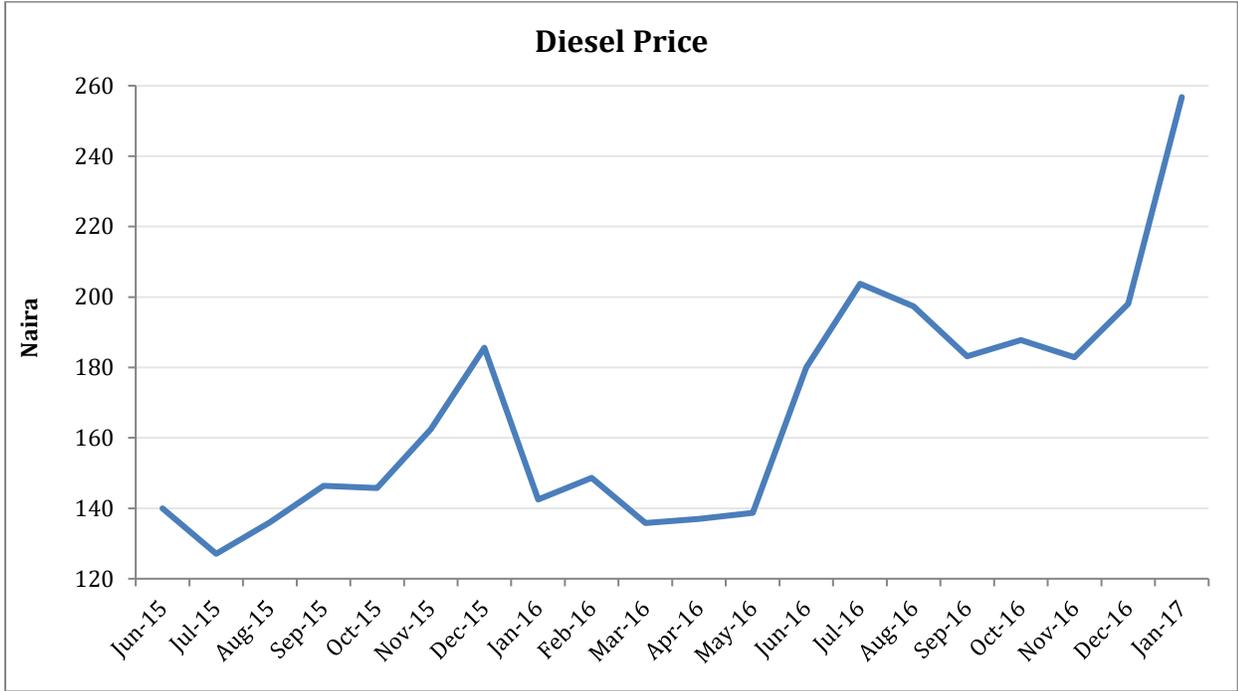


Figure 5: The average monthly price of diesel in Nigeria
 Source: Nigerian Bureau of Statistics

3.2 Cost of Credit

Nigeria’s inflation rate has more than doubled since the naira’s devaluation, partly due to the cost of imported goods (see Chapter 3.1). To reduce the inflation rate, the CBN raised the Monetary Policy Rate (MPR), its main interest rate, in March 2016 from 11 percent to 12 percent and then increased it further to 14 percent in July 2016. As a result, commercial banks were forced to increase the interest rates they offered their customers. From the graph below, we can see that the average maximum lending rate of commercial banks in Nigeria increased from just under 27 percent in June 2016 to 29.3 percent in February 2017, following the MPR increase. Additionally, the naira’s devaluation increased the amount that Nigerian banks that had borrowed on international credit markets would have to pay to service their debts.

This increase in the already high interest rates offered by Nigerian banks has increased the difficulty of obtaining credit for all actors along the various value chains we analysed. Prior to the devaluation, the share of total loans by commercial banks going to the agricultural sector was already quite low compared to agriculture’s share of Nigeria’s economy. Between 2010 and 2014, only 2.75 percent of loans by Nigerian

commercial banks went to the agricultural sector even though that sector accounted for around 20 percent of the country’s GDP during that period. Obtaining loans from commercial banks has continued to be a constraint on the growth of the agricultural sector as many of the actors we interviewed during this study, particularly the smaller ones, reported that they have struggled to obtain credit to expand their operations to take advantage of the increased demand for their products. However, the government, through the CBN, has several programmes, such as the Agricultural Credit Guarantee Scheme Fund and the Anchor Borrowers Programme (ABP), that provide loans to agribusinesses at single-digit rates. If farmers and other actors in the agricultural value chains in the Niger Delta can access credit through these programmes, it would ease their funding constraints.

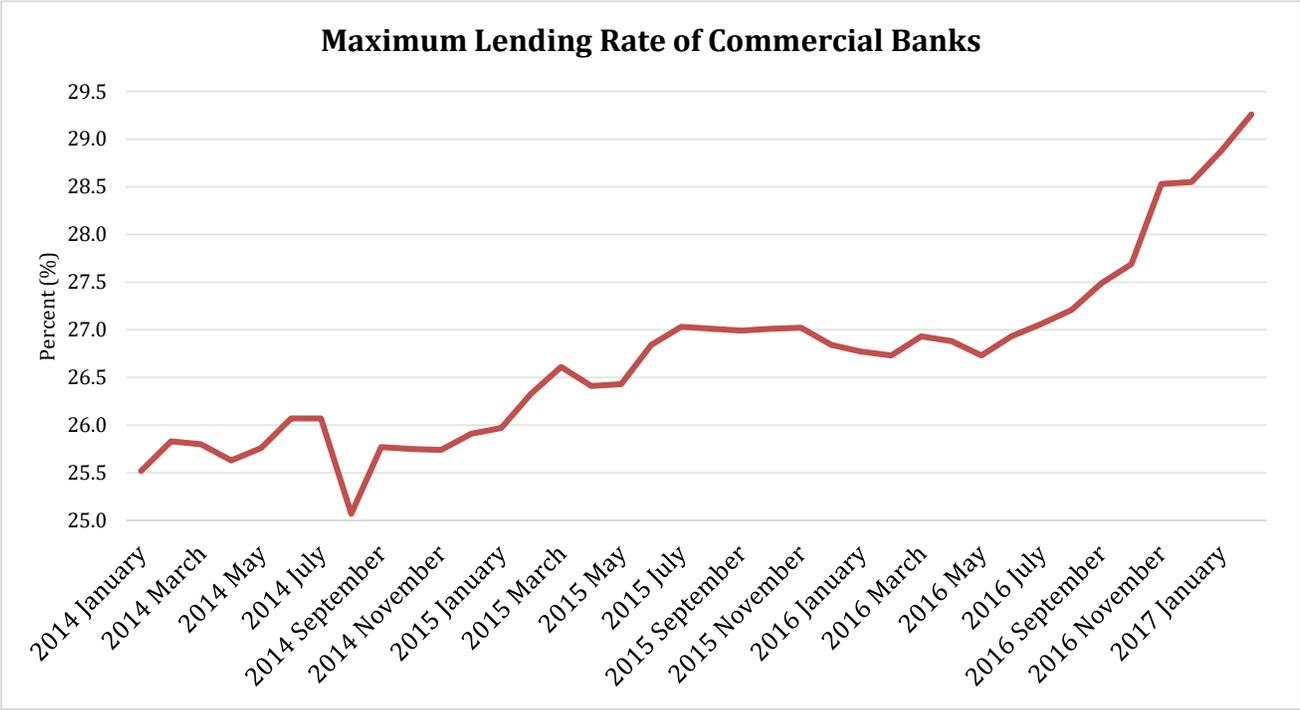


Figure 6: The average maximum lending rate offered by Nigerian banks
 Source: Central Bank of Nigeria

3.3 Agricultural Inputs

3.3.1 Fertilizers

Nigeria fertilizer blending companies have a total capacity of 4 million tonnes of nitrogen phosphorous and potassium (NPK) fertilizer and 2 million tonnes of urea fertilizer. However, only 10 percent of this capacity is currently utilized. An industry expert observer explained that importation of raw materials for fertilizer production has become more difficult because of increased Customs scrutiny of shipments containing chemicals that can be used to make explosives. This new oversight, combined with low availability of gas due to militant attacks on pipelines and the restriction on accessing foreign currency at the official rate are the key reasons for low utilization.

It is on this basis that the present administration came up with the Presidential Fertilizer Initiative (PFI). The government negotiated with a state-owned Moroccan company, Office Cherifiennes des Phosphates (OCP), to supply discounted 300,00 to 350,000 metric tonnes (MT) of phosphate per year for the next three years to help support the local blending of NPK fertilizer starting January 2017. Fertilizer blenders that access this initiative can only sell the bag of 50 kilogrammes of fertilizer for 5,500 naira rather than the market price of 7,000 naira. Members of the Fertilizers Producers and Suppliers Association of Nigeria (FEPSAN), as part of this initiative, have imported 42,000 MT of phosphate since January 2017.

The major impact of the devaluation of the naira and the increased difficulty in importation has been an increase in the price of fertilizer, particularly of imported urea fertilizer (see Table 2). The price of NPK, which is mostly locally produced, has increased by 55 percent since 2014 while the price of urea, which is mostly imported, has doubled. The increase in fertilizer prices has increased costs for medium- to large-scale farmers in the cassava and palm oil value chains, but not as much for smallholder farmers who do not usually use fertilizer. Since most of the crops in the Niger Delta are produced by smallholder farmers, the increase in the price of fertilizer has not had much of an impact on production. However, the price increase is likely to reduce the adoption of fertilizer by smallholder farmers which means they will struggle to increase their productivity thereby reducing their abilities to take advantage of the increased competitiveness that has come with the naira's devaluation.

Table 2: Average prices of fertilizer in Nigeria from 2014 to 2017
Source: PIND and MADE independent market research

	Locally Produced NPK (Naira per 50 kg bag)	Percentage Price Increase Since 2014	Imported Urea (Naira per 50 kg bag)	Percentage Price Increase Since 2014
2014	5,500	0%	5,000	0%
2015	5,500	0%	5,000	0%
2016	9,000	64%	10,000	100%
Feb 17	8,500	55%	10,000	100%
Jun 17	8,500	55%	10,000	100%

3.3.2 Crop Protection Products

There are very few manufacturers of crop protection products in Nigeria. Most of the firms are input marketing companies; they commission the production of the products in countries like China, then import and brand them. This practice represents a significant exposure to the value of the local currency. There have been significant price increases for these products, particularly for smallholder farmers, but the reduced availability of these products has been even more costly for these farmers.

The overall impact has been mixed for these companies. Some have been shuttered, while others have increased market share with significant sales growth. One such company has grown its sales by about 28 percent in volume and 45 percent in value. The major reason for the mixed results is that the Chinese government has clamped down on sub-standard crop protection products, reducing production capacity in the country. Due to reduction in the number of crop protection products producers, the prices of some of these products increased by as much as 157 percent (see Table 3). As with fertilizers, these price increases have mostly affected medium and large farmers in the cassava and palm oil value chains but this could affect adoption of crop protection products by smallholder farmers with negative implications for their productivity.

This price increase, coupled with the devaluation of the naira, led some Nigerian input companies to default on credit, leading to some companies getting blacklisted by Chinese producers. The companies that were not blacklisted were therefore able to increase market share and prices due to a reduction in competition and supply.

Table 3: Price of imported crop protection products from 2014 to 2017
Source: PIND and MADE independent market research

	Glyphosate Herbicide (Naira per litre)	Percentage Price Increase Since 2014	Paraq Herbicide (Naira per litre)	Percentage Price Increase Since 2014	Lamba Insecticide (Naira per litre)	Percentage Price Increase Since 2014
2014	700	0%	850	0%	780	0%
2015	700	0%	700	-18%	780	0%
2016	1,200	71%	1,200	41%	1,350	73%
Feb-17	1,500	114%	1,400	65%	1,400	79%
Jun-17	1,800	157%	1,700	100%	1,700	118%

3.4 Programming Implications

Although the impact of devaluation has mostly been positive for the crop protection product firms, the foreign currency exposure has led some to make the following strategic changes:

1. Input companies are moving to crop solution companies and are now offering crop-specific products and services to customers.

2. More focus on medium-sized farms and group of smallholder farmers with a minimum of 10 hectares of land.
3. Digital extension provision to farmers to reinforce and differentiate brands.
4. Input companies are now offering precision farming services.

The main programmatic implications of these changes are:

- The devaluation and the forex policies has also resulted in the average cost of input to increase from 15,000 naira per hectare, per season, to 35,000 naira. This will definitely effect the rate at which smallholder farmers adopt these products, particularly because this cost is required up front. If smallholder farmers are unable to purchase fertilizers and crop protection products to improve their productivity, they will struggle to take advantage of the increased competitiveness of locally produced goods.
- The reduced range of products will adversely affect some project interventions. Although the farmers are responding by increasing the range of input used, and it appears to have resulted in increased yield, the reduction in the range and availability of products may reduce the adoption rate of these inputs among farmers.
- The promotion of organic fertilizers as designed by Contec Global Agro Limited (CGAL) presents an opportunity to circumvent most of the imported input challenges of chemical-based fertilizers, but there is only one company with limited capacity. The projects may have to allocate increased resources to the scale-up interventions to convince the farmers of the efficacy of these new types of inputs.
- The shift of emphasis by some of these companies to more crop-specific solutions can be a double-edged sword, particularly because the crop-specific solutions are generally more expensive than the generic products. It appears the cost premium is not significant and will not be prohibitive, but it should be considered as potential risk for the scale-up intervention. The scale-up intervention will require more involvement by the project and the company to promote the new solution by showing and proving the value proposition to the farmers.

4. Palm Oil

Palm oil production in the Niger Delta is carried out in three main production systems: large estate plantations, medium and smallholder plantations, and natural groves. Production is dominated by collection of fresh palm fruit bunches (FFBs) from wild groves, accounting for about 50 percent of the supply of FFBs. The most important inputs for primary producers are the costs of fertilizers and crop protection products, although as with the cassava value chain, this mainly applies to the estate plantations, and not to the natural grove harvesters that dominate the market. A major constraint is the availability of harvesters, so demand for harvesting equipment to increase harvesting capacity has been increasing.

Palm oil processors purchase FFBs from the primary producers and process them mainly into technical palm oil (TPO) used mainly for the food market, and special palm oil (SPO) and palm kernel oil (PKO), purchased by industrial users to produce cosmetics, soap, margarine, and industrial chemicals. This study focuses mainly on SPO and TPO as these are the major products from the palm oil value chain. SPO has a free fatty acid (FFA) content less than 5 percent, while TPO has FFA between 5 and 30 percent. Pre-devaluation, SPO prices were about 17 percent higher than TPO prices. The major production costs for palm oil processors are the costs of energy and processing technologies.

4.1 Impact of Devaluation

Forex restrictions, import levies and a ban on the importation of refined palm oil have meant that both industrial and commercial users of palm oil have been unable to import the palm oil they need; import prices have gone up, increasing the amount of palm oil they demand from local producers. However, local producers have been unable to ramp up production to meet this increased demand.

Although input prices have increased, the increase in the prices of FFBs, SPO, and TPO have meant that devaluation has largely been positive for both producers and processors. Figure 7 shows the palm oil value chain map. Table 4 shows the costs and prices of end products at various stages of palm oil production, and the price variations before and after June 2015. It is noteworthy that these are prices the authors got from interactions with a few market actors during the brief field study that was done for this report and not the result of an extensive survey. In addition, it was not possible to get detailed price information for an enterprise-level analysis—this does not take away from the general impact analysis, however.

Table 4: Palm oil value chain price movements
 Source: PIND and MADE independent market research

Value Point	Item	Season	Current Price (2017)	Pre-June 2015 Price
Primary Production	FFB	Peak	17,948	7,692
		off Peak	25,641	10,260
	Pickers (Per Day)		1,000	500
	Carriers		2,000	1,000
Primary Processing	Processing a tonne of palm oil		21,740	10,840
	TPO sale price per tonne	Peak		
		Off Peak	347,840	152,180
	Palm kernel sale price per tonne		100,000	30,000
	Price of SSPE		650,000 – 750,000	650,000 – 750,000
Wholesale & Aggregation	Palm oil per tonne	Peak	400,000	175,000
		Off Peak	640,000	300,000
	Palm kernel aggregation	Peak	125,000	65,000
		Off Peak	150,000	90,000
Retailing	TPO per tonne	Peak	543,500	375,000
		Off Peak	720,000	420,000
Industrial	CPO	Peak	500,000	230,000
		off Peak	650,000	400,000
	Refined, bleached, deodorized oil (RBDO)	Peak	580,000	270,000
		off Peak	750,000	480,000

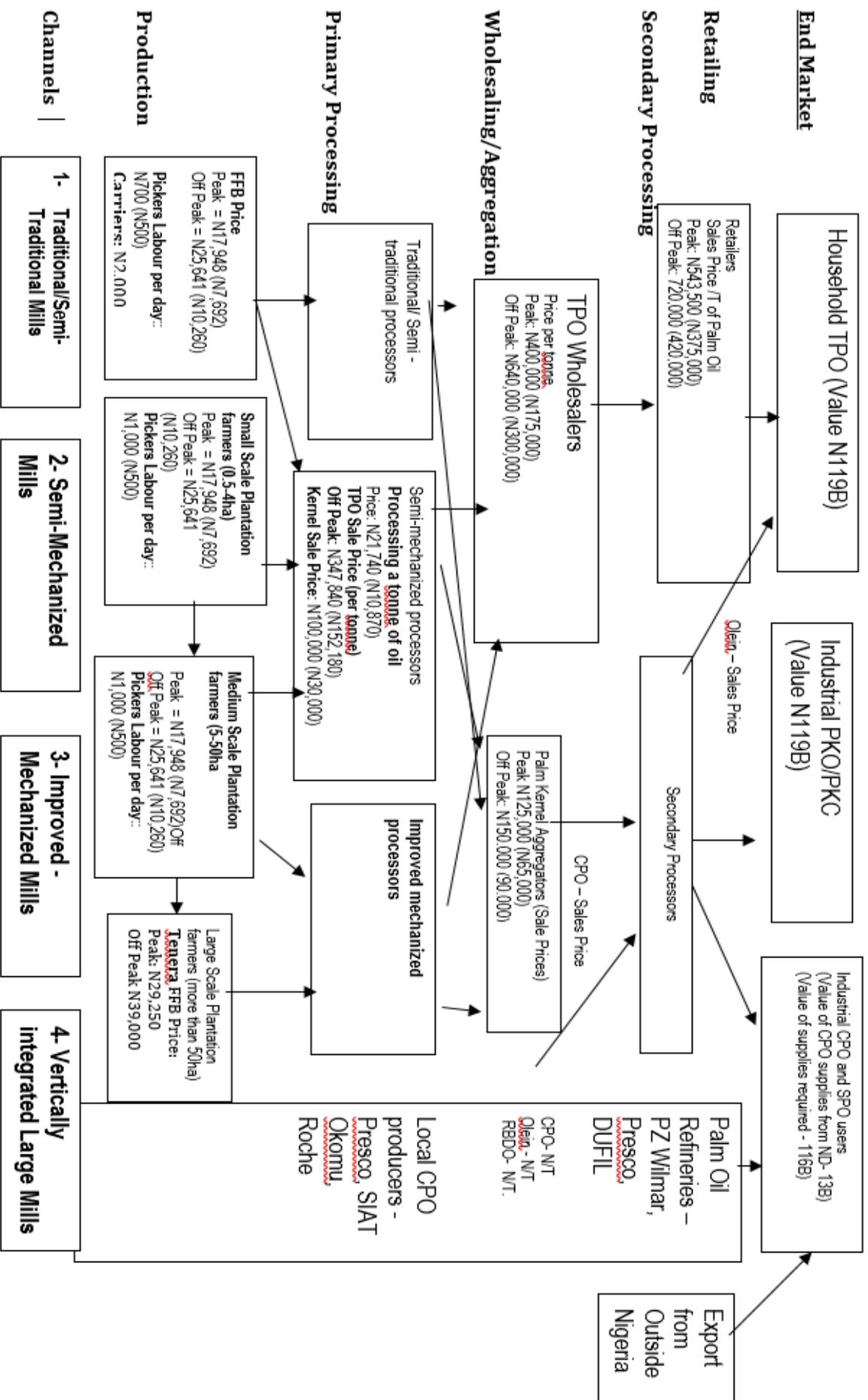


Figure 7: The palm oil value chain in the Niger Delta updated to show recent price changes due to devaluation with pre-devaluation prices in brackets
Source: PIN and MADE Independent market research

4.1.1 End Users

The restriction on access to forex for palm oil products and the high import levies on palm oil importation have caused the price of imported palm oil to surge in recent years. Despite anecdotal evidence that there is increased supply of palm oil imported into ECOWAS countries and palm oil produced in the ECOWAS countries is smuggled into Nigeria, this has had very little impact on the price as the supply gap has considerably widened since the policy. Historically, an estimated 300,000 to 350,000 tonnes of palm oil is imported via Benin Republic per year. Unverified estimates by an observer of the sector suggest that this has increased to 450,000 to 500,000 tonnes per year since June 2015.

The increase in the price of imported palm oil has led to increased demand for locally produced palm oil, particularly SPO. Interviews with processors and end users showed that industrial users of palm oil have been unable to import enough palm oil to meet their needs and so they have increasingly turned to local producers to make up the shortfall.

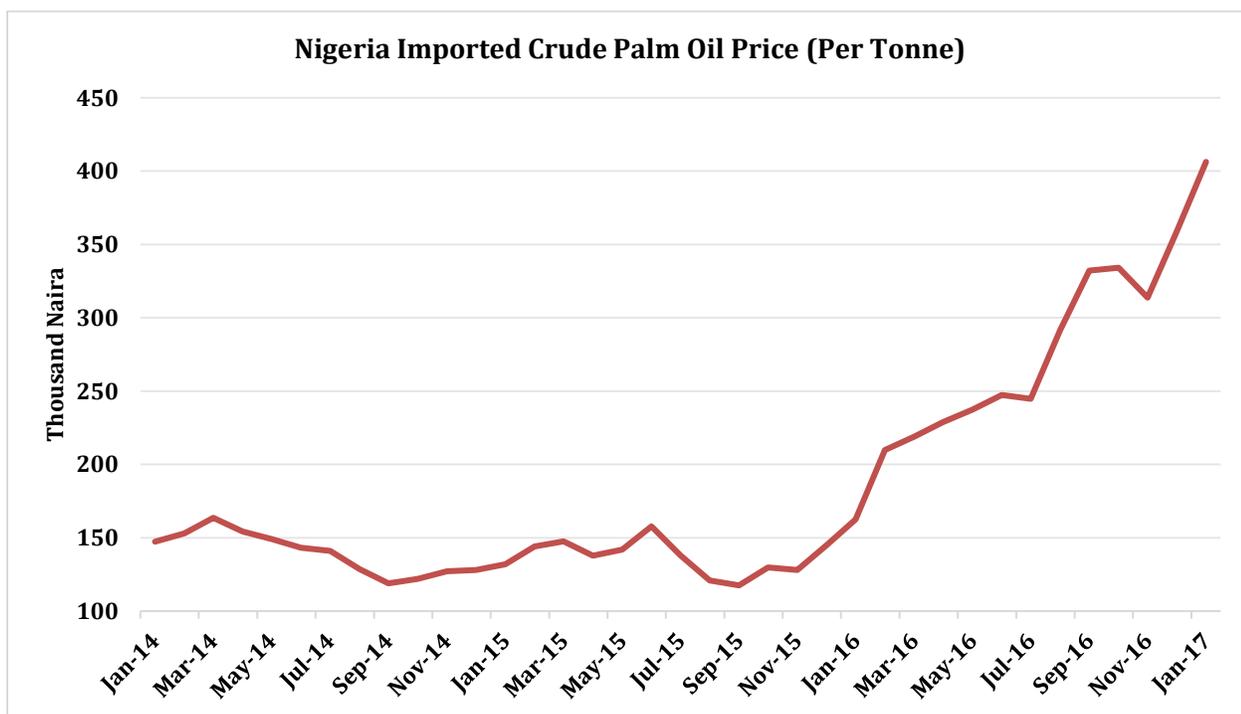


Figure 8: The global crude palm oil price in naira calculated using the parallel market rate
Source: U.S. Department of Agriculture, Central Bank of Nigeria

4.1.2 Primary Processors with Own Plantation (Semi-Mechanized Processors)

The cost of production for primary processors has increased by about 35 percent mostly due to higher fertilizer prices and increases in the price of harvesting materials such as the Malaysian knife and mechanical harvesters (see Table 5). Since most of the production in the Niger Delta consists of harvesting from wild groves, the higher fertilizer prices have not had much of an impact on production. But it is important to note that higher fertilizer prices will make it harder for smallholder farmers to increase their productivity to better position them to take advantage of the higher demand for locally produced palm oil.

Partly as a result, production has not increased in the same proportion as demand. Major primary processors we spoke to reported that they have been unable to produce as much palm oil as they would want due to issues of availability FFBs. Due to the increased demand, the price of FFBs has increased by an average of 133 percent, much larger than the increase in costs. Additionally, demand for harvesting equipment is increasing as plantation owners seek to increase their productivity; although the price of mechanical harvesters almost tripled in 2016, there was still large demand for it. The period it takes for producers to recoup their investment from mechanical harvesters is still short despite the increased prices, making it a good investment.

Table 5: Prices and percentage price increases of mechanical harvesters from 2014 to 2017
Source: PIND and MADE independent market research

	Mechanical Harvester Prices (Naira)	Percentage Price Increase Since 2014
2014	130,000	0%
2015	250,000	92%
2016	350,000	169%
2017	270,000	108%

In addition to the insufficient supply of FFBs for their own needs, primary processors are facing increased demand for palm oil from local refineries and large plantations. Historically, these large plantations and refineries would not buy fruits and palm oil from these primary processors because of quality concerns, however, the need to guarantee enough supply of oil for their own processing operations to meet increased demand from their customers led to these large plantation and refineries formalizing supply relationships with these primary processors by issuing formal procurement documents such as purchase orders.

Some processors anticipate that the present conditions will continue for some time and therefore are investing to replace trees and expand their plantations. They are investing in nurseries of the improved variety (Tenera) but most of them will not disclose from where they get the seedlings.

There is also a severe scarcity of spare machinery parts. Some of the machinery used in the processing requires imported spare parts; these have been cost prohibitive and the merchants have reduced the quantity imported (cash flow restriction), so most are not readily available.

4.1.3 Fabricators of Processing Equipment

Fabricators of small-scale processing equipment (SSPE) have had increased demand for their equipment from palm oil processors as these processors try to increase production to meet increased demand for oil. SSPE fabricators have also faced increased costs of raw materials because of the devaluation of the naira.

Although SSPE fabricators have faced increased costs of some imported inputs such as metals, the most expensive costs are local as they usually obtain engines for their equipment from old vehicles. As a result, SSPE prices have remained largely unchanged since the devaluation. Some fabricators we spoke to are considering increasing the prices of their equipment but have so far declined to do so to avoid falling demand.

4.1.4 Wholesalers and Retailers

The increase in demand for domestic palm oil, has raised prices and has increased profitability at the retail and wholesale level. Consumers do not have cheaper substitutes, leading to significant increase in the profit at this level. However, supply continues to be a challenge; it was reported that there simply isn't enough palm oil, peak and off-peak season, to meet the industrial demand.

4.2 Programming Implications and Opportunities

The current economic conditions and government policy appears to have aligned the objectives of the large processors with that of the two projects, MADE and PIND. The primary objective of the projects continues to be building capacity in terms of best practices, machinery, and quality that meets standards acceptable to industrial end-users. Now the conditions appear to have forced these users to focus their strategies on building local supply chains to support their operational needs.

The projects are now well placed to engage aggressively with processors at all levels to meet the needs of these industrial users, to better understand their specifications, and influence the direction of their coping strategies.

1. **Promoting access to improved processing technology.** The demand for improved processing technology is increasing steadily and should accelerate as the income benefits are expanding.
2. **Agricultural input providers promoting good agricultural practices (GAP).** With the demand for FFBS rising, farmers are adopting practices to increase the productivity of their farms.
3. **Oil Palm Tree Renewal (Source of seedlings).** The insufficient supply of FFBS is leading to increasing investments in both the establishment of improved trees (tenera). However, the supply of certified quality seedlings is very low, opening the opportunities for increased certified nurseries.
4. **Supply Chain Support for Industrial End Users.** The increasing demand for locally produced palm oil is creating opportunities for the secondary oil processors to link back to the primary processors and can stimulate more adoption of new productivity enhancing technologies.

5. Cassava

5.1 Market Structure Pre-Devaluation

The two main channels in the cassava value chain are the food market, which accounts for about 90 percent of the cassava produced, and the industrial market. The major products for the food market are garri and fufu; the major industrial market products are cassava chips, starch, and high quality cassava flour (HQCF), and ethanol. Some 95 percent of all cassava farmers are smallholders. The major cost of production for cassava farmers is fertilizer, although this only applies to medium- and large-scale producers, as few smallholder farmers use fertilizers.

Most farmers prefer to sell their cassava to food market processors as the prices offered by these processors are much higher than those on the industrial market, which partially explains the dominance of the food market. One of the major alternatives to cassava is rice. A large amount of the rice consumed in Nigeria is imported. To stimulate growth, the government has started numerous initiatives to promote industrial use of cassava derivatives—none of which have made any real impact, as the food market continues to offer higher prices. The major production costs faced by large cassava processors is energy, including the costs of diesel and electricity.

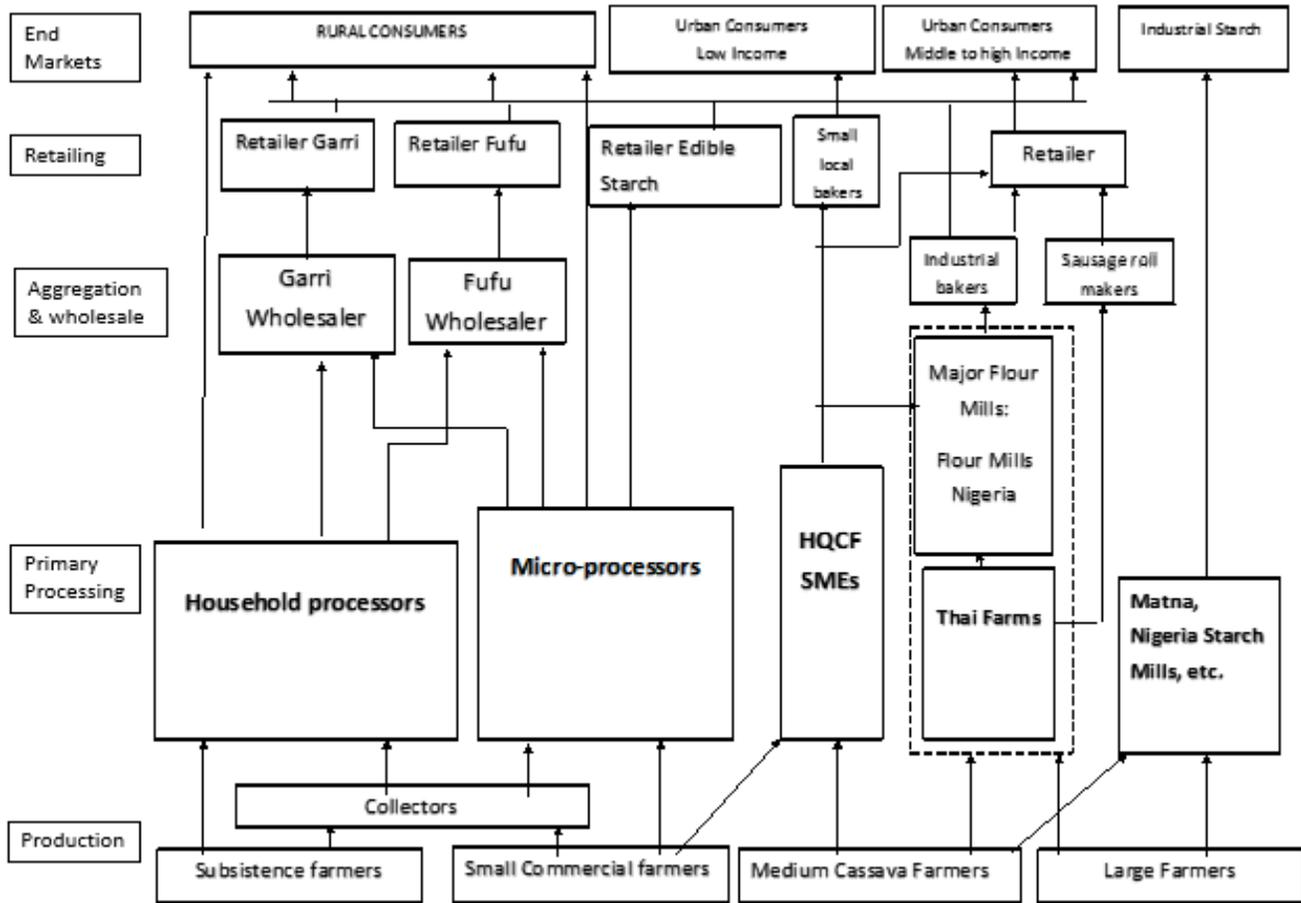


Figure 9: The cassava value chain in the Niger Delta
 Source: PIND

5.2 Impact of Devaluation on the Value Chain

The major impact of the naira's devaluation on the cassava value chain has been to greatly increase cassava demand, and prices, both from the industrial and food markets. There has been increased demand for cassava from the food market as households use cassava products such as garri and fufu as substitutes for rice, which has seen relatively larger price increases in recent years, and a major decrease in importation and consumption. Meanwhile, demand from industrial users has also increased as they turn to cassava chips and cassava starch as alternatives for imported inputs.

Costs for producers and processors have increased as fertilizer prices and the price of diesel, petrol, and electricity have increased. However, the increase in the prices at which these market actors sell their products has been greater than the increase in their costs, leading to an overall positive impact from devaluation. We look at the changes in the cassava value chain starting from the changing demand patterns of the end users and then follow the effects that these changes have had further down the value chain.

5.2.1 End Users

5.2.1.1 Industrial Market Demand

The recent economic conditions and the government policy have increased the demand for cassava and its derivatives such as cassava chips, HQCF, and starch by industrial users. The forex restrictions and the devaluation of the naira have led to significant increases in the cost of the imported inputs such as starch and wheat flour but more importantly, reduced the availability of these inputs. This has led industrial users of cassava substitutes—including wheat and maize—to substantially increase their demand for cassava derivatives such as cassava chips and cassava starch.

Animal and fish feed companies lead the way in the increased demand for cassava chips as a substitute for an imported input. Cassava grits can also be used as a substitute to imported energy sources in feed, however, feed companies' capacity to use grits as substitute (formulation of feed) and the capacity of grit producers to meet the quality specifications of the feed companies is currently weak. There is currently a price premium of 47 percent of the cost of feed pre-June 2015. There are significant efforts by these feed companies, the government, and donor projects to build capacity of producers to meet the requirements of the feed companies.

Pharmaceutical, beverage, and consumer goods companies are users of corn starch. The current conditions have threatened their supply chain as imported inputs such as maize have become too expensive and the increased production costs cannot be passed on to household consumers. This has resulted in major efforts by these companies to engage with local suppliers of cassava starch. However, capacity, in terms of quality required, is a significant concern that is being addressed by various government initiatives.

As flour for baking, cassava's biggest competitor is wheat, which is the predominant type of flour used in Nigeria. However, as most of the wheat used in Nigeria is imported, the price of wheat flour for Nigerian bakers has increased in recent years despite a drop in the global price of wheat, due to the naira's devaluation and the 65 percent levy on wheat imports. The price of a metric tonne of wheat increased from 130,000 naira in 2012 to 240,000 naira in 2016.

HQCF is a substitute for wheat in flour production. However, production of HQCF appears to have fallen since the devaluation of the naira², as the market price was significant lower than the alternative food products (garri and fufu) produced for the household market.

5.2.1.2 Food Market Demand

In addition to restricting access to foreign exchange at the official CBN window for rice imports, the government also banned importation of rice through land borders and placed a 10 percent import duty and a 50 percent import levy on importation through sea ports (see Table 12). Between January 2014 and May 2017, the dollar gained 124 percent against the naira on the parallel market, increasing prices by the same amount for goods that were not eligible for access to foreign exchange from the official CBN window. This price increase due to the devaluation, combined with the 10 percent import duty and the 50 percent import

² It is not clear if there was a significant decrease, as anecdotal evidence suggests that production was already quite low prior to the devaluation of the naira because of weak demand and weak commercial viability.

levy, increased the price of imported rice to Nigerians by 184 percent. The actual market price increases were not as high, probably due to increased smuggling through the land border with Benin.

As a result, imported rice prices increased from 8,500 naira in January 2015 to 22,000 naira to 24,000 by the end of 2016 before dropping back to about 15,000 naira following interventions in the forex market by the CBN to strengthen the naira on the parallel market. The price of local rice has also increased during this period, continuing a trend which previous PIND studies have highlighted showing that an increase in the price of imported rice is usually followed by an increase in the price of locally produced rice. There was no comparable increase in household disposable income so this large increase in the price of rice caused a large decrease in consumers’ real incomes and the purchasing power in relation to rice.

Consumers switched from rice to cassava derivatives like garri, which, despite becoming more expensive, is still cheaper than rice. This is an example of a value chain where the substitution effect is dominant, so that even as garri prices have increased, demand for garri is still going up. The data shows that rice imports into Nigeria fell by 1.5 million tonnes between 2014 and 2016. There is some evidence that some of this was replaced by smuggling imported rice through Benin to avoid duties, but imports into Benin only increased by about 630,000 tonnes, so even assuming that increase ends up in Nigeria, there is still a significant shortfall of more than 1 million tonnes of rice. Our research shows that much of this has probably been replaced by a huge increase in the demand for cassava derivatives.

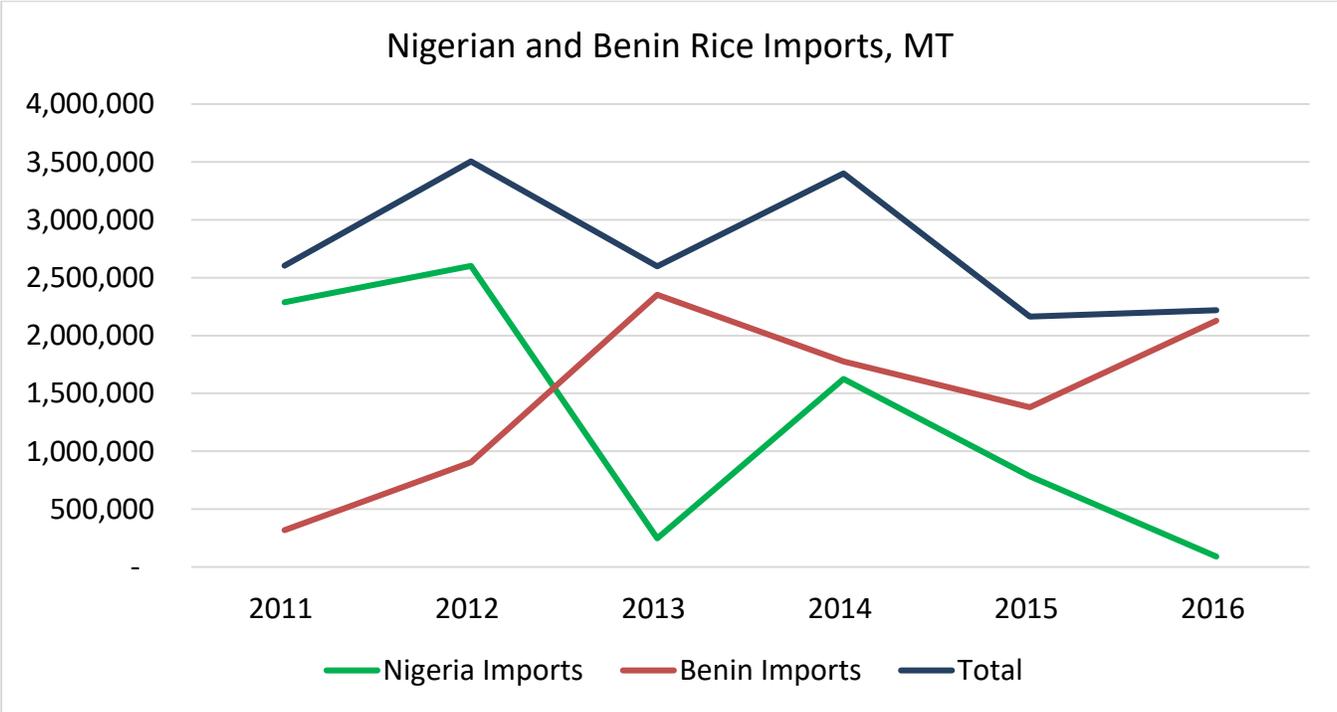


Figure 10: Rice imports into Nigeria and Benin from 2011 to 2016
 Source: Global Trade Atlas

The table below shows the prices of each of garri, indigenous varieties traditionally milled rice (Ofada, Abakaliki, Sokoto, etc.), local industrially milled rice and imported rice, before and after the devaluation of the naira. It also includes the impact of CBN interventions in the forex market, since March 2017, which

have succeeded in reducing the parallel market exchange rate and reduced the price of imported rice. Garri prices are expected to fall further as the harvest season approaches. The indigenous locally milled rice is considered a premium product, particularly because the production capacity cannot meet the current demand.

Table 6: Price of a 50-kilogramme bag for various food items
 Source: Independent market research

	Garri*	Indigenous Variety, Traditionally Milled	Local Industrially Milled Rice	Imported Rice (Thailand Rice)
Pre-June 2015	N4,000	N30,000	N7,000	N8,500
February 2017	N12,000	N33,000	N17-18,000	N22-23,000
April 2017	N11,000	N33,000	N17,000	N15,000

*Garri is used here as a catchall phrase for all cassava food derivatives

The combination of the consumption trends in the industrial market and the switch in food preferences has led to significant increase in demand for cassava root, but the same price spread between the industrial and food markets endures, reducing the quantity available for industrial market. The table below shows the price variance. Logic dictates that this spread should have narrowed since the increase in the industrial demand, however, the brief field study did not find evidence of this. It is, however, worth a detailed price survey to be carried out.

Table 7: Cassava root price per tonne
 Source: Independent market research

	Industrial Market	Food Market
Pre-June 2015	N15,000	N25,000
February 2017	N30,000	N45,000

5.2.2 Primary Producers

The increase in the cost of fertilizers from 5,500 naira for a 50-kilogramme bag in 2015 to 7,000 naira in 2017 has directly increased production costs for cassava farmers. However, previous studies show that subsistence and small-scale farmers in the Niger Delta largely do not use fertilizers, meaning that the effect of the fertilizer increase is more likely to affect medium- and large-scale commercial farmers in the short term. But in the long term, the higher prices of agricultural inputs will reduce adoption of these products by smallholder farmers, curtailing their ability to increase productivity and grow production.

In any case, from the point of view of the producers, both large and small, the increase in the prices they can obtain for their cassava roots (a 100 percent increase on the industrial market and an 80 percent increase for the food market) more than makes up for the 27 percent increase in the cost of fertilizer.

Additionally, smallholder farmers are choosing to process more of their own cassava roots into garri to earn higher incomes. Farmers in the contract farming scheme (promoted by MADE) have since reduced the quantity of cassava roots supplied to processors because of the significant increase in price of garri. The smallholder farmers are processing the cassava into garri to sell to the local market for additional income. The value addition by the smallholder farmers has increased their income by 45 percent.

5.2.3 Processors

Processors have also faced increased costs as the prices of diesel, petrol, and electricity have increased over the last two years. However, as is the case with the cassava farmers, the increase in the prices at which they sell their own products is much higher than the increase in the price of their inputs. The prices of HQCF and garri have more than doubled since devaluation, while diesel and electricity tariffs have increased by 66.7 percent and 65 percent, respectively.

Garri processors can pay higher prices for cassava than industrial users, so even as industrial demand has gone up, the supply of cassava for industrial uses, as a percentage of cassava production, has fallen. The allocation of cassava production between industrial and food uses has shifted even more in favour of the food market in recent years due to the increase in the price of garri. Cassava processors have mostly stopped producing HQCF because of the lower prices and have instead increased production of garri, which offers higher prices and is easier to process.

A large cassava processing firm in Cross River State reported that the percentage of cassava it processes that is converted to HQCF has fallen from 35 percent pre-2014 to 0 percent in early 2017, while the proportion going to garri production has increased from 50 percent to 95 percent. The table below shows the change in production distribution by the processor since the devaluation. The changes in the production distribution are mostly due to price, as HQCF continues to offer low margins for the farm so it has temporarily focused on producing only garri.

*Table 8: Changing cassava processing patterns for a processor
Source: Independent market research*

	Pre-2014	2017
HQCF	35%	0%
Garri	50%	95%
Fufu	10%	0%
Starch	5%	5%

5.3 Programming Implications

1. The increased selling price and the value addition (garri production) have resulted in a positive net effect in income for the smallholder farmers. However, given likely increases in total supply and future drops in prices, the importance of increasing productivity stands out the behavioural change the projects are promoting (for smallholder farmers to increase input for greater yield and income). This presents an opportunity for the projects to expand and re-inforce these activities, especially discussing the potential downside of not increasing productivity.
2. The increase in the price of cassava has caused an increase in production of cassava through more extensive production. This will increase supply and eventually cause the price of cassava to go down. If industrial processors of cassava have built up relationships with producers, they will be able to take advantage of the lower prices, allowing them to compete favourably with the food processors. The projects should, however, explore including aggregators, primarily traders that bridge the cash flow gap between producers and processors.
3. The increased demand from traders raises the potential risk for contract farming scheme owners (processors) not to get enough cassava roots for processing due to side-selling. It is, however, expected that the increased yield by farmers applying project supported GAP and inputs, and the limited processing capacity, will continue to ensure adequate supply and loyalty to scheme owners.
4. The promotion of cassava grits amongst the microprocessors also offers the projects greater impact in income and reach. Since the grits will use primarily the waste (peels) it should add greater value, but “whole tuber” grits will not compete, profit wise, with garri. The microprocessors of garri are mostly women; these women can be linked to an aggregator that will provide the required support to achieve the required specifications of the feed companies.

6. Aquaculture

6.1 Market Structure Pre-Devaluation

Aquaculture in the Niger Delta mostly consists of catfish production; about 90 percent to be exact. The most important cost in the aquaculture value chain is the price of feed, which accounts for between 60 and 65 percent of the cost of producing fish in a cultured environment, when fixed and setting up costs are taking into consideration. The five major categories of feed producers in the Niger Delta are on farm production (35 percent of feed consumed in the Niger Delta) micro, completely unbranded producers (25 percent), small and medium enterprises (5 percent), large local producers (25 percent), and importers (10 percent).

Pre-devaluation, imported feeds sold for between 4,500 naira and 5,000 naira for a 15-kilogramme bag while local feeds cost about 3,600 naira for a 20-kilogramme bag. However, feeds produced by large local producers have a substantial imported component, as the fish meal used to provide protein in local feeds is mostly imported. This makes up about 30 percent of the cost of local feeds. Although on-farm, micro producer, and small and micro enterprise feeds are usually of lower quality than imported feeds, demonstration has shown that feeds produced by large local producers are as good as imported feeds, except as starter feeds. For starter feeds, which are used within the first few weeks of fish farming, farmers use imported feeds as local producers generally lack the capacity to produce starter feed.

Fish farmers then sell their fish to wholesalers who can either sell the fish to retailers for fresh or smoked fish. Wholesale prices for fresh fish are generally higher than those for smoked fish since processors are less particular about what kind of fish they buy than those who sell fresh fish. Pre-devaluation, wholesale prices for fresh fish were about 500 naira per kilogramme while those for smoked fish were about 450 naira. At the retail level, however, smoked fish prices were about 800 naira per kilogramme while fresh fish prices were around 700 naira per kilogramme. The price structures for smoked and fresh fish are a significant opportunity for value addition in the aquaculture value chain. The most significant production costs for processors in the aquaculture value chain are the costs of energy and the cost of the smoking kilns.

AQUACULTURE ACTORS IN THE NIGER DELTA

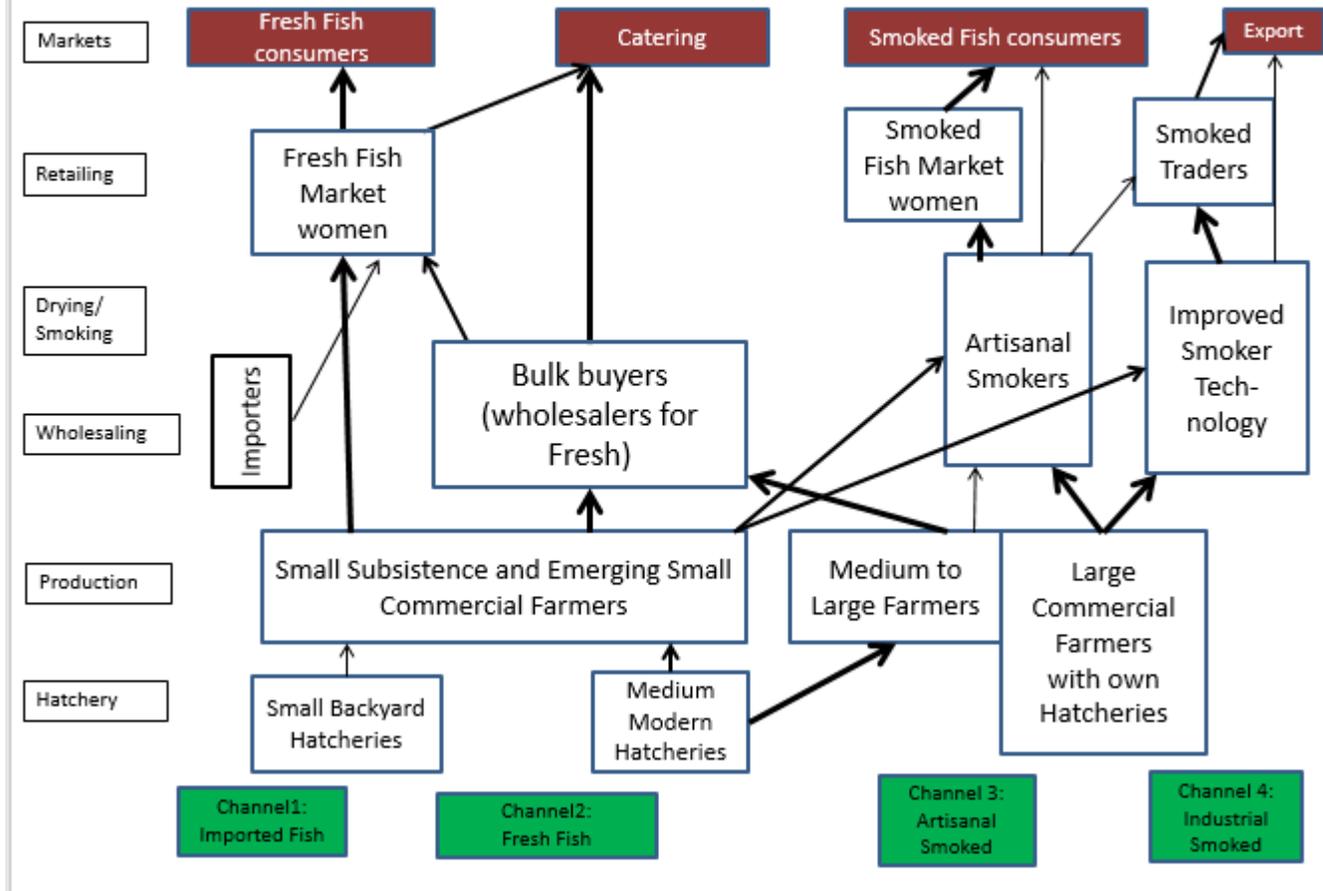


Figure 11: The aquaculture value chain in the Niger Delta
Source: PIND

6.2 Impact of Devaluation on the Value Chain

The structure of the value chain and the end market channels remains largely unchanged after the naira's devaluation. However, the costs and subsequently the prices of the products in the value chain have increased substantially. We examine the impact of these changing costs on the local feed manufacturers, fish farmers and the processors (also called smokers) and the end market effects that these have had.

6.2.1 Feed Manufacturers

As the cost of imported energy sources in feed such as maize and wheat have increased, feed manufacturers have increasingly turned to cassava chips as a potential substitute. However, they are mostly unable to get the volumes of cassava they require at a satisfactory price given the competition for cassava from garri processors (see Chapter 5.2.1). Feed producers are also seeking an alternative to imported fishmeal as a protein source but the local substitutes available are largely unproven or of lower quality.

Since the devaluation, the price of imported feed has increased by an average of 151 percent. Imported feed prices increased from between 4,500 naira to 5,000 naira pre-devaluation in 2014, to between 10,000 naira

and 14,000 naira in 2016. Local feed prices have also increased although not by as much as the imported feed, with price increases in the range of 50 to 60 percent. Local feeds have increased from about naira 3,600 per bag to about 5,500 naira to 6,500 naira by the end of 2016. Given the relatively large price increases of imported feed, demand for locally produced feed has increased substantially. PIND studies show that large local feed companies have increased production; large feed producers have increased their capacity utilization from an average of 50 percent in 2014 to about 97 percent in 2017. Some of the large companies are investing in expanding overall production capacity. Meanwhile medium, small, and micro enterprises have also increased production over the past few years, especially due to increasing demand from smallholder farmers who are unable to afford higher quality imported feeds or feeds produced by the large companies.

6.2.2 Fish Farmers

Our interviews with catfish producers show that they are generally attempting to reduce costs by substituting local feeds for imported ones, which is consistent with the increase in demand that local feed producers have reported, and in some cases, formulating their own feeds.

Since feed is such a major portion of the costs for catfish farmers, the large increases in the cost of both locally produced and imported feed is a huge issue for them. In addition to higher prices, availability of feed, especially starter feed, which is mostly still imported, is also a major constraint to the operation of catfish ponds. The problems of higher feed costs and low availability have forced some of the weaker catfish farmers out of business. New entrants into the business are most at risk since they have less experience and smaller capital buffers with which to absorb losses.

Given the high price of poultry relative to fish, and the increased enforcement of the ban on frozen poultry imports, demand for fish as a source of protein has increased. The higher costs and demand have combined to cause the price of a kilogramme of catfish to increase from 450 naira to 500 naira pre-devaluation, to between 650 naira and 1,000 naira per kilogramme in 2016. The price increase has helped fish farmers who have been able to stay in business to cover their rising costs and remain profitable.

While there is no evidence that overall catfish production has fallen significantly in the Niger Delta region, there is demonstrable evidence that poorer catfish farmers have been squeezed from both the income effects on the demand side, following significant fall in average income, and on the supply side by increases in the price of feed. While large and long-term farmers are exhibiting resilience in the face of these income effects from both ends, their margins are lower than they were a few years ago.

6.2.3 Processors (Smokers)

Processors, or smokers, in the catfish value chain have experienced some rising costs due to the increase in the cost of steel, aluminium, and insulation materials for manufacturing smoking kilns. Since catfish can be sold fresh instead of smoked, these costs are not as important for the catfish value chain as the cost of feed. However, smoking preserves the catfish, increasing the period during which the catfish can be sold and reducing the amount of catfish that is wasted before sale, and as we mentioned earlier is a major point of value in the aquaculture value chain.

The price of a 120-kilogramme steel smoking kiln has increased from 350,000 naira pre-devaluation, to 450,000 naira now, while in the same period, a 250-kilogramme aluminium kiln (mainly used for smoking

fish for export) has increased from 850,000 naira to 1.2 million naira. Even though the price of smoked fish has also increased, the large upfront investment makes it more difficult for small processors to purchase the kilns, limiting potential valuable addition for these processors.

6.3 Programming Implications

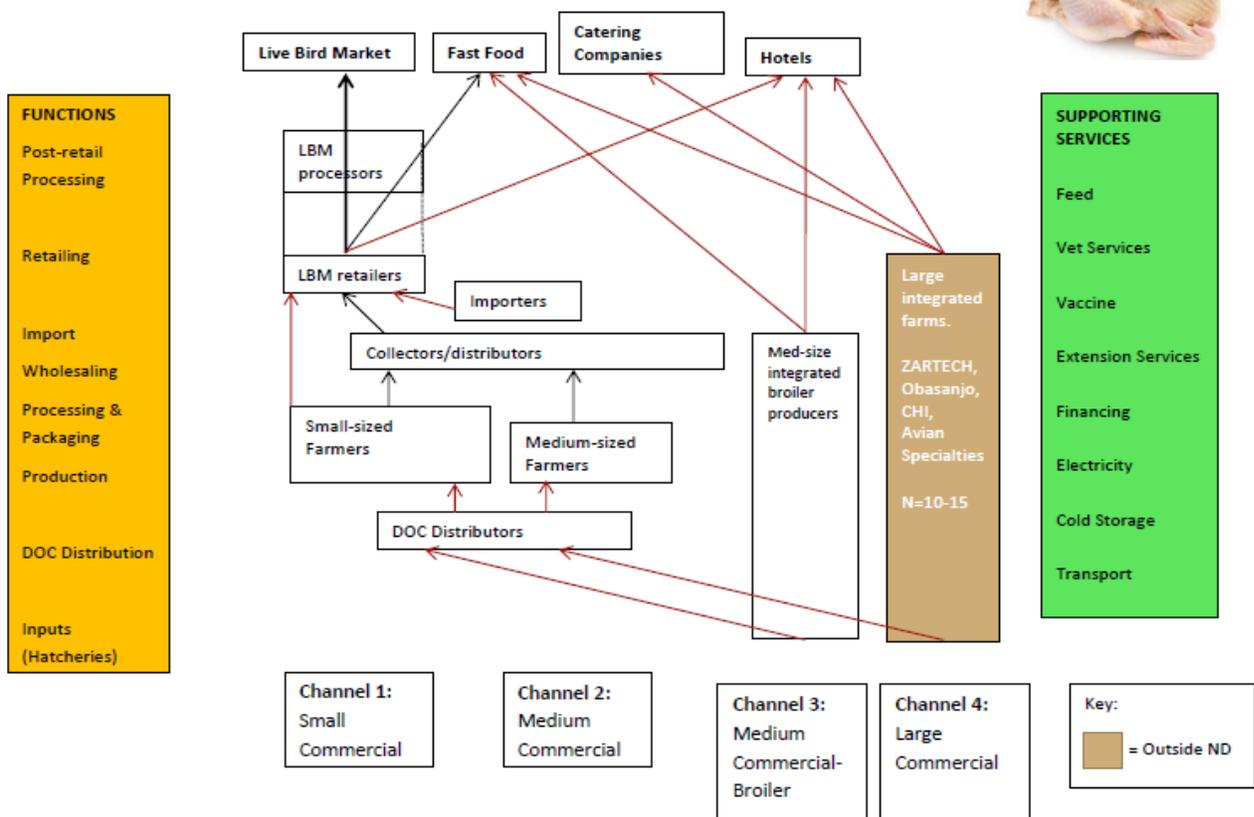
1. A shortage of quality feed is hampering the growth of a competitive aquaculture sector. The steadily increasing prices of quality feed is putting pressure on some small farmers, forcing them to upgrade and improve their feed conversion ratios, or go out of business. This can create greater demand for productivity training.
2. The increased demand for locally produced high-quality feed will create significant opportunities for investment in the feed sector.
3. Even though the costs of inputs are increasing, the steadily increasing price of fish is creating opportunities for the productive farmers. This means that the most competitive farmers, and those who can afford the feed, will prosper.
4. However, with the significant increase in the cost of inputs (feed), smallholder farmers who do not have the cashflow to purchase the quality inputs needed to increase productivity are likely to drop out of the aquaculture value chain.

7. Poultry

The two major products in the poultry value chain are the meat and egg markets. The poultry value chain begins with hatcheries, which supply day-old-chicks (DOCs) to poultry farms. The poultry farms grow the chickens and produce eggs, which they sell to wholesalers who package the chickens and eggs and sell them to retailers who sell them to consumers (See Figure 12 below). The major input costs for poultry farmers are the costs of feed, energy, and vaccines.

Vaccines are particularly important for the poultry value chain as farm chickens in the Niger Delta have average mortality rates of 30 percent from Newcastle Disease (NCD), or as high as 50 percent if farming practices are poor. PIND and MADE have promoted the usage of vaccines by poultry farmers to bring down this high mortality rate.

STRUCTURE: CHICKEN MEAT VALUE CHAIN



STRUCTURE: CHICKEN EGG VALUE CHAIN

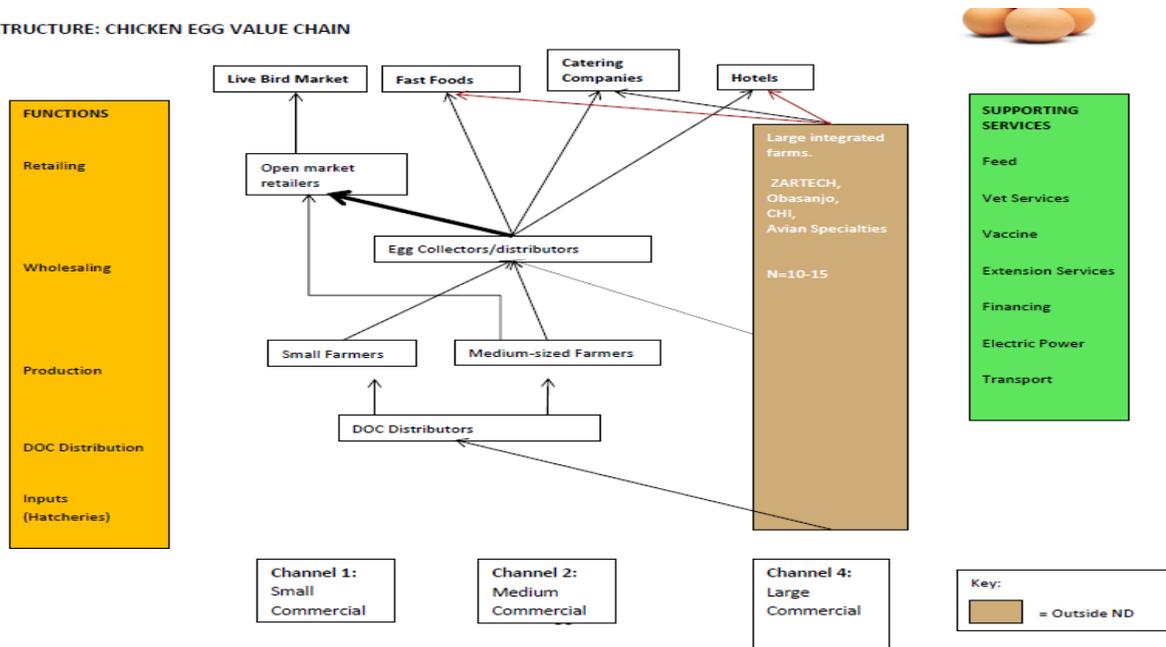


Figure 12: The poultry value chain in the Niger Delta showing both the meat and egg channels
Source: PIND

7.1 Impact of Devaluation

We have already dealt with the costs of feed and energy so our analysis of the poultry value chain is focused on the effects of changes in the price and availability of vaccines on the poultry industry. The cost of importation of vaccines into the country has increased for pharmaceutical companies because of the naira's devaluation. Although the National Veterinary Research Institute (NVRI) produces some vaccines for NCD locally, most vaccines used in the country are imported. The price of locally produced vaccines has remained unchanged while imported vaccines have increased by as much as 167 percent (see Tables 9 and 10).

Table 9: Price of both locally produced and imported NCD vaccines
 Source: PIND and MADE independent market research

	Locally Produced NCD Vaccines	Percentage Price Change Since 2014	Imported NCD Vaccines	Percentage Price Change Since 2014
2014	250	0%	870	0%
2015	250	0%	1080	24%
2016	250	0%	1800	107%
Feb-17	250	0%	2130	145%
Jun-17	250	0%	2130	145%

Table 10: Price of other imported vaccines
 Source: PIND and MADE independent market research

	Gumboro Vaccine (Naira)	Percentage Price Change Since 2014	Imopest (ND oil) (Naira)	Percentage Price Change Since 2014	Gallimune 302 (Naira)	Percentage Price Change Since 2014
2014	1140	0%	3600	0%	10800	0%
2015	1500	32%	4200	17%	10800	0%
2016	2160	89%	6720	87%	16800	56%
Feb 17	2346	106%	10026	179%	28800	167%
Jun 17	2346	106%	10026	179%	28800	167%

Pharmaceutical companies have been unable to pass these increases in costs on to customers since the industry is quite competitive. To protect revenues and profits, the general trend in the pharmaceutical companies is to reduce dependence on imports. Poultry farmers have responded to the increased cost of vaccines by reducing demand for preventative vaccines and purchasing mainly for treatment products. While this means they do not have to spend money if their birds do not get sick, it can increase overall costs of production. In response, pharmaceutical companies have switched their product lines to focus more on treatment products. Although this protects margins for pharmaceutical companies, it exposes poultry farms to viral attacks and losses.

7.2 Programming Implications

1. The inability of the NVRI to produce enough NCD vaccine and the reduced importation of vaccines has resulted in availability concerns and shortfall on the local market.
2. The price rise for live birds in the market appears to sufficiently cover the price rises for inputs. It is therefore an opportunity for the project to scale up the intervention that promotes the use of vaccines in the household by focusing on demonstrating the value proposition of making the keeping of the birds a commercially and profitable enterprise.
3. The programmes should increase their emphasis on convincing smallholder farmers to invest in preventative treatment, even if it requires upfront cashflow, rather than risk losing all of flock.

8. Conclusions

The rapid decline in the value of the naira over an 18-month period between November 2015 and June 2016 has created many shocks to the Nigerian economy. This serious official devaluation of more than 50 percent has been compounded by the Central Bank of Nigeria's policy of rationing hard currency, in part by restricting access at official exchange rates for many commodities that are produced in the country. The rationing of hard currency led to the development of a vibrant parallel market that plateaued at a further 40 percent reduction of the official rate, meaning that by January 2017 the naira was trading at one-third of its official value in October 2015 on the informal market. The impacts have been widespread, both positive and negative, with significant implications for PIND and MADE's operational support to growing the economy in the Niger Delta. Some of the major effects are:

Increased competitiveness of Nigerian products on local and international markets: The major finding of this report is that the naira's devaluation has led to the increase in prices of both locally produced and imported products across the value chains. Following that, there are differences in the level of price changes, especially that locally produced products prices have increased by less than that of imported products. In this study, we found that devaluation has led to a major shift in the terms of trade for Nigerian products, with the prices Nigerians pay for imported goods increasing significantly—doubling in most cases. For those products on the Central Bank of Nigeria's restricted list, the prices Nigerians pay have increased even more, sometimes tripled.

As a result, there have been significant substitution effects within and across the value chains. A major part of the substitution effects is the substitution of locally produced goods for imported ones where available. This is increasing the competitive advantage of locally produced goods over imports, so Nigerian commodities like rice, palm oil, fish, starch, as well as many inputs that could be manufactured locally, such as animal feed, are in high demand and are attracting higher prices. This has led to increases in the incomes of the local producers in these value chains, especially that of palm oil and cassava. The implication of this is increased competitiveness for these local producers who have responded by increasing production and thereby increasing their incomes.

The naira's devaluation has also made Nigerian exports more competitive on international markets as the products are now cheaper on international markets. Although exports of some products—e.g. cocoa—have increased substantially, seemingly in response to this increased competitiveness, we have not yet seen a general increase in agricultural exports. This creates an opportunity to train farmers and other participants in the value chains we have studied to produce at the standards required for the export market. Overall, the naira's devaluation is creating significant opportunities to stimulate local production to compete with imports or to promote exports.

However, it must be noted that the increase in competitiveness derived from devaluation is not sustainable because Nigeria's unwritten exchange rate policy is the preference for a strong naira. Historically, Nigeria's episodes of devaluation have been forced by the decline in oil prices and the pressure on the naira. This is also the case in the last two years. Indeed, following recent increases in the price of oil and other forms of dollar incomes, the naira has strengthened once again.

Furthermore, Nigeria's inflation trajectory has been higher than that of most trading countries. The implication is that even given the level of exchange rate at which there is still a significant increase in competitiveness from devaluation, these gains will be wiped off by increases in Nigeria's rate of inflation. Finally, and related, is that Nigeria's exchange rate policy is neither tied nor consistent with the export promotion of agricultural products. It thus means that the exchange rate policies, continuing historical exchange rate policy preferences is to lean in favour of strong naira and consumption.

Higher production but not higher productivity: As demand for local products such as catfish, cassava, and palm oil have gone up, the producers in these value chains have increased production to meet this increased demand. The study found that most of the increases in production, both from existing and new producers, have come from the expansion of proportional use of inputs, rather than increasing productivity from the improved use of inputs. Local producers have taken advantage of their increased competitiveness driven by devaluation, rather than productivity gains caused by improved utilization of inputs. This distinction is important for policy and the dynamics of future incomes of local producers.

While this increase in production has allowed these producers to take advantage of higher prices and increase their profits, this is not sustainable. For a sustainable increase in production, producers must invest in inputs such as fertilizers, crop protection products, and vaccines that increase their productivity. This is necessary, as the advantage they currently enjoy due to devaluation is a "one-off" gain. To maintain this advantage, producers must increase their productivity.

Major consumer substitution effects: With the major increases in prices of imports, and the subsequent increase in prices of the local product, there have been some major substitution effects occurring. The steady increase in the prices of rice (both local and imported) has reduced demand for rice, stimulating substitution of cassava products (primarily garri). This has led to a significant increase in the demand for (and price of) the raw cassava tubers to make them. While there is also increasing demand for locally made starch and other industrial products from cassava, the high prices of tubers for garri continue to affect the competitiveness of cassava for industrial products. The increasing price of maize and imported fish meal, is also creating demand for substitutes the fish feed industry, such as cassava grits.

Increasing input costs threaten productivity growth for smallholder farmers: The devaluation has also increased the costs of imported inputs into the agricultural and manufacturing sectors. Increasing prices of crop protection products, fertilizers, seeds, metal for fabricating equipment, agro-vet pharmaceuticals, and even finished leather, are leading to increases in costs of production for agricultural and finished goods. This is compounded by the increases in basic costs for fuel and electricity.

At the same time, demand for those products is increasing, with prices of the products usually rising faster than the price of inputs, use of the inputs is still profitable and large and medium farmers are still purchasing these inputs. Smallholder farmers, on the other hand, are less able to afford the upfront costs for these inputs and so they will struggle to take advantage of the increased competitiveness of locally produced goods. There might be a need for special programmes to enable these smallholder farmers to overcome the constraint of the high upfront costs for these productivity-enhancing inputs.

Inconsistency between trade and monetary policy: The devaluation of the naira has caused an increase in Nigerian competitiveness which has led to import substitution and more export opportunities. However,

this was not a deliberate Central Bank of Nigeria policy; rather, it was forced upon them by the fall in oil prices. Since oil prices have recovered in 2017, the Central Bank has intervened to strengthen the naira, partially reversing some of the gains in competitiveness. This shows that the government's trade policies (to increase exports and reduce dependence on imports) and its exchange rate policy (to maintain a strong naira) are often inconsistent. Additionally, the restrictions on access to hard currency have affected the purchase of needed imported inputs for the significant growth of the value chains. Beyond the effects of purchasing power and increased prices, importers of critical inputs have not been able to get the currency needed to buy them.

The major implication of this misalignment between trade and monetary or exchange rate policy is that investors in these value chains must understand they cannot count on future devaluations to deliver these gains in competitiveness that they have experienced in the past few years. Furthermore, given that the Central Bank has reversed its naira float, it is possible that if oil prices increase in future, it will intervene to strengthen the naira further. It is also important for the government to fully understand the implications of its monetary and trade policies so that it can fully align them to meet its objectives.

8.1 Future Implications and Opportunities

While there have been positive and negative changes from the devaluation, overall, the changes are positive for the value chains in which MADE and PIND are operating. Significant increases in prices for the products have outstripped the increase in costs, stimulating production. However, there will be a lag in the ability of the supporting industries to respond as their business models adjust to the increased costs of inputs and the difficulties of accessing hard currency.

Both PIND and MADE should be focusing on these new opportunities, and ensuring that the broader market and stakeholders such as the Federal Ministry of Agriculture and Rural Development (FMARD), the Central Bank of Nigeria, and major commercial actors are informed of the implications of the devaluation as highlighted in this study.

Export opportunities: What we have noticed across these value chains is that locally produced goods have become more competitive because of the devaluation which has made them cheaper than imported goods. As we have seen throughout this report, this has led to large-scale import substitution within and across the various value chains that we have studied. In the same vein, the devaluation has also increased the competitiveness of Nigerian products on the international market as foreigners now need fewer units of foreign currency to buy the same amount of Nigerian goods. However, we have not yet seen a large increase in exports for many Nigerian agricultural products, although exports of some products such as cocoa have increased. This presents an opportunity for investments geared towards exporting that will enable Nigerian products take advantage of this price advantage.

Increased competitiveness and production through higher productivity: The increases in competitiveness over the past two years have come due to devaluation, while the increases in production have come by increasing the amount of land being cultivated. But this is not a sustainable path to achieve sustainable competitiveness. To sustainably increase competitiveness, leading to continued demand for the production, productivity must be increased. The increase in income that producers have experienced

means that they have more capital with which to make the investments in increasing productivity that will help them secure these gains they have experienced in the last few years.

Price volatility in the short term: The increase in prices for domestic commodities in 2016 and 2017, particularly for cassava, maize, and palm oil, have caused producers to increase their production capacity and attract new entrants into the production of these crops. This implies that there will be a substantial increase in supply by the next harvesting season for seasonal crops like maize and cassava³, which would cause prices to fall. At this point, some of the new entrants will exit the market, causing supply to fall and prices to rise again. This process will continue until the market fully adjusts to the devaluation causing price volatility.

³ Palm oil, as a plantation crop, has a longer adjustment period so it is unlikely that there will be a sharp immediate increase in actual FFB production, except from increased productivity of existing plantations.

9. Appendices

9.1 Appendix 1: Market Actors Interviewed

Table 11: Market actors interviewed for the study

Market Actor	State	City/Town	Sector	Category
Gonchucks	Delta	Ugheli	Cassava	HQCF Processor (Medium)
Wilnosa	Delta	Abavo	Cassava	HQCF Processor (Medium)
Ika Agro Multipurpose	Delta	Ika	Cassava	Producer (Small)
Ifedima Farmers Association	Delta	Ubulu Uku	Cassava	Producer (Small)
Zeti	Delta		Palm Oil	Processor (Medium)
AIS Energy & Amp. Procurement Services	Rivers	Port Harcourt	Aquaculture	Processing Technology
Siat	Rivers	Ubima and Elele	Palm Oil	Industrial Processor
Life Flour Mills	Delta	Sapele	Cassava	Flour Miller and HQCF End User
United Ufoma Fish Farmers Association	Delta		Aquaculture	Primary Producers
Crown Flour Mills	Lagos	Apapa	Cassava	Flour miller and HQCF End Users
Notore	Lagos	Victoria Island	Cassava/Palm Oil	Fertilizer
Zygosis	Lagos and Oyo	Lagos	Poultry	Agro Vet Pharmaceutical Company
Catfish Farmers Association	Oyo	Egbeda	Aquaculture	Primary Producers
Saro	Oyo	Ibadan	Palm Oil	Inputs (CPP)
Godoligo	Cross River	Umere	Cassava	HQCF Processor (Medium)

9.2 Appendix 2: CBN List of Items for Restricted Access to Hard Currency for Imports

1. Rice
2. Cement
3. Margarine
4. Palm kernel/palm oil products/vegetable oils
5. Meat and processed meat products
6. Vegetables and processed vegetable products
7. Poultry-chicken, eggs, turkey
8. Private airplanes/jets
9. Indian Incense
10. Tinned fish in sauce (Geisha)/sardines
11. Cold rolled steel sheets
12. Galvanized steel sheets
13. Roofing sheets
14. Wheelbarrows
15. Head pans
16. Metal boxes and containers
17. Enamelware
18. Steel drums\steel pipes
19. Wire rods (deformed and not deformed)
20. Iron rods and reinforcing bars
21. Wire mesh
22. Steel nails
23. Security and razor wire
24. Wood particle boards and panels
25. Wood fibre boards and panels
26. Plywood boards and panels
27. Wooden doors
28. Furniture
29. Toothpicks
30. Glass and glassware
31. Kitchen utensils
32. Tableware
33. Tiles-vitrified and ceramic
34. Textiles
35. Woven fabrics
36. Clothes
37. Plastic and rubber products, cellophane wrappers
38. Soap and cosmetics
39. Tomatoes/tomato pastes
40. Eurobonds/foreign currency bond/share purchases
41. Steel pipes

9.3 Appendix 3: Import Duties and Levies on Selected Products

Table 12: Price increase of selected products due to import tariffs and devaluation.*

Source: Nigeria Customs Service and Central Bank of Nigeria

Product	Import Duty	Levy	Price Increase Due to Devaluation (Official Rate) **	Price Increase Due to Devaluation (Parallel Market)***	Cumulative Impact on Nominal Price (Percentage Increase)
Rice	10%	50%	91%	124%	184%
Wheat	5%	65%	91%	124%	161%-194%
Maize Flour	20%		91%	124%	111%-144%
Cassava	20%		91%	124%	111%-144%
Starch	10%		91%	124%	101%-134%
Crude Palm Oil	10%	25%	91%	124%	159%
Frozen Fish	20%		91%	124%	111%-144%

* Note that total price increases may be higher as these would include other cost increases which are not accounted for in this table.

** The percentage devaluations were calculated from January 2014 to May 2017

***The percentage price increases for rice and palm oil only use the parallel market price to calculate the devaluation because these items are not valid for foreign exchange at the official rate.

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