AfricaFertilizer.org

REVIEW OF FERTILIZER USE BY CROP AND BY PRODUCT NIGERIA




2015 – 2017

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Acronyms and Abbreviations

ACGSF -	Agricultural Credit Guarantee Scheme Fund
ADP -	Agricultural Development Programmes
AFA -	African Transformation Agenda
AFO -	African Fertilizer Organization
AGRA -	Alliance for a Green Revolution in Africa
AIMS -	Agriculture Inputs and Mechanization Scheme
ARCN -	Agricultural Research Council of Nigeria
APMCU -	Agricultural Project Monitoring and Evaluation Unit
APP -	Agricultural Promotion Policy
BOI -	Bank of Industry
CBN -	Central Bank of Nigeria
ERGN -	Economic Recovery and Growth Plan
FACU -	Federal Agricultural Coordination Unit
FAO -	Food and Agricultural Organization
FEPSAN -	Fertilizer Producers and Suppliers Association of Nigeria
FMARD -	Federal Ministry of Agriculture and Rural Development
FUBC -	Fertilizer Use By Crop
GESS -	Growth Enhancement Support Scheme
GDP -	Gross Domestic Product
HOPE -	Harnessing Opportunities for Productivity and Enhancement
IAR -	Institute of for Agricultural Research
ICRISAT -	International Crops Research Institute for the Semi- Arid Tropics
IFDC –	International Fertilizer Development Centre
LCRI -	Lake Chad Research Institute
MT -	Metric Tonnes
MOU -	Memorandum of Understanding
NAERLS -	National Agricultural Extension Research Liaison Service
NBS -	National Bureau of Statistics
NCS -	Nigeria Customs Service
NFRA -	National Food Reserve Agency
NGO -	Non Governmental Organization
NPK -	Nitrogen Phosphorus Potassium
NSDC -	National Sugar Development Center
PFI -	Presidential Fertilizer Initiative
REFILS -	Research Extension Farmers Inputs Linkage System
SFC -	Superphosphate Fertilizer & Chemical
SSA -	Sub-Saharan Africa
SSP -	Single Superphosphate
WR -	Water Revenue

1 Introduction

1.1 Background of the study

In 2013, as part of AfricaFertilizer.org's (AFO) mandate to improve access and availability of essential fertilizer statistics in Africa, such as production, trade and consumption, AFO commissioned a series of studies in Sub-Saharan Africa (SSA), to provide best estimates of current (national) fertilizer consumption and Fertilizer Use by Crop (FUBC). These studies were conducted in Cote d'Ivoire, Ghana, and Nigeria in West Africa; and Ethiopia, Kenya, Mozambique, Tanzania and Uganda in Eastern and Southern Africa.

AFO in continuation of its mandate has commenced another study to update the previous Fertilizer Use by Crop study. The update would cover the period of 2015 – 2017.

1.2 Purpose of the study

a. To provide best estimates on National consumption and Fertilizer Use by Crop (FUBC) statistics for Nigeria for the periods of 2015, 2016 and 2017.

b. To provide estimates of real consumption by product per crop at a national level for the periods of 2015, 2016 and 2017.

2 Methodological Framework

2.1 Methodological approach

Fertilizer Production, import, export and non-fertilizer use data was collected from the major fertilizer players and the Nigeria customs service (NCS) to arrive at apparent consumption. This consumption was then subtracted from the carryover stocks that were not sold and the balance of the fertilizer use for the production of the Presidential Fertilizer Initiative (PFI). The left over from apparent consumption figures were then distributed by type and state, using the distribution survey conducted by a fertilizers manufacturer to estimate the quantity of fertilizers likely to be consumed by each state. This data was then complemented with the data for land area cultivated per crop and the quantity of crops produced for each state which was gotten from the National Agricultural Extension and Research Liaison Service (NAERLS) and the National Bureau of Statistics (NBS) These were also supported by data from individual farming projects carried out by various organizations (NGO, Private fertilizers and agricultural companies) as a control guide for the distribution of fertilizer according to the size of area cultivated and quantity of produce to arrive at fertilizer consumed by type and crop in each state in the Country.

2.1.1 The data sources

Key stakeholders both in the public and private agricultural sectors with relevant data within the specified period of the study were identified and contacted. The sources were categorized into primary and secondary data.

Primary data - This involved interviews from manufacturers, blenders, NGO and survey of Agro dealers.

Secondary data - These data were obtained from existing crop production, farm data as well as fertilizer supplies and distribution data available at the Federal Ministry of Agriculture, the National Bureau of Statistics, FEPSAN, NAERLS, private farms, NGO programs and farmers associations among others. Other secondary data were obtained from fertilizer study reports from multilateral organizations (FAO statistics, World Bank), and research institutes.

2.1.2 The targeted structures

Targeted organizations that were identified, participated and contributed to the completion of this study where

1. AFEX
2. OCP
3. Propcom Maikarfi
4. Golden Fertilizers
5. Indorama
6. Notore
7. FMARD
8. Nigeria Customs Service
9. National Bureau of Statistic
10. All Farmers Association of Nigeria
11. FEPSAN
12. TAK Agro
13. NAERLS

2.2 Techniques and Data Collection Instruments

2.2.1 Collaboration with Ministry of Agriculture / Public services

As part of the techniques used to ensure that key stakeholders are involved in conducting the study and achieving acceptable estimates, the study was done in collaboration with the ministry of Agriculture and National Bureau of Statics (NBS) who assisted in sharing data and also facilitated some meetings with key stakeholders in the Agricultural Sector. The Federal Ministry of Agriculture and Rural Development [FMARD] and the National Bureau of Statistics are the arm of government responsible for developing the agricultural sector of the Nigerian economy with a view to growing the sector, driving income growth, accelerate food and nutrition security, generating employment and transforming Nigeria into a leading global food market, through the commodity value chain.

2.2.2 The interviews

The study team itemized some key questions that would spur better understanding; especially the fertilizer space and these premeditated questions were used to interview some key stakeholders in the public and private fertilizer sector. This gave an opportunity for better interaction and opportunity to probe and ask follow up questions.

2.2.3 The questionnaires

Well-structured questionnaires consisting of open ended and closed ended questions were used to get information from stakeholders both in public and private fertilizer and crop production sectors. The questionnaires were used in collecting data and information on

- Areas planted from 2015 to 2017
- Quantity of produce per crop for 2015 to 2017
- Quantity of fertilizer produced, imported and distributed
- Method and category of product distribution
- Guestimate of fertilizer consumption by crop

See (Appendix 1)

2.2.4 Treatment method

Primary data collected: Information on stakeholders were entered, cleaned, analyzed and stored using excel spreadsheets. Descriptive methods of analysis were used showing the frequencies, proportions, means and where necessary, the mode and the spread. Statistics were generated for each fertilizer type used for each crop and conversion of fertilizer types into fertilizer nutrients used by each crop.

2.2.5 Constraints and limitations of the method used

Fertilizer consumption by crop was estimated by a combination of data from area of land cultivated and apparent consumption. Fertilizer consumption by crop has to be estimated because farmers don't keep data, coupled with an inefficient extension system in Nigeria. The limitation of this method used is that; it assumed that apparent consumption data is real consumption data, and this data was also spread evenly across crops based on land area without necessarily putting into consideration factors such as farmers practice on fertilizer application, smuggling of fertilizers, accurate aggregate of left over fertilizers and also ignoring the possible errors that might be associated with the fertilizer distribution by state survey carried out by the manufacturer.

3 Overview of agriculture in Nigeria

Agriculture is the biggest sector and still accounts for 23 percent of GDP in Nigeria. The Central Bank of Nigeria (CBN) in 2016, issued a circular excluding importers of 41 selected goods and services from accessing foreign exchange (Forex) at the Nigerian official Forex markets. The food and agricultural items affected include rice, margarine, palm kernel/palm oil products, vegetable oils, meat and processed meat products, vegetables and processed vegetable products, poultry-chicken, eggs, turkey, fish and tinned fish in as well as tomatoes/tomato pastes. About 90% of the total agricultural output is produced by small holder farmers cultivating between 0.8 to 1.2 hectares in forest areas and 2-4 hectares in savannah areas (FAO). With the use of inputs such as fertilizer and improved seeds being low, average fertilizer consumption is below 20kg nutrient per hectare against 100kg world average.

Nigeria's total food and agricultural imports are growing and estimated at more than $10 billion in 2015 (US Agricultural Trade Summary 2016). Wheat, rice, brown sugar, frozen fish, dairy products, vegetable oil, intermediate and consumer-oriented products are the largest imports.

3.1 Cropping systems and agro-ecological zones

Cropping systems

Cropping systems across most zones are characterized by tremendous diversity. Nigerian farmers predominantly comprise of subsistent farmers who generally practice mixed cropping. The predominant form of crop husbandry is the rain fed cultivation of annual crops, while irrigation still remains low. Areas under cultivation are generally small (0.8 to 4 ha) with the primary objective of farmers being to meet subsistence needs. Surplus crops however, are sold and some cash crops may be grown. Cropping operations are almost exclusively done manually as labor is the major input. The amount of land cultivated annually per household is therefore a function of family and/or hired labor availability during periods of peak demand i.e. during land preparation and weeding.

As in much of sub-Saharan Africa, intercropping or the simultaneous cultivation of two or more crops on the same piece of land is common throughout all regions over sole cropping which is mainly done by large scale farmers. By combining crops of different growing periods, farmers develop highly diversified cropping patterns involving as many as 5 to 6 but more commonly 2 to 3 crops in a mixture.

Fallowing is commonly practiced as a means of maintaining land at a steady productive level without it undergoing severe or progressive degradation. The frequency of cropping is increasing and fallowing is decreasing. In areas of high population density where land is the limiting factor, the length of fallow periods is greatly reduced or the practice abandoned altogether.

Agro Ecological Zones

Nigeria is found in the Tropics, where the climate is seasonally damp and very humid. The natural vegetative zones that exist in the country are governed by the combined effects of temperature, humidity, rainfall and particularly, the variations that occur in the rainfall. This forms a major influence on the type of indigenous plants that grows successfully in different parts of the country.

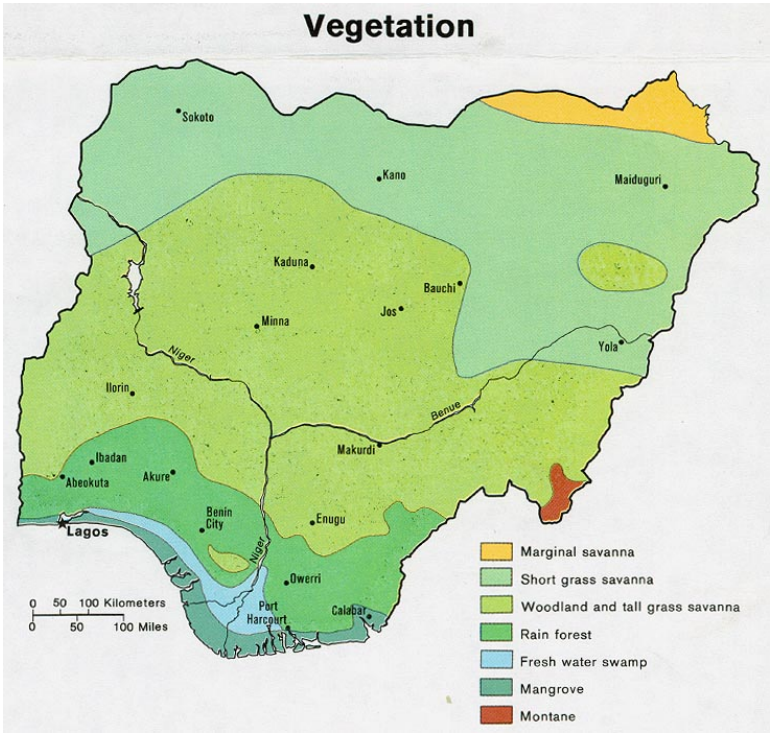
The humid tropical forest zone of the South that has longer rains is capable of supporting a number of plantation crops such as cocoa, oil palm, rubber, coffee, cotton and staple crops like, yam, cassava, cocoyam, sweet potatoes, melon, groundnut, rice maize and cowpeas. However, in some parts of the East and many areas near the coast, the high rainfall has led to badly leached soils and severe erosion in some places.

The Northern part of the country represents about 80% of the vegetative zones and experiences lower rainfall and shorter rainy season as they make up the Savannah land

Nigeria’s agro-ecological zones can be classified into: -

i. The Mangrove forest and coastal vegetation
ii. The Freshwater swamp forest
iii. The tropical high forest zone
iv. The derived Guinea Savannah
v. The Guinea Savannah zone
vi. The Sudan savannah (Short grass savanna)
vii. The Sahel savannah (Marginal Savanna)
viii. The Montagne Vegetation

Figure 1: Map of the agro-ecological zones in Nigeria



Source: Wikipedia

3.2 Crop Calendar of Major Crops

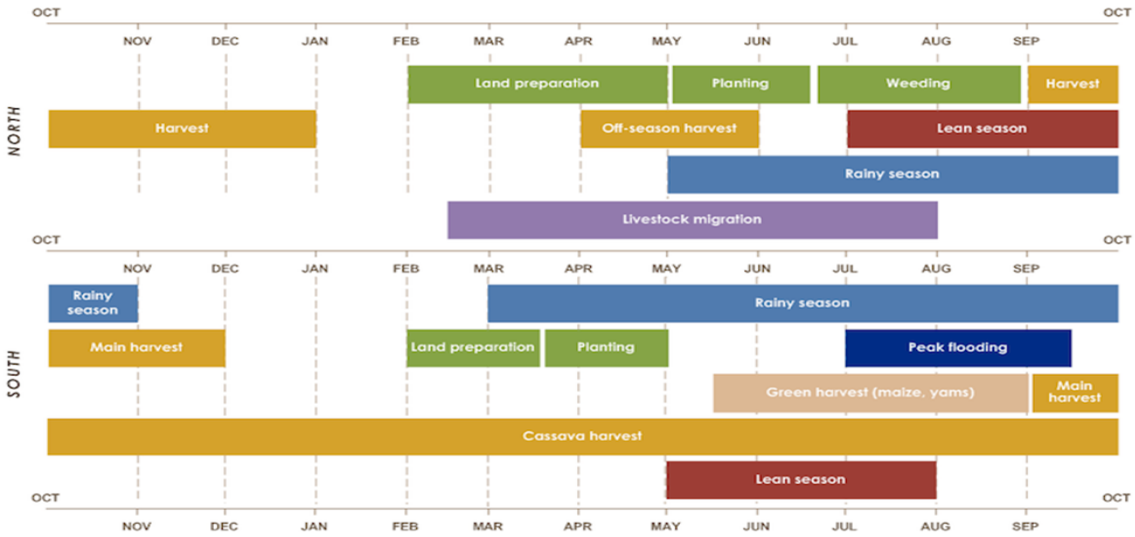
Table 1: List of major crops in Nigeria and the region and states that cultivate those most

ABIA	Plantain	Rubber	Cashew	Oil Palm							
ADAMAWA	Wheat	Maize	Sugar Cane								
AKWA-IBOM	Plantain	Rubber	Oil Palm								
ANAMBRA	Rubber	Cashew	Rice	Oil Palm	Cassava						
BAUCHI	Sorghum	Tomato	Pepper	Sesame	Soybean	Groundnut	Hibiscus	Ginger	Garlic		
BAYELSA	Plantain	Rubber	Oil Palm								
EDO	Plantain	Cocoa	Timber	Rubber	Oil Palm	Cassava					
ENUGU	Cashew	Oil Palm	Cassava								
LAGOS	Plantain	Soybean									
ONDO	Plantain	Cocoa	Timber	Rubber	Cashew	Cotton	Oil Palm	Cassava			
OGUN	Plantain	Timber	Rubber	Cotton	Oil Palm	Cassava					
OYO	Plantain	Cocoa	Timber	Soybean	Cashew	Cotton	Oil Palm				
OSUN	Plantain	Cocoa	Timber	Cashew							
EKITI	Plantain	Cocoa	Timber	Cashew	Oil Palm						
DELTA	Plantain	Timber	Rubber	Oil Palm	Cassava						
CROSS-RIVER	Plantain	Cocoa	Timber	Rubber	Cashew	Oil Palm	Cassava				
EBONYI	Plantain	Rubber	Cashew	Rice							
IMO	Plantain	Cashew	Oil Palm	Cassava							
BORNO	Wheat	Sorghum	Soybean	Cowpea	Groundnut	Gun Arabic					
YOBE	Wheat	Cowpea	Groundnut	Sesame	Gum Arabic						
JIGAWA	Wheat	Tomato	Pepper	Sesame	Soybean	Groundnut	Hibiscus	Garlic	Cotton		
KANO	Wheat	Sorghum	Tomato	Pepper	Sesame	Cowpea	Groundnut	Hibiscus	Garlic	Cotton	Rice
ZAMFARA	Wheat	Sorghum	Tomato	Soybean	Cowpea	Groundnut	Garlic	Cotton			
KATSINA	Wheat	Sorghum	Tomato	Pepper	Sesame	Groundnut	Garlic	Cotton			
SOKOTO	Wheat	Tomato	Pepper	Sugar Cane	Soybean	Cowpea	Groundnut	Garlic	Cotton		
KEBBI	Wheat	Soybean	Groundnut	Garlic	Cotton	Rice					
NIGER	Sorghum	Sugar Cane	Sesame	Maize	Yam	Groundnut	Rice				
PLATEAU	Sorghum	Pepper	Sesame	Maize	Groundnut						
KADUNA	Sorghum	Tomato	Pepper	Soybean	Maize	Groundnut	Ginger	Garlic	Cotton		
BENUE	Sorghum	Sesame	Soybean	Cashew	Yam	Ginger	Cassava				
GOMBE	Tomato	Sesame	Cowpea	Groundnut	Ginger						
TARABA	Tomato	Sugar Cane	Maize	Yam	Groundnut	Rice	Cassava				
KOGI	Sugar Cane	Sesame	Cashew	Cassava							
NASARAWA	Sesame	Soybean	Cashew	Yam	Groundnut	Ginger					
KWARA	Sesame	Soybean	Cashew	Cotton							
RIVERS	Rubber	Oil Palm									
FCT	Soybean										
SOURCE	***Agronewsng.com***										

Source: Agronewsng.com

Cereals are Nigeria's most widely cultivated crops, accounting for more than 60 percent of the total area. Cereal crops grown in Nigeria are sorghum (guinea corn), millet, maize, wheat and rice. Millet, sorghum, and wheat are produced in the drier savanna north, and corn is commonly grown in the middle and southern part of the country where heavier rainfall sometimes permits two corn crops per year.

Figure 2: Cropping calendar for most crops in Nigeria.



Source: FEWS NET

The agricultural production system in Nigeria is predominantly rain-fed and that; to a large extent determines the cropping season in Nigeria. The figure above shows the cropping calendar when farmers prepare, plant and harvest their products.

3.3 Agricultural statistics (areas, production, yield)

Nigeria produces a wide range of crops that use various types of fertilizers. The main food crops are categorized into cereals and pulse crops (maize, wheat, rice, sorghum, millet; beans, soybeans and cowpea), roots and tuber crops (potatoes, cassava, yams, sweet potato) and oil crops (ground nuts, sunflower, sesame). The main cash crops include; palm oil, cocoa, sugarcane, and groundnut. Nigeria also produces several horticultural crops as well as flowers, both for consumption and exports. The national area, production and average yields data of specific crops in the country from 2015 to 2017 were gotten from National Agricultural Extension and Research Liaison Service (NAERLS) and the National Bureau of Statistics (NBS). The data provided which were supposed to cover all crops for all states still had some crops missing from their surveys which wasn't captured as both bodies complained of financial constraints in covering the entire country adequately.[1]. The available data so far are summarized in the table.

[1] However, the data for the other crops could be obtained from the individual commodity associations if there was more time to carry out the study

Table 2: Agricultural statistics for planted area, production and yield in Nigeria 2015-2017

NIGERIA		AGRICULTURAL STATISTICS								
		Year 2015			Year 2016			Year 2017		
Crop	Farming System/ Region	Planted Area (x1000 ha)	Production (x1000 tons)	Yield (kg/ha)	Planted Area (x1000 ha)	Production (x1000 tons)	Yield (kg/ha)	Planted Area (x1000 ha)	Production (x1000 tons)	Yield (kg/ha)
Maize		5,671.6	9,540.5	1.8	5,484.1	10,814	2.0	5,960.9	12,107.6	2.0
Rice		2,626.3	7,526.8	2.9	3,651.3	6,916	1.9	3,898.9	7,826.2	2.0
Soya Beans		901.6	1,223.8	1.2	1,070.5	936.9	0.9	1,119.7	994.5	0.9
Cassava		9,151.6	57,794.1	7.3	8,385.3	52,537.9	6.3	8,929.1	55,068.7	6.2
Yam		6,598.2	44,103.9	8.5	6,080.3	51,362.9	8.5	6,446.1	54,083.1	8.4
Millet		1,783.9	1,477.3	0.9	1,737.8	1,487.2	0.9	1,800.1	1,528.2	2.0
Sorghum		4,586.9	5,668	1.3	5,471.9	6,506.4	0.9	5,665.8	6,758.8	0.9
Cowpea		4,155.4	3,933.9	0.9	4,814.6	3,750.5	0.8	8,929.1	3,874.7	0.8
Cocoa Yam		1,232	4,637.3	3.1	948.7	7,151.2	7.6	1,066.2	7,549.5	7.1
Ginger		55.9	309.5	4.8	85.4	774.9	9.1	96.1	834.6	8.7
Cotton		428.8	941.2	0.5	549.4	206.1	0.4	555.9	215.3	0.4
Palm oil		1,831.6	1,432.1		1,897.0	1,519.2				
Cocoa		1,146.1	316.0		1,158.4	323.6				
Ground nut		2,922.9	3,278	1.1	3,458.7	4,360.5	1.3	3,596.9	4,521.4	1.3
Coffee		48.1	31.0		47.7	31.5				
Sugarcane		1,406.8	82.0							

Source: NAERLS & NBS

3.4 The main actors in the agricultural sector

Agriculture is Nigeria's single largest economic sector. In 2016, agriculture accounted for 24.47% of Gross Domestic Product (GDP). The sector is highly concentrated on crop production, which accounts for 90% of outputs. Fishery, forestry, and livestock, account for the remaining10%. Though agriculture makes up a sizeable portion of economic activities in Nigeria, the sector's impact on government and export revenues is relatively small, accounting for only 4.8% of total foreign earnings in 2016 (NBS 2016).

In spite of this, the country's agricultural potential is high because Nigeria has 82 million hectares of arable land and so far, only 34 million hectares have been cultivated. With government's renewed focus on diversification through import substitution, as well as Nigeria's large and growing population, agriculture is increasingly becoming important as a source of consumer and industrial demand. Despite all the policy interventions, the agricultural sector is still largely underdeveloped primarily because the focus is on production, rather than on enhancing value addition across value chain segments. However, Nigeria's value chain is characterized by 80% small holder farmers and a few commercial processors plagued by inadequate inputs, obsolete technology and poor financing.

Nigeria is a big producer of main agricultural commodities and to achieve self-sufficiency and deepen diversification, there is an increasing need to increase production and value addition across key agriculture food products[2].

[2] www.pwc.com/ng/en/assets/pdf/transforming-nigeria-s-agric-value-chain.pdf

In the last 5 years, Nigeria's share of global food consumption has averaged 3.45%, the highest amongst all African countries. By 2050, Nigeria's population is projected to be 400 million, which would make it the third most populous country in the world. We expect food consumption to continue to grow by at least 4% per annum – its historical average (*PwC* 2017). Thus, there is an urgent need to increase production to meet the country's food requirement and achieve self-sufficiency.

Between 2011 and 2015, agro-processed exports declined by 41% to NGN 143 billion. These exports which accounted for an estimated 20% of Nigeria's non-oil exports in 2015 (*PwC 2017)*, were mainly leather and processed skin, alcoholic and non-alcoholic beverages, tobacco and cocoa derivatives. According to the FAO, Nigeria is estimated to have lost US$ 10 billion in annual exports of agricultural and agro-processed commodities including groundnut, palm oil, cocoa and cotton as a result of the decline in production quantities ideally expected to be produced from a country with such huge arable land area for these commodities.

3.5 Agricultural policies

In the last five years, different administrations have focused on agriculture as a means to diversify the economy and several policies have been designed in this regard. In 2012, the Agricultural Transformation Agenda (ATA) was introduced to improve farmers' income, increase food security, generate employment and transform the country to a leading player in the food market. The ATA is reported to have increased agriculture output by 11% to 202.9 million tonnes between 2011 and 2014. Also, the scheme is reported to have boosted commercial banks' lending to agriculture from 0.1% in 2011 to 5% in 2014, and reduced the 2014 food import bill by NGN 466 billion (FMARD 2014). More recently, the current administration launched the Agriculture Promotion Policy (APP) aimed at resolving food production shortages and improving output quality. In addition, the Economic Recovery and Growth Plan(ERGP) prioritizes food security and aims to achieve self-sufficiency in tomato paste, rice and wheat, by 2017, 2018, and 2019/2020 respectively. The ERGP projects that the value of agricultural production would increase by 31% to NGN 21 trillion in 2020.

The Agricultural Transformation Agenda (ATA) was focused on addressing the input challenge. This resulted in policies that facilitated the supply of subsidized seedlings and fertilizers to 18% of farmers in Nigeria (estimated at 12 – 14 million) between 2011 and 2014. In addition, some state governments have launched different initiatives to ease the process of land acquisition for agriculture purposes. Edo State subsidized land acquisition costs and eased the Certificate of Occupancy (C of O) acquisition process. Similarly, Anambra State is promoting community relations to facilitate a conflict free land acquisition process, while enacting the Land Acquisition Act to smoothen land transfers. Most recently is the presidential fertilizer initiative which is a collaboration between the federal government and the private fertilizer producers of Nigeria to get fertilizer raw materials at a concessionary price so as enable cheaper, affordable and timely input delivery to farmers to increase fertilizer consumption, the initiative which begun in 2017 was expected to produce 1 million of fertilizer tons/ha in 2017 wet season. This is envisaged to increase production and crop productivity to ensure food security and income at farm level for the small scale farmers (who make over 70% of the farming community in the country).

4 The fertilizer market in Nigeria

The Nigerian market is approximately 830,000 – 1million MT annually, with NPK 15-15-15 and Urea accounting for over 400,000 MT each. Other fertilizers consumed include SSP at 18,000mt. Over 600,000mt of Urea are exported in 2017 alone (*AFO FTWG 2017*). The agronomic potential of fertilizer use in the country is about 7 million metric tons (APMEU). With increased release of higher yielding and fertilizer consuming crop varieties, this potential is now much higher than the 7 million metrics tons. About 70% of the fertilizer used by farmers is consumed in the northern part of the country due to the numerous farming activities leaving 30% to the southern part (NFDC 2002). Nigeria has great potential to produce substantial quantities of its fertilizer requirements for the market. The fertilizer manufacturing companies are: Super phosphate Fertilizer and chemical (SFC) but has not produced since 2015, Notore have installed capacity of 500,000mt, Indorama have installed capacity of 1.5 million MT (though Indorama is expanding with about 1.5 million tons bringing it to a total of about 3 million MT), Dangote is setting up his plant with an installed capacity of 2.8 million MT which will start production by June 2019 for Urea production[3].

- There are over 25 blending plants scattered all over the country with over 2million installed capacity for production of NPK. The Urea production plants provide urea, the main input for blending and direct application on crops. The market size potential for fertilizer in the country is very large due to the following reasons
- Large expense of arable land and varied ecologies that is conducive for the cultivation of variety of crops.
- Government's economic recovery policy of putting the private sector in the driver's seat for under taking economic activities
- Withdrawal of Federal Government from direct production and importation of fertilizers – especially with the GESS and Presidential Fertilizer Initiative
- Availability of local raw materials – natural gas and phosphate rock.

4.1 Production, import, export and apparent consumption

4.1.1 Fertilizer production

Table 3: Production of fertilizer in Nigeria from 2015-2017

HS Code	Product	2015	2016	2017
3102100000	Urea	281,750	695,000	1,420,325
3103100000	SSP	611	-	-
Total (MT)		**282,361**	**695,000**	**1,420,325**

Source: AfricaFertilizer.org, FTWG 2018

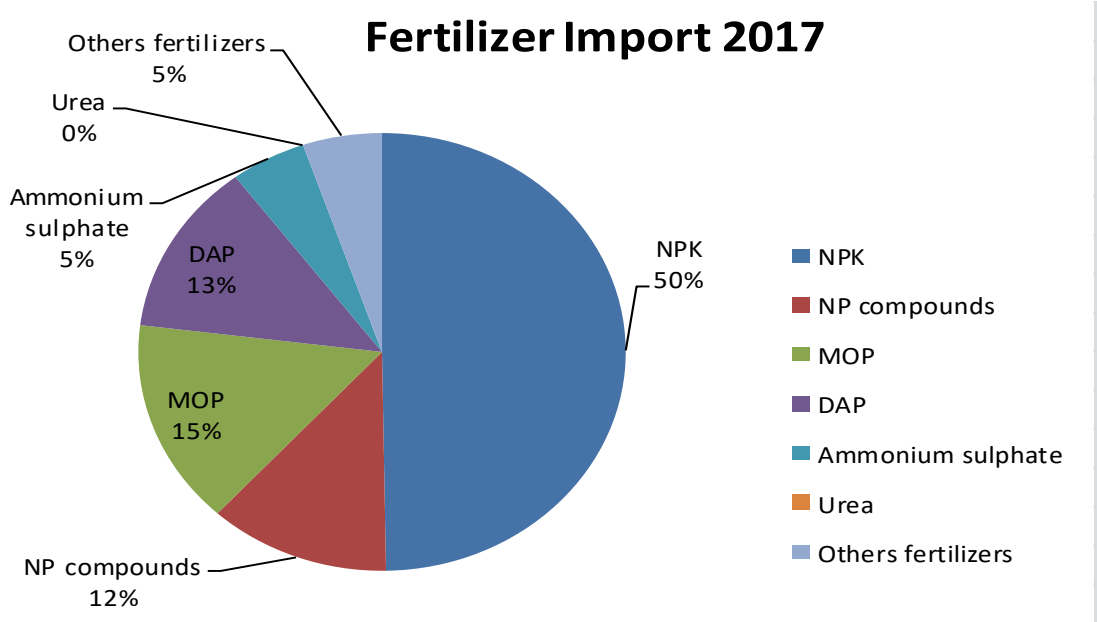
Fertilizer production has been on the increase in the last two years. Since Indorama commenced operation, Urea fertilizer production doubled from 281,750MT to 695,000MT in 2015 and 2016 respectively, while in 2017, it further increased to 1,420,325MT. In the same vein, in 2017, the fertilizer blending plants have also improved NPK production to about 500,000MT. The surge in production was attributed to improved government policies and Indorama Urea plant.

[3] www.dailytrust.com.ng/farmers-hopeful-of-in-fertiliser-prices.html

4.1.2 Imports and exports

Fertilizer imports

Figure 3: Fertilizer Imports in 2017



Source: AfricaFertilizer.org, FTWG 2018

Table 4: Fertilizer imports from 2015 -2017

HS Code	Fertilizer Name	2015	2016	2017
3105200000	NPK	165,684	380,455	399,949
3105510000	NP compounds	47,986	115,845	96,984
3104200000	MOP	408	3,683	121,846
3105300000	DAP	5,500	5,250	102,770
3102210000	Ammonium sulphate	10,483	27,450	40,248
3102100000	Urea	120,346	21,013	12
	Others fertilizers	67,569	40,298	42,285
Total fertilizer for agric (MT)		**417,976**	**593,994**	**804,095**

Source: AfricaFertilizer.org, FTWG 2018

There are about 64 importers of fertilizers to Nigeria but the most active are 18. The 18 importers supply fertilizer to both the large scale and small scale farmers. Most of the imported fertilizers (70%) arrive as bulk cargo (not bagged) the greatest challenge is therefore, in adulteration and sale of underweight fertilizer which mainly occurs during bagging and re-bagging. Some 20 – 25% of fertilizers that leave the port are re-bagged mainly at the retailer level due to the high demand of fertilizer in smaller units.

Imports of finished NPK fertilizers have been on the increase since the growth enhancement program was lunched, while urea fertilizer imports have been decreasing due to the ban on urea importation in 2016 and also due to increased production form both urea manufacturers. Finished NPK fertilizers imports increased in 2015 but not significantly from 2016 to 2017, while there was great increase in the import of MOP and DAP used for blending in 2017. The increase in MOP and DAP import was

because of the revival of the moribund blending plants under the presidential fertilizer initiative which blended NPK 20 10 10 in 2017 farming season, so importation of finished NPK products are expected to gradually decrease from 2018 provided the program continues well.

Fertilizer Exports

Table 5: Fertilizer export in Nigeria from 2015 – 2017

HS Code	Fertilizer Name	2015	2016	2017
3102100000	Urea	82,440	329,630	659,603

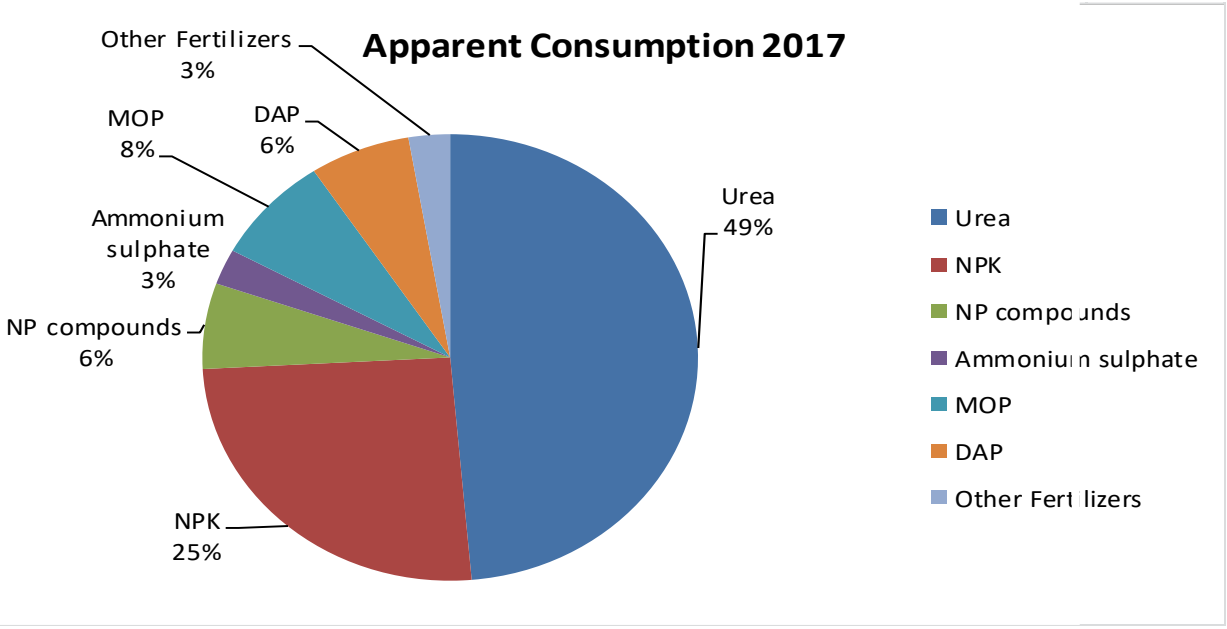
Source: AfricaFertilizer.org, FTWG 2018

Nigeria exports only urea for years now, the sector was dominated by Notore who were the only manufactures of urea in the country and their export which represents the total Urea export then, ranges between 50,000MT to about 100,000MT annually.

With the commencement of Indorama Urea plant in 2016, Nigeria Urea exports has significantly increased, with the country recording a historical high of 659,603MT in 2017 from what it was in 2015 (82,440MT) and 2016 (329,630). This huge leap was attributed to increase in production from both manufacturer of Urea in the country which eventually resulted into higher exports in order to sell their products as the Nigerian market currently may not absorb all urea produced.

4.1.3 Evolution of apparent consumption

Figure 4: Fertilizer Apparent consumption in 2017



Source: AfricaFertilizer.org, FTWG 2018

The apparent fertilizer consumption is usually used in place of real consumption as a best estimate to determine national fertilizer consumption as real fertilizer consumption would require a survey to be carried out. This is usually financially intensive and time consuming. Apparent consumption is deduced from quantities of annual production, import, export and non-fertilizers use. Table 6 below shows Nigeria's apparent consumption of major fertilizer types in Metric Tons consumed between

2015 and 2017. As can be observed, the fertilizer consumption has been on the increase since 2015 and reached an all-time high of about 1,5 million in 2017. This increase in consumption was attributed to the increase in production of Urea and the increase in imports of raw materials used for the production of NPK 20 10 10 produced under the presidential fertilizer initiatives. Urea and NPK consumption constitute about 75% of the total fertilizer consumption in the country, establishing the fact that the countries fertilizer market is majorly Urea and NPK products.

Apparent consumption = Production + Import – Export – Non Fertilizer Use

Table 6: Apparent consumption (metric tons)

HS Code	Fertilizer Name	2015	2016	2017
3102100000	Urea	319,656	386,383	760,734
3105200000	NPK	165,684	380,455	399,949
3105510000	NP compounds	47,986	115,845	96,984
3102210000	Ammonium sulphate	10,483	27,450	40,248
3104200000	MOP	408	3,683	121,846
3105300000	DAP	5,500	5,250	102,770
	Other Fertilizers	68,180	40,298	42,285
Total (MT)		**617,897**	**959,364**	**1,564,816**

Source: AfricaFertilizer.org, FTWG 2018

4.2 Structure and size of the national market

The fertilizer market comprises of the producers/importers- distributors- wholesalers-retailers – farmers

Producers/blenders: - We have two urea producing companies in the country, both located in Port-Harcourt and over 32 blending plants producing different NPK blends, some are blending for the PFI while others are blending for the market only. All producers sell to their distributors at ex-factory or their warehouses located within or outside their location.

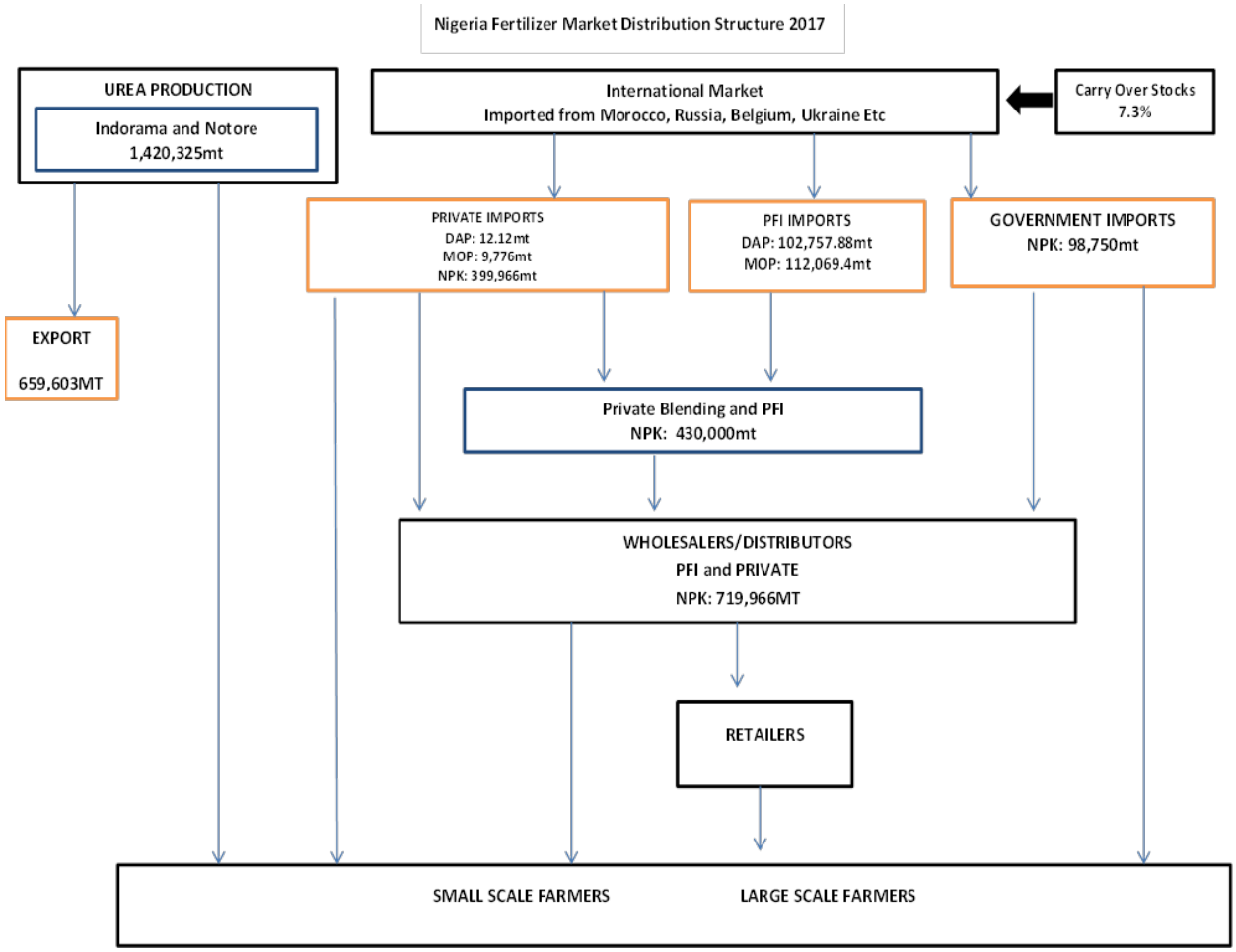
Importers: - Import fertilizer from other countries and they sell to their distributors at ex-factory or their warehouses located within or outside their location

Distributors:-Buy fertilizers from the producers or importers in large quantities either from the factory, port or warehouses. They normally buy from more than one producer or importer

Retailers: - Buy fertilizers from the distributors in small quantities to sell to farmers in smaller quantities, they normally buy from more than one distributor

Farmers: - Buy fertilizers from retailers which is closer to them in their locality

Figure 5: Nigerian fertilizer Market distribution structure in 2017



4.2.1 The main distribution channels

Fertilizer distribution is the critical link between the suppliers and the end users. The distribution system is an uninterrupted supply chain that ensures that farmers have access to fertilizer at the right time and within the closest proximity of their farm gates.

Public Sector Distribution

Under the public sector distribution, various models were applied, and different prices were charged due to the variation in subsidy levels. Even though Federal Government provided guidelines for implementing the stabilization program, various models were applied at the state levels, they include:-

- Distribution solely by Ministry of Agriculture, through the Local Governments.
- Distribution by a Task Force or Special Committee appointed by the Ministry of Agriculture both at the Federal and state levels.
- Distribution through the Agricultural Input Supply Company of the State.
- Distribution through the Agricultural Development Project (ADP) of the State.
- Distribution through hybrid arrangements of 2 or more of the above systems.

Private Sector Distribution

Following the liberalization in 1997, many private sector entrepreneurs entered the fertilizer market. Many set up distribution networks and were using their outlets/depots to sell to their dealers in the major agricultural areas who subsequently sell to village retailers at various selling points. Liberalization saw the rapid development of fertilizer network of distributors, wholesalers, dealers and retailers in the country. In addition, the major suppliers now prefer to make their sales ex-factory/blending plants or ex-port of importation.

Unfortunately, except for one or two companies, the private suppliers are not making efforts towards development of the market chain. Most suppliers rely mainly on government orders, which they readily deliver on credit basis, but they insist on full payment for orders by private distributors. While government takes delivery on credit, private distributors are required to operate on cash and carry basis.

4.2.2 The key players in the fertilizer market

The Nigerian fertilizer market key players can be grouped into three, which are the manufacturers, blenders and importers. There are about 64 importers of fertilizers to Nigeria but the most active ones are 15 in number, with golden fertilizers (FMN), springfield, KBRL and TAK agro topping the list. The importers supply fertilizer to both the large scale and small scale farmers. Most of the imported fertilizers (70%) arrive as bulk cargo (not bagged). The greatest challenge is therefore, in adulteration and sale of underweight fertilizers which mainly occur during bagging and re-bagging. Some 20 – 25% of fertilizers that leave the port is re-bagged mainly at the retailer level due to the high demand of fertilizer in smaller units.

The manufacturers are Indorama, Superphosphate fertilizer and chemical and Notore with Dangote hopefully joining them soon when he commences production. While Notore, Indorama and Dangote are all into Urea production, Superphosphate Fertilizers and Chemicals are into production of SSP. However since 2015, Superphosphate have not been producing SSP so, all the SSP used in the country are imported.

Nigeria has over 30 blending plants with most of them moribund. The active blenders were Golden and TAK Agro, however with the introduction of the PFI, quite a number of blending plants have been revived. About 15 blending plants spread across the country have been revived and are currently producing NPK fertilizers under the program. There are also other new players such as OCP, who are setting up their blending plant in the country to begin production for the Nigerian market before the end of the year 2018. While others like golden fertilizers and Notore are expanding their blending plants or adding more blending plants in other region.

Table 7: List of main fertilizer importing companies in 2017.

S/N	Importer	Quantity (MT)	% Share
1	NAIC NPK LTD	204,104	29.28%
2	FMN (Golden)	123,346	17.69%
3	KBRL Food Industry	113,652	16.30%
4	Ponglomerape Ltd	65,190	9.35%
5	OCP	54,512	7.82%
6	Spring Field	46,777	6.71%
7	Elephant group	44,000	6.31%
8	White Field Venture	20,051	2.88%
9	Insis Ltd	8,979	1.29%
10	Biase Plantations	8,159	1.17%
11	Presco PLC	4,240	0.61%
12	Siat Nigeria Limited	2,005	0.29%
13	Clearli Company Ltd	1,120	0.16%
14	AS Baba Trading Links Nig Ltd	1,004	0.14%

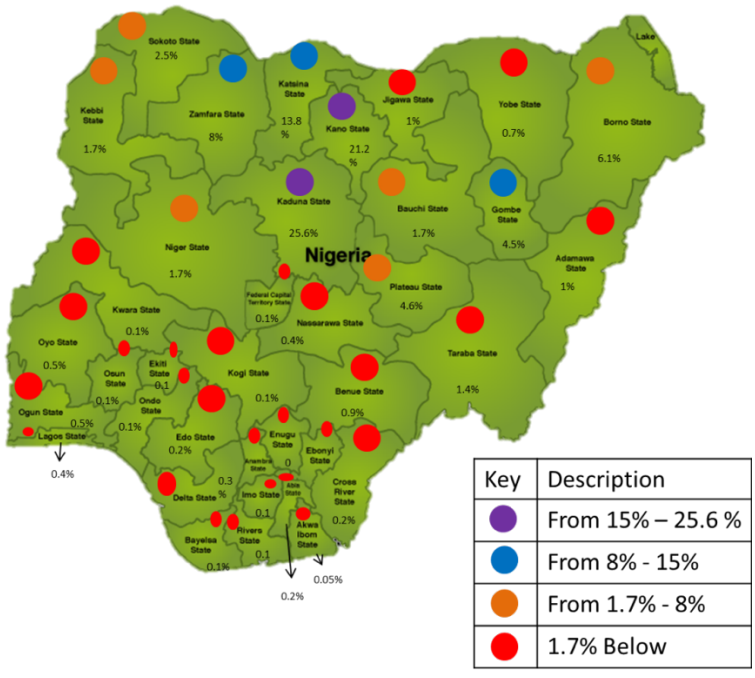
Source: NCS

4.2.3 The market size

The agronomic potential of fertilizer use in the country is about 7 million metric tons. With increased release of higher yielding and fertilizer consuming crop varieties, this potential is now much higher than the 7 million metrics tons. Despite this high potential, supply and consumption, always peaked at 800,000 to 1 million metric tons per annum. Nigeria Market majorly consumes Urea and NPK fertilizers and in 2016, Nigeria developed fertilizer recommendations for crops with micro nutrients added for the six geopolitical zones. This is yet to be fully adopted and farmers are still using the generic fertilizers NPK 15 15 15, NPK 20 10 10 and Urea which do not contain any micro nutrients.

Fertilizer Consumption intensity by states

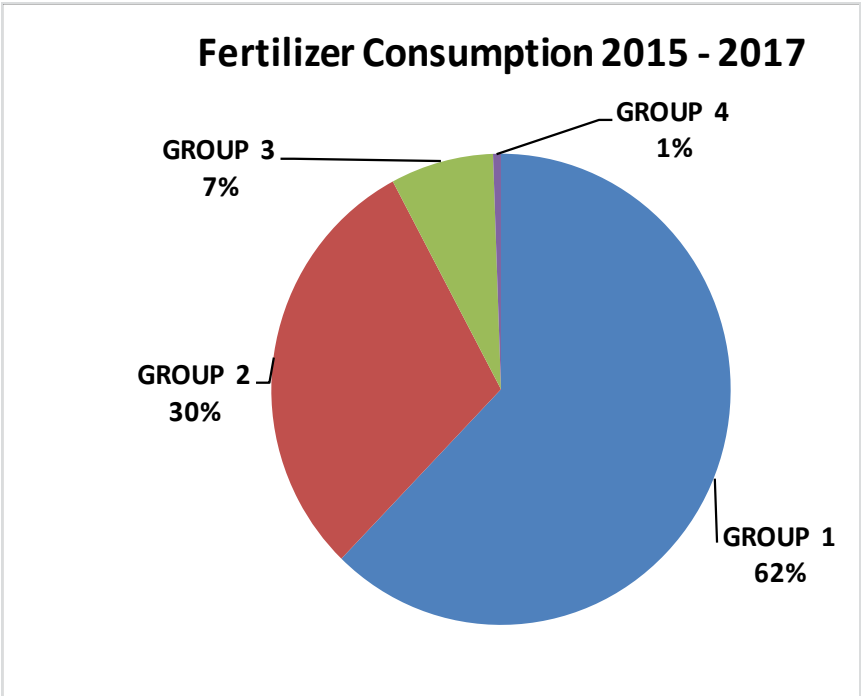
Figure 6: Fertilizer utilization intensity in Nigeria from 2015 - 2017



Source: AfricaFertilizer.org computation

As illustrated above, the fertilizer utilization varies from state to state depending on the geographical location of the state and the agro ecology. The states in the north use more fertilizers than the states in the south; over 70% of the entire fertilizers consumed is used in the North part of Nigeria. Also, the north produces more of cereals and this is one of the major reasons why cereal which is a staple food in the north is one of the highest consumers of fertilizers use in Nigeria.

Figure 7: Fertilizer consumption from 2015 - 2017



Source: AfricaFertilizer.org computation

The grouping analysis carried out gave us a base to classify the main fertilizer consuming crops into 4 groups according to their level of importance in fertilizer consumption. The 4 cash crops (sorghum, Maize, Cowpea, and Groundnut) accounts for more than 62% of fertilizer consumed for the years 2015 – 2017.

Table 8: Nigeria Fertilizer consumption of crops in groups

GROUP 1	GROUP 2	GROUP 3	GROUP 4
Sorghum	Cassava	Soya Beans	Oil Palm
Maize	Rice	Cotton	Sugar Cane
Cowpea	Millet	Coco Yam	Cocoa
Groundnut	Yam	Ginger	Coffee
MORE THAN 62% CONSUMPTION	*ABOUT 30% OF CONSUMPTION*	*LESS THAN 7% OF CONSUMPTION*	*LESS THAN 2% CONSUMPTION*

4.3 Fertilizer Sector Value Chain Environment

4.3.1 Research & Extension

In Nigeria, extension services were delivered and funded by the government (public) before there near collapse, prompting the private sector to currently do more extension. The three tiers of government; Federal, State and the Local government played varying roles in the delivery and funding. The Federal government provides coordination and policy direction through the Federal Ministry of agriculture and natural resources, which is carried out by the National Food Reserve Agency (NFRA) formerly known as Project Coordinating Unit (PCU). It was initially known as Federal Agricultural Coordinating Unit (FACU), which was merged with its sister department; the Agricultural Projects Monitoring and Evaluation Unit (APMEU) and called Project Coordinating Unit (PCU). The FACU and APMEU were established together with the state ADPs and the World Bank support in the early 1980s. The ADPs are the State institutions with the mandate to carry out extension services to raise agricultural production and improve rural living conditions. Despite the fact that, all Local Government authorities have agricultural departments and some staff, there is no indication that extension delivery is one of their major activities.

One of the strong mechanisms in extension delivery is a linkage between agricultural research, extension and the farmers. Training and Visit (T&V) extension system remains the basic strategy for public extension delivery. The Research-Extension-Farmers-Inputs-Linkage System (REFILS) is the management mechanism being used to bring together, stakeholders in agricultural development as equal partners. The institutions involved include; the ADPs, National Food Reserve Agency (NFRA), a department under the Federal Ministry of agriculture and Water Resources (FMA & WR) responsible for the coordination of the multilateral Donor supported Agricultural Development Projects (ADPs). The National Agricultural Extension Research and Liaison Services (NAERLS), is the planning and coordinating agency for agricultural extension liaison nationwide and for conducting research on technology transfer and adoption. Zonal REFILS activities are coordinated by zonal coordinating research institutes. The institute for Agricultural Research (IAR) of Ahmadu Bello University, Zaria, is responsible for the Northwest zone. Lake Chad Research Institute (LCRI) Maiduguri is in-charge of North-East zone.

The agricultural Research Council of Nigeria (ARCN), a supervisory body to the Agricultural Research Institutes (NARIs), has reintroduced the adopted village concept in all the NARIs. It is now mandatory for each institute to operate in at least, one adopted village. Some Universities in Nigeria undertake research responsibilities.

However, besides the general government extension programs in Nigeria, some private extension programs exist for the advancement of agriculture who are currently doing more than the government in terms of extension. The foremost participants in private extension services are United African Company (UAC), John Holt, Nigerian Tobacco Company (NTC), and Diocesan Agricultural Development Programme of the Catholic

Diocese of Ijebu-Ode, among several others who became involved in agricultural production, processing, and marketing some decades ago (Adedoyin, 1995).

Recently, Green River Project of the Agip Oil Company, Ciba Geige Agro-Chemical extension outfit, and Olam Nigeria Limited (formally Agro Millers) at Makurdi Benue State,

Informal private sector is another dimension to privatization of extension services. The Informal Sector denotes private organizations that provide various extension services in the area of agro-seed, agro-chemicals, agro-processing, micro financing, farm tools, and agric-consultancy with the aim of making profit from the ventures. However, farmers are not directly charged fees for extension services received. The informal private sector is so called because the simple structure and mode of operation of the organization can be limited to just husband and wife, or two or more brothers coming together to form the organization. The mode of operation is devoid of complex bureaucratic procedure. This structure allows flexibility and prompt response to the needs of the clientele (Okoro et al. 2006).

4.3.2 Regulation of fertilizers

In 2016, the Alliance for Green Revolution in Africa (AGRA) funded the Fertilizer Producers and Suppliers Association of Nigeria (FEPSAN) to draft a fertilizer policy for Nigeria, for presentation to the lower legislative house.

The Bill was successfully passed by the lower legislative house, a fertilizer stakeholder meeting in Nigeria was convened by both Fertilizer Producers and Suppliers Association of Nigeria (FEPSAN) and International Fertilizer Development Center (IFDC) to discuss this fertilizer bill on October 31st 2016 before a final accent could be obtained by the upper chamber of the legislative house.

The bill is currently in the senate where it has scaled through the first reading on the 22nd of March 2017, presented by the Deputy chairman Senate committee on Agriculture; Senator Theodore Orji. The bill then, scaled through the second reading on the 27th of September 2017 and it was presented by the chairman senate committee on Agriculture; Senator Abdullahi Adamu. This was followed by a Public hearing which was held on the 14th of November 2017 at the senate. After relevant submissions and compilations of the bill were made by stakeholders, the bill is currently in the senate waiting for third reading and final accent by the president.

5 Fertilization and fertilizer use in major crops

5.1 Sorghum

5.1.1 The sector and its main actors

Nigeria is the second largest producer of sorghum, coming next to Mexico, with the majority of domestic production used for household consumption/fodder. Sorghum is a local grain grown predominantly in the semi-arid, savannah and grassland areas of Northern Nigeria cultivated by small holders' farmers. Sorghum is produced in most States in Nigeria, though some States produce more than others. Plateau, Kano, Kaduna, Sokoto, Gombe, Bauchi, Zamfara, Benue, Kogi , Nassarawa and Taraba are major Sorghum producing States. Sorghum is grown on about 5.6 million ha in Nigeria and the current annual production is estimated to be only about 6 million tonnes. It has multifarious usages which span across the production of Malt, Beer, Beer powder, Sorghum meal, Sorghum rice, and Livestock feed among others. The whole grain may be grounded into flour which is then used in various traditional foods.

However, sorghum is also a cash crop processed into food, beverages, commercial animal feed, and ethanol. It is used by major local industries, like Nigerian Breweries Plc and also exported to borders countries.

The major outlet for selling sorghum is the open market, though processors and off-take still buys from the farmers but not in large quantity compare to the open market.

5.1.2 Planted areas, production and yields

Table 9: Planted area, production and average yield for Sorghum in 2015-2017

Date	Land Area (x1000ha)	Production (X1000mt)	Average Yield(t/ha)
2015	4,586.92	5,668.00	1.30
2016	5,471.92	6,506.41	0.90
2017	5,665.83	6,758.79	0.90

Source: NAERLS

Sorghum is an important crop mainly cultivated in the northern agro-ecology of Nigeria. From the above, the total estimated land area used for sorghum production in 2017 was 5,665.83Ha which was higher compared to the 5,471.92Ha cultivated in 2016 with a corresponding average yield of 1.19 t/Ha recorded in both cropping seasons.

This shows that more farmers have ventured into sorghum plantation and possibly more area of land have been dedicated to sorghum production. In turn, there is an increase in sorghum yield thereby resulting in increased consumption.

5.1.3 Fertilization: Recommended Rates and Farmer Practices

Table 10: Fertilizer recommended application rate for Sorghum

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Sorghum	sahel, sudan and northern guinea savanna	0.6tons-1.7tons	At Planting,2-3WAP and 6-8 WAP	Urea (142kg) or CAN (246kg) NPK 20-10-10 (220kg) SSP (178kg) MOP (50kg)	475
	Southern guinea savanna	0.6tons-1.7tons	At Planting,2-3 WAP and 6-8 WAP	Urea (71kg) or CAN (123kg) or NPK 20-10-10 (160kg) SSP (89kg) MOP (50kg)	237.5

Source: FMARD

The known recommended practice is to apply Phosphorus fertilizer in furrow bottoms before splitting the old ridges. Nitrogen fertilizer is applied in two splits half at 2 - 3 weeks after planting and the other half applied at 6 - 8 weeks after planting. It is suggested that applying Phosphorus and potassium fertilizers in old furrows before re-ridging and planting and the placement of all the Nitrogen in grooves 8cm from the row of plants at 3 - 4 weeks after planting would result in improved yields and a reduction in the cost of application.

5.1.4 Fertilizer supply chain

The small scale farmers usually buy from the open market (retailers) and sometimes get from various state government subsidy programs if they are available for the planting year, while the large scale farmers buy from the open market or directly from the companies or even import their fertilizer. The farmers normally purchase the fertilizer between March-August of every year depending on their location in the country. Those in the southern part of the country start buying fertilizer from March while those in the north start buying from May of the year due to different distribution pattern of the rain.

In 2016 Harnessing Opportunities for Productivity and Enhancement (HOPE), an initiative intended to help farmers of millet and sorghum in Nigeria, is being implemented with new seeds varieties provided farmers in four states (Sokoto, Kebbi, Kano and Jigawa states) in the country. The programme is being supported by the Bill and Melinda Gates Foundation under the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

5.1.5 Fertilizer consumption

Table 11: Fertilizer consumption for Sorghum in 2015-2017

Fertilizers	2015	2016	2017
Urea	74,327.6	89,770.2	129,549.1
NPK 15 15 15	23,766.2	61,481.2	85,359.5
NPK 20 10 10	39,064.9	56,191.6	72,568.7

Source: AfricaFertilizer.org calculation

Nigeria Sorghum uses different types of fertilizers according to recommended rates as prescribed by the Federal ministry of Agriculture in Nigeria. However, farmers generally use some common fertilizers that are found in the market to fertilizer their crops, especially in the absence of specific fertilizer formations for sorghum production. The demand for sorghum has been on the increase from beverage companies (Nigerian Breweries) and that has also translated in improved production and increased planted area. Sorghum mainly cultivated in the northern part of Nigeria is currently the highest fertilizer consumer with about 22% of the total fertilizer consumption in the country. NPK fertilizers are used for basal application and Urea used for top dressing, some farmers apply urea randomly both during basal application and top dressing. As can be seen from the table above sorghum fertilizer consumption has been increasing yearly from 137,158.72MT in 2015, to 207,442.93MT in 2016 and increased again in 2017 to 287,477.25MT due to the various programs such as the PFI that made fertilizer substantially available in the north that year.

5.1.6 Comments on the quality of the data

Data gotten for sorghum was easily accessible and reliable. Sorghum is becoming an important cash crop in Nigeria and its getting more attention from research institutes which translates into better data collection on sorghum.

5.2 Maize

5.2.1 The sector and its main actors

Maize crop started as a subsistence crop in Nigeria and has gradually risen to a commercial crop on which many agro-based industries depend on as raw materials. The maize produced is also exported

to some neighboring Africa countries such as Chad, Niger and Benin Republic etc. maize production have increased 45% with corresponding increase in land area.

The farmers that plant maize are majorly small scale farmers scattered all over the country, though there are large scale farmers that also produced maize. The major outlet for selling maize is the open market, though processors and off-take still buys from the farmers but not in large quantity compare to the open market.

5.2.2 Planted areas, production and yields

Table 12: Planted area, production and average yield for Maize from 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	5671.62	9540.53	1.8
2016	5,484.05	10,814.00	2.0
2017	5,960.93	12107.58	2.0

Source: NAERLS

Maize production has increased from 9,540.53 MT in 2015 to 10,814.0MT in 2016 and 12,107.58MT in 2017 with corresponding increase in land under cultivation from 5,550,900 in 2015 to 5,484.05Ha in 2016 to 5,960.93Ha in 2017.

5.2.3 Fertilization: Recommended Rates and Farmer Practices

Table 13: Fertilizer recommended application rate for Maize

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Maize	sahel, sudan and northern guinea savanna	7-8t/ha	At planting or 2-3 WAP and 5-6 WAP	Urea 260kg or CAN 462kg, 20-10-10 (300kg) at planting or 2 - 3 WAP and 125kg of Urea at 5 - 6 WAP SSP (333kg) MOP (50kg)	500
Maize	Southern guinea savanna	4-5t/ha	At 2-3 WAP and 5-6 WAP	Urea (220kg) or CAN (385kg) or 20-10-10 (667kg) half N at planting or 2 - 3 WAP and half 5 - 6 WAP SSP (278kg) MOP (50kg)	400

Source: FMARD

In the Sahel Northern and Southern Guinea Savanna zones, half of the Nitrogen is applied at planting or 2 -3 weeks after planting and the remainder is applied at about 5 - 6 weeks after planting. For the

Sahel, Sudan and Northern Guinea Savanna, in particular, basal Nitrogen should be dibbled along a 5cm deep groove about 8cm away from the row of plants at 3 weeks after planting and cover with sod. Phosphorus and Potassium are applied in furrows as single sources or compared to NPK fertilizers before splitting

In the forest zones, all the Nitrogen, Phosphorus and Potassium are applied at planting or at 2 - 3 weeks after planting. However, under continuous cropping, the Nitrogen is split-applied at planting and 5-6 weeks after planting.

5.2.4 Fertilizer supply chain

The small scale farmers usually buy from the open market while the large scale farmers buy from the open market or directly from the companies or even import their fertilizer. The farmers normally purchase the fertilizer between March-August of every year depending on their location in the country. Those in the southern part of the country start buying fertilizer from March while those in the north start buying from May of the year due to different distribution pattern of the rain.

In 2016 CBN Anchor Borrowers Program a public private partnership on maize, this is a private large-scale integrated processors who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.2.5 5.3.5 Fertilizer consumption

Table 14: Fertilizer consumption for Maize from 2015-2017

Fertilizers	2015	2016	2017
Urea	27,256.37	33,116.96	81,470.74
NPK 15 15 15	16,582.19	36,250.19	54,182.86
NPK 20 10 10	27,256.37	33,116.96	45,636.92

Source: AfricaFertilizer.org calculation

Maize is the most important cereals crop in Nigeria in terms of crop area and output. It is widely produced across the country following the development and introduction of early, extra-early and medium maturing varieties. However, maize is regarded as a staple crop in the country and even though most states plant maize, it still ranked second in fertilizer consumption with a little bit over 14% of fertilizers consumed in the country despite having the highest number of cultivated land and continued expansion in production and industrial usage. In 2016, maize fertilizer consumption increased to 102,484.10MT from 71,094.92MT, recorded in the previous year 2015 and further increased to 181,290.53MT in 2017, showing a constant growth in consumption.

5.2.6 Comments on the quality of the data

Data on maize are usually good and reliable because maize is a focus crop and a number of government organization pay close attention to the data gathering of the crop especially due to the fact that it's an important staple food crop in Nigeria.

5.3 Cowpea

5.3.1 The sector and its main actors

The sector is still dominated by small scale farmers. The major outlet for selling cowpea is the open market, though processors and off-takers buys from the farmers but not in large quantity compare to the open market. It has been observed that cowpea production increased year on with corresponding increase in production.

5.3.2 Planted areas, production and yields

Table 15: Planted area, production and average yield for Cowpea from 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	4,155.38	3,933.93	0.9
2016	4,814.56	3,750.46	0.78
2017	8,929.08	3,874.73	0.77

Source: NAERLS

Cowpea production increased from 3933.93Ha in 2015 to 3,750.46Ha in 2016 and 3,874.73 in 2017 with corresponding increase in land under cultivation from 4,155.38MT in 2015 to 4,814.56Ha in 2016 and 8,929.08Ha in 2017.

5.3.3 Fertilization: Recommended Rates and Farmer Practices

Table 16: Fertilizer recommended application rate for Cowpea

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Cowpea	sahel and sudan	1.5tons-2.0tons	At planting or 2 WAP	Urea (44kg) CAN (74kg) NPK 20-10-10 (100kg) SSP (222kg), TSP (89kg) MOP (33kg)	325
Cowpea	Guinea savanna forest	1.5tons-2.0tons	At planting or 2 WAP	Urea (22kg) CAN (37kg) SSP (200kg), TSP (80kg) MOP (33kg)	259

Source: FMARD

When applied at pre-planting, the fertilizers should be broadcasted and incorporated into the seedbeds before ridging. If application is made at or within 1 -2 days after planting, the fertilizers should be dibbled along grooves made from the line of planting holes.

5.3.4 Fertilizer supply chain

The small scale farmers usually purchase from the open market while the large scale farmers buy from the open market or directly from the companies or even import their fertilizer. The farmers normally purchase the fertilizer between May-August of every year.

In 2016 CBN Anchor Borrowers Program a public private partnership on cowpea. This is a private large-scale integrated processor who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to cowpea farmers in form of loan which will be paid back after harvest.

5.3.5 Fertilizer consumption

Table 17: Fertilizer consumption for cowpea from 2015-2017

Fertilizers	2015	2016	2017
Urea	34,153.7	39,502.7	58,010.6
NPK 15 15 15	10,920.6	27,103.3	38,588.2
NPK 20 10 10	17,950.4	24,726.6	32,495.4
SSP	8,107.6	6,550.8	6,890.4

Source: AfricaFertilizer.org calculation

Cowpea is a staple crop and it one of the most important legume in Nigeria. It is the third ranked crop in fertilizer consumption as it consumes about 10% of fertilizer consumed in Nigeria. From the table above, it shows there is an increase of fertilizer usage as in 2015 the total amount of fertilizer used was 71,132.24MT and it increased in 2016 to 97,883.35MT and furthermore increased in 2017 to 135,984.60MT.

5.3.6 Comments on the quality of the data

Cowpea data is good and reliable because they are one of the most important staple crops in Nigeria. Data is always readily available because it is a focus crop in the country.

5.4 Groundnut

5.4.1 The sector and its main actors

Groundnut in Nigeria, as in other major producing areas, is largely a smallholder crop, grown under rainfall conditions in semi-arid areas. Groundnut production in Nigeria has suffered major setbacks from the groundnut rosette epidemics and foliar diseases, aflatoxin contamination and lack of sufficient and consistent supply of seed of improved varieties. This has significantly affected productivity and thus production and subsequently led to lose its share in the domestic, regional and international markets. To regain its competitiveness, recently groundnut trend have increased from 2015 to 2017 due to using yield enhancing technologies including varieties tolerant. Farmers sell their produce at the local market. The wholesale market supplies rural markets, oil milling industry as well as, exports to neighboring countries such as Niger, Cameroon and Chad.

The major source of groundnut to the oil milling industry is the wholesale market through the middlemen. Although the large oil millers appoint agents to supply them, the Kano market and the middlemen remain the most important sources of supply. There is no linkage between farmers and milling industry. Farmers sell their produce at the local market and there is no evidence of any

collective or bulk marketing of groundnut by the farmers. Another important source of income to groundnut farmers is sales of Groundnut haulms, which constitutes about one third and one fourth of the total income realized by small and large scale farmers respectively. Even though almost half of the haulms are used for feeding small ruminants kept by the farmers, the remaining half is sold to generate cash to finance next seasons farming operations.

5.4.2 Planted areas, production and yields

Table 18: Planted area, production and average yield for Groundnut in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	2,922.89	3,277.97	1.1
2016	3,458.71	4,360.51	1.30
2017	3,596.87	4,521.43	1.26

Source: NAERLS

The table above shows that the land area used to plant groundnut increased from 2,922.89Ha and 3,458.71Ha in 2015 and 2016 respectively to 3,596.87Ha in 2017 leading to a corresponding increase in production from 3,277.97MT and 4,360.51MT in 2015 and 2016 respectively to 4,521.43 MT in 2017.

5.4.3 Fertilization: Recommended Rates and Farmer Practices

Table 19: Fertilizer recommended application rates for groundnut

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Groundnut	Country wide	2.5tons-3tons	At Planting or 2 WAP	SPP (300kg) or TSP (120kg) MOP (42kg)	300

Source: FMARD

Both Phosphorus and Potassium should either be applied in old furrows before splitting the ridges or they should be side-dressed at or shortly after planting. It should be noted that if a source of Phosphorus other than SSP is used, then sulphur must be supplied. In the case of Nitrogen deficiency, 2 bags of NPK 15-15-15 and 4 bags of SSP should be applied. In the Savanna Zone, 0.6kg/ ha Boron in the form of Sodium Borate (Borax) is recommended.

5.4.4 Fertilizer supply chain

Agricultural Transformation Agenda consider the groundnut value chain where farmers were given 2 bags of fertilizer at subsidized rate it ended in 2015. It is largely cultivated by small scale farmers that buy their fertilizer from the open market

5.4.5 Fertilizer consumption

Table 20: Fertilizer consumption for groundnut from 2015-2017

Fertilizers	2015	2016	2017
Urea	31,051.16	39,317.93	55,947.36
NPK 15 15 15	9,928.60	26,916.84	37,941.49
NPK 20 10 10	16,319.77	24,611.01	32,115.81
SSP	1,639.81	1,689.10	1,665.46

Source: AfricaFertilizer.org calculation

Ground nut remain the country's legume cash crop and consumes a substantial quantity of fertilizers in the country. In 2015 groundnut consumed a total of 58,939.34MT, while in 2016 it rose to 92,534.88MT, it further increased in 2017 to 127,670.12MT which is also attributed to the gains recorded in fertilizer input supply programs for 2017. Groundnut consumes about 9% of fertilizer in the country.

5.4.6 Comments on the quality of the data

Data for groundnut is accessible, readily available and reliable.

5.5 Cassava

5.5.1 The sector and its main actors

Cassava is largely cultivated by small scale farmers. There is a wide range of cassava food products in Nigeria. However, industrial demand for cassava is relatively small, probably less than 5 percent of the total production. Cassava can be used to produce; gari (roasted granule), fufu and akpu which is in high demand among the populace, the production trends of cassava have been increasing over the past 20 years. Union Dicon is one company showing massive interest in starch, having acquired 15,000 hectares of land in Ebonyi to produce cassava, starch and other food products.

The firm, agreed with the Federal Ministry of Agriculture and Rural Development (FMARD) to replace Cargill as the core investor in the $100m Alape Staple Crop Processing Zone in Kogi State. Only very few firms like Yale Foods are tapping into the cassava flour industry.

5.5.2 Planted areas, production and yields

Table 21: Planted area, production and average yield for Cassava in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	9,151.63	57,794.06	7.3
2016	8,385.31	52,537.86	6.30
2017	8,929.08	55,068.73	6.20

Source: NAERLS

Cassava is an important root tuber cultivated in almost all the States of the Federation. The crop recorded a marginal increase in land area used in the production of the crops per hectare. Cassava is grown all year round in most of the States making it preferable to other seasonal crops. From the table above, it can be seen that the land area planted for cassava in 2015 was 9,151.6Ha which

reduced to 8,385.31Ha in 2016 and increased again to 8,929.08Ha in 2017 there by leading to a corresponding decrease in production from 57,794.06MT in 2015 to 52,537.86MT in 2016 and then again an increase from 52,537.86MT IN 2016 to 55,068.73MT in 2017.

5.5.3 Fertilization: Recommended Rates and Farmer Practices

Table 22: Fertilizer recommended application rate for Cassava

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Cassava	Countrywide	11-15tons	At planting or 8 Weeks After Planting	196Kg Urea. 47Kg P2O5 or 288Kg, SSP. 90Kg K20 MOP	600-750

Source: FMARD

Fertilizer should be applied in a ring form at 8 weeks after planting. It should be applied 6cm deep and 10cm from plant or broadcasted with a car around the plant ensuring the fertilizer does not touch the stem or leaves. Complementary use of inorganic fertilizer and organic manure is done by applying 3t of poultry manure + 200KG NPK (20:10:10) per hectare.

5.5.4 Fertilizer supply chain

Cassava BOI Intervention Fund is a Federal Government of Nigeria's initiative to provide subsidized loans to Micro, Small and Medium Enterprises (MSME) at single digit (9% per annum) all inclusive interest rate to increase cassava production.. The farmers buy their fertilizer from the open market.

In 2016 CBN Anchor Borrowers Program a public private partnership on Cassava, Potatoes, Yam, Ginger etc this is a private large-scale integrated processors who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.5.5 Fertilizer consumption

Table 23: Fertilizer consumption for Cassava from 2015-2017

Fertilizers	2015	2016	2017
Urea	22,323.4	36,263.0	54,603.1
NPK 15 15 15	7,137.9	25,225.2	37,305.2
NPK 20 10 10	11,732.6	22,698.8	30,586.7
NPK 27 13 13	893.8	1,203.9	1,263.0
NPK 12 12 17 + MgO	476.7	466.5	921.2
SSP	4,399.5	5,218.5	5,273.2

Source: AfricaFertilizer.org calculation

Cassava, one of the important tubers in Nigeria consumed about 10% of fertilizers in the country. In 2015, cassava consumption was 46,963.87MT, which increased to 91,075.87MT, 129,952.28MT; generally fertilizer consumption is increasing in Nigeria as can be seen for every other product which reflects the current fertilizer growth pattern.

5.5.6 Comments on the quality of the data

The data for cassava is not comprehensive but it is available, however some of the data capturing system needs to be updated.

5.6 Rice

5.6.1 The sector and its main actors

Of all the staple crops, rice has risen to a position of pre-eminence. Since the mid-1970s, rice consumption in Nigeria has risen tremendously, at about 10% per annum due to changing consumer preferences. Domestic production has never been able to meet the demand, leading to considerable imports which today, stand at about 1,000,000 metric tons yearly. The imports are procured on the world market with Nigeria spending annually over US$300 million on rice imports alone. Nigeria's rice sector is still driven by small/cottage mills operating out dated mills and applying mostly traditional methods. Millers prefer to sell to government and humanitarian buyers due to consistent purchases at favorable prices. Although the Federal Government has set a 95 per cent self-sufficiency target in rice, only 50 per cent of rice consumption is currently being met locally.

5.6.2 Planted areas, production and yields

Table 24: Planted area, production and average yield for Rice in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	2,626.32	7,526.83	2.9
2016	3,651.25	6,915.96	1.90
2017	3,898.91	7,826.15	2.0

Source: NAERLS

Rice is an important staple food crop in Nigeria consumed in almost every household. The crop is grown in all the States of the Federation. The table above reveals that the land area planted increased from 2,626.32 Ha in 2015 to 3,651.25Ha in 2016 and 3,898.91Ha in 2017. However, rice production dropped slightly from 7,526.83MT to 6,915.96MT between 2015 and 2016 despite the increase in land area but increased again from 6,915.96 in 2016 to 7,826.15 in 2017.

5.6.3 Fertilization: Recommended Rates and Farmer Practices

Table 25: Fertilizer recommended application rate for Rice

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Rice	Upland rice	2.5-3.0t/ha	At planting 1-2 WAP and 6 WAP	Urea 100kg, 80kg NPK 20 10 10 (100Kg), NPK 15 15 15 (80kg)	275-325
Rice	Lowland rice	5-6t/ha	At planting and 6-7 Weeks After Planting	Urea 100kg, 80kg NPK 20 10 10 (100Kg), NPK 15 15 15 (80kg)	350-450

Source: FMARD

For lowland rice (shallow swamp, irrigated, hydromophic and inland valley swamp) half of Nitrogen and all Phosphorus and potassium is applied at planting/transplanting. The remainder is broadcasted at 6 - 7 weeks after planting/transplanting or at panicle initiation stage.

For lowland rice (deep water and floating and mangroove ecologies), all Nitrogen, Phosphorus and potassium are applied at planting.

For upland rice in Sahel, Sudan and Northern Guinea, half Nitrogen and all Phosphorus and Potassium are applied at 1 - 2 weeks after planting. The remaining Nitrogen is broadcasted at 6 weeks after planting.

For upland rice in Southern Guinea and Forest zones, all Nitrogen, Phosphorus and Potassium are applied 1 - 2 weeks after planting and first weeding.

7 bags of NPK 15:15:15 is used as basal and 2 bags of Urea used for topdressing.

5.6.4 Fertilizer supply chain

In 2016 CBN Anchor Borrowers Program a public private partnership on rice. This is a private large-scale integrated processors who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.6.5 Fertilizer consumption

Table 26: Fertilizer consumption for rice from 2015-2017

Fertilizers	2015	2016	2017
Urea	24,570.65	32,311.34	48,662.35
NPK 15 15 15	7,856.46	22,170.53	32,248.79
NPK 20 10 10	12,913.77	20,225.25	27,258.86

Source: AfricaFertilizer.org calculation

Rice is food staple that is fast becoming a cash crop because of urbanization and changing lifestyles of Nigerians. The grain consumes about 8% of fertilizer in Nigeria. In 2015, rice production area increased slightly with fertilizer consumption of 45,340.87MT to 74,707.13MT in 2016 and increased to about 108,170.01MT, it is anticipated that huge domestic demand for rice will significantly stimulate more local production, investments and fertilizer consumption.

5.6.6 Comments on the quality of the data

The data is reliable as it correlates with the data from the NBS on the same crop for the same year and is quite comprehensive.

5.7 Millet

5.7.1 The sector and its main actors

Millet is found in Nigerian markets, grown majorly by small holders farmers, in the northern part of the country, and is used by various industries. Millet is important for households in the north, particularly the border markets where millet is also heavily traded with Niger. Millet production and

development Nigeria has almost remained stagnant due to poor soil fertility, low and erratic rainfall, high temperatures, widespread Striga infestation, downy mildew disease and loss of grain to birds.

5.7.2 Planted areas, production and yields

Table 27: Planted area, production and average yield for Millet in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	1,783.91	1,477.26	0.88
2016	1,737.83	1,487.22	0.90
2017	1,800.07	1,528.22	2.00

Source: NAERLS

Millet is another important cereal crop mainly produced in the northern States of Nigeria on estimated crop land area of 1,800.07 Ha in 2017 and 1,737.83 Ha in 2016. It can be deduced that the average yield increased from 0.81 in 2015 to 0.86 in 2016 and 2.00 in 2017 due to an increase in millet production from 1,477.26MT in 2016 to 1,487.22MT in 2016 and 1,528.22MT in 2017.

The crop performs better in agro-ecologies with less amount and short duration of rainfall which account for it being cultivated in the Southern ecological zones of Nigeria.

5.7.3 Fertilization: Recommended Rates and Farmer Practices

Table 28: Fertilizer recommended application rate for Millet

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Millet	sahel, sudan and northern guinea savanna	0.45tons-1.4tons	At planting and 3 Weeks After Planting	Urea (131kg) or CAN (231kg) 20-10-10 (300kg) SSP (167kg) MOP (50kg)	450
Millet	Southern guinea and savanna and forest	0.45tons-1.4tons	At planting and 3 Weeks After Planting	Urea (65kg) or CAN (115kg) or 20-10-10 (150kg) SSP (82kg) MOP (25kg)	225

Source: FMARD

Phosphorus and Potassium is spread in old furrow bottoms before making new ridges and planting. All the Nitrogen should be drilled at 3 weeks after planting in grooves about 8cm from the row of plants and should be covered with soil. Where 20-10-10 is used, all the recommended rates should be applied 3 weeks after planting.

5.7.4 Fertilizer supply chain

In 2016 Harnessing Opportunities for Productivity and Enhancement (HOPE), an initiative intended to help farmers of millet and sorghum in Nigeria, is being implemented with new seeds varieties provided farmers in four states (Sokoto, Kebbi, Kano and Jigawa states) in the country. The programme is being supported by the Bill and Melinda Gates Foundation under the International

Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The farmers get their fertilizer from the open market.

5.7.5 Fertilizer consumption

Table 29: Fertilizer consumption for Millet from 2015-2017

Fertilizers	2015	2016	2017
Urea	20,427.73	21,118.07	30,392.22
NPK 20 10 10	6,531.76	14,480.30	19,694.08
NPK 15 15 15	10,736.34	13,218.83	17,024.61

Source: AfricaFertilizer.org calculation

The table above shows the consumption of fertilizer for millet. Its cultivation is mostly by small holder farmers and average yields are very low. In 2015, millet fertilizer consumption increased from 37,695.82MT, to 48,817.20MT in 2016 and in 2017 it went higher again to 67,110.91MT. It consumes about 5% of fertilizer in the country.

5.7.6 Comments on the quality of the data

The data for millet is readily available and reliable but it is quite comprehensive.

5.8 Yam

5.8.1 The sector and its main actors

Nigeria accounted for over 65% of the world yam production. The trend of yams output is consistent, however, the majority of the rural population engaged in farming yam. Yams are among major cash and most consumed food crops in Nigeria. An average profit per yam seed, Households demand for yam consumption is very high in Sub-Saharan Africa which makes it an exportable crop to neighbouring countries.

5.8.2 Planted areas, production and yields

Table 30: Planted area, production and average yield for Yam in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	6,598.22	44,103.86	8.5
2016	6,080.31	51,362.93	8.50
2017	6,446.12	54,083.09	8.40

Source: FMARD

Nigeria is by far the world's largest producer of yams accounting for over 70-76 percent of the world production. It is an important tuber crop in Nigeria. It is produced in all the agro ecological zones of the country. The total land area put to cultivation of yam in 2017 was 6,446.12Ha as compared to the 6,080.31Ha in 2016 and 6,598.22Ha in 2015 which led to a corresponding increase in yam production from 44,103.86MT and 51,362.93MT in 2015and 2016 respectively to 54,083.09MT in 2017.

5.8.3 Fertilization: Recommended Rates and Farmer Practices

Table 31: Fertilizer recommended application rate for Yam

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Yam	sahel, sudan and northern guinea savanna	7tons-40tons	8 Weeks After Planting	196kg Urea, 278kg SSP 90kg K20 of MOP, NPK 15 15 15 (720kg), NPK 20 10 10 (540kg)	450
Yam	Southern guinea and savanna and forest	7tons-40tons	9 Weeks After Planting	196kg Urea, 278kg SSP 90kg K20 of MOP, NPK 15 15 15 (720kg), NPK 20 10 10 (540kg)	600

Source: FMARD

Magnesium should be applied as a basal dose at 10 kg as magnesium oxide (Mg0) per hectare. This will be supplied through application of 1.25 bags of magnesium fertilizer per hectare. Whenever the soil pH is less than 4.5 application of lime during land preparation at 500kg per hectare is recommended.

Fertilizer is applied at 8 weeks after planting in a ring or side band 15cm from the base of the vine at about 3 – 5cm deep. Avoid contact of fertilizer with vine. For November planted yam, fertilizer should be applied by March or April in the following year.

5.8.4 Fertilizer supply chain

In 2016 CBN Anchor Borrowers Program a public private partnership on Cassava, Potatoes, Yam, Ginger etc. This is a private large-scale integrated processor who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.8.5 Fertilizer consumption

Table 32: Fertilizer consumption for Yam from 2015-2017

Fertilizers	2015	2016	2017
Urea	12,493.37	16,678.77	25,549.02
NPK 15 15 15	3,994.75	11,698.51	18,027.76
NPK 20 10 10	6,566.22	10,440.06	14,339.63
NPK 27 13 13	767.03	1,000.18	1,006.94
NPK 12 12 17 + MgO	406.63	387.57	778.22
SSP	1,847.11	1,810.08	1,821.78

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer consumption for Yam, it can be seen that in year 2015 fertilizer consumption was 26,075.11MT, which was the lowest and this can be attributed to the absence of any input program in Nigeria, but the consumption began to increase in 2016 to 42,015.17MT, and later went higher to 61,523.35MT in 2017 which can be attributed to the various input programs like the PFI to make fertilizers more affordable and available.

5.8.6 Comments on the quality of the data

The data for yam in Nigeria is good and reliable as it the data from NAERLS correlates with the data from the NBS on the same crop for the same year.

5.9 Soybean

5.9.1 The sector and its main actors

The farmers that plant soybeans are majorly small scale farmers, though there are large scale farmers that produced soybeans. Nigeria has been producing only 25 percent of its annual soya bean demand leaving a gap of about 75percent. Part of this demand gap is being met by importation. According to various reports, Nigeria's domestic production of soya beans is no doubt trending upwards, but there is still a shortfall in supply to demand due to heavy usage of the commodity by the livestock industry, especially the poultry industry and for human food formulations. Soya bean crushers in the country are operating below capacity and are unable to satisfy the growing demand for soya bean meal and oil.

5.9.2 Planted areas, production and yields

Table 33: Planted area, production and average yield for Soybean in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	901.56	1,223.78	1.2
2016	1,070.54	936.87	0.88
2017	1,119.66	994.46	0.90

Source: NAERLS

Soybean is a legume, produced in most parts of the country. It is an important source of high quality protein and oil. The crop has an average protein content of about 40% and oil content of 20%. The total area cultivated for soybean in 2015 was 901.56Ha and 1,070.56 Ha in 2016 while in 2017; there was an increase in area cultivated from 1,070.54Ha in 2016 to 1,119.66Ha in 2017.

5.9.3 Fertilization: Recommended Rates and Farmer Practices

Table 34: Fertilizer recommended application rates for Soybean

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Soybeans	Sahel and Sudan	3tons	At planting or 2 WAP	30kgN/ha, 60kgP2O5/ha and 30kgK2O/ha. Mix 150kg of NPK 15:15:15 and 200kg of SSP	350
	Guinea and Savannah	3 tons	At planting or 2 WAP	Urea (22kg) CAN (37kg) SSP (200kg), TSP (80kg) MOP (33kg)	259

Source: FMARD

3 bags of NPK 15:15:15 and 4 bags of Single Superphoshate should be properly mixed and broadcasted before harrowing or applied 4 weeks after planting by side dressing. All fertilizers

including Nitrogen (if used) should be broadcasted and incorporated before planting. In newly opened lands, fertilizer should be placed in grooves 8cm away from the row of seeds at planting or immediately after germination.

5.9.4 Fertilizer supply chain

In 2016, CBN began an Anchor Borrowers Program which is a public-private partnership on soybeans. The program comprises of private large-scale integrated processors who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.9.5 Fertilizer consumption

Table 35: Fertilizer consumption for Soybeans for 2015-2017

Fertilizers	2015	2016	2017
Urea	8,069.88	13,211.93	19,374.51
NPK 15 15 15	2,580.34	9,031.70	12,901.14
NPK 20 10 10	4,241.34	8,269.99	10,852.89
SSP	1,861.69	2,073.90	2,038.83

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer consumption for soybean, Urea fertilizers are used for basal and for top dressing in soybean production. In 2015 the total fertilizer consumption was 16,753.26MT and this doubles to 32,587.53MT in 2016 which is a significant increase in fertilizer use, and increased to about 45,167.37MT in 2017 showing a significant consumption as a result of overall increment in the national consumption. Soybeans consumes 3% of fertilizer in the country.

5.9.6 Comments on the quality of the data

The data for Soybeans is reliable and easily accessible but it is quite comprehensive.

5.10 Cotton

5.10.1 The sector and its main actors

Cotton farming in Nigeria has received very little attention from various governments over the past two decades. This has however made the commodity to witness continuous decline in production, with its contribution to GDP dropping from 25 per cent to 4 per cent and exports now at 5%. Cotton is largely produced by small scale farmers. Cotton is a highly demanded commodity in the country and it is majorly produced in Katsina, but because of the closure of the ginneries, wholesalers mop up cottons produced by farmers and sell to neighboring countries like Cameroon, Niger etc. There is however a new initiative to awaken the sector again and part of the initiative is the anchors borrowers program, which is expected to catalyze an otherwise extinct product.

5.10.2 Planted areas, production and yields

Table 36: Planted area, production and average yield for Cotton in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	428.77	941.18	0.5
2016	549.38	206.07	0.38
2017	555.87	215.31	0.39

Source: NAERLS

Cotton has been a major cash crop in Africa, especially in Nigeria. Cotton production in Nigeria is concentrated in the savannah belts of the country, which is the Northern and South western Nigeria such as Kano, Kaduna, Oyo, Ondo, Kwara, Katsina, Jigawa, Ogun, Kebbi, Sokoto and Zamfara States. The land area put to cultivation of cotton in 2017 was 555.87Ha compared to 428.77Ha in 2015 and 549.87Ha in 2016.

5.10.3 Recommended Rates and Farmer Practices

Table 37: Fertilizer recommended application rate for cotton

Crops	Agro ecological zone	Expected yield	Time of application	Fertilizer product	RAR per product (kg/ha)
Cotton	sahel, sudan and northern guinea savanna	2.5tons-3tons	2-3 WAP and 7-8 WAP	Urea (125kg) CAN (125kg) B SPP, 140kg KCl, 33kg or 20-10-10 in Boronated SSP	300

Sources: FMARD

Boronated super-phosphate and muriate of potash should be applied during seed-bed preparation or soon after planting by placing in holes 5cm deep and 8cm away from the seed. Delay in application should be avoided. It is preferable to apply nitrochalk (CAN) in two split doses, one half at 3 weeks (just after thinning) and the second half at 8 weeks after sowing. This fertilizer should be applied into shallow grooves about 8cm away from the plants and covered with soil immediately after application.

Note that; nearly all the single super-phosphate currently used on cotton is in the boronated form. The recommended rates of the fertilizer, therefore, satisfy the needs for both Phosphorus and Boron. In the event that single super-phosphate is used, enough boron-containing material preferably borax, should be added to give the appropriate rate of boron. Borax contains 10.6% Boron.

5.10.4 Fertilizer supply chain

In 2016 CBN Anchor Borrowers Program a public private partnership on cotton. This is a private large-scale integrated processor who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project

Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.10.5 Fertilizer consumption

Table 38: Fertilizer consumption for cotton from 2015-2017

Fertilizers	2015	2016	2017
Urea	6,657.21	8,306.56	11,859.92
NPK 15 15 15	2,128.64	5,702.17	7,719.52
NPK 20 10 10	3,498.87	5,199.48	6,643.49

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer consumption for cotton, although cotton production has really not improved as it ought to but there have been some gains recorded in the consumption. In 2015 cotton fertilizer consumed stood at 12,284.72MT then increased to 19,208.22MT, and went higher in 2017 to 26,222.93MT.

5.10.6 5.11.6 Comments on the quality of the data

The data for Cotton is reliable and easily accessible but it is quite comprehensive.

5.11 Cocoyam

5.11.1 The sector and its main actors

Cocoyam is a traditional staple root crop, commonly grown among small-scale farmers who operate within the subsistence economy. In the past, it is regarded as a lowly crop, which cultivation and consumption lies among the less privileged farmers, but presently it is consumed by Nigerians of different cadres. The current yield of cocoyam is far below its potential yield. However, production increases to meet increasing demand, there is shortage of the crop in some parts of the country, especially Southern part where it is mostly cultivated and consumed.

5.11.2 Planted areas, production and yields

Table 39: Planted area, production and average yield for Cocoyam in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	1,232.02	4,637.32	3.1
2016	948.73	7,151.18	7.55
2017	1,066.16	7,549.50	7.11

Source: NAERLS

Cocoyam is an important crop in most States of the country. The crop is mostly used for human consumption. It is commonly grown amongst small-scale farmers who operate with the subsistence economy. The total cotton production in 2017 was 7,549.5MT as compared to the 7,151.18MT in 2016 and 4,637.32MT in 2015.

5.11.3 Fertilization: Recommended Rates and Farmer Practices

Table 40: Fertilizer recommended application rates for cocoyam

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Cocoyam	Countrywide	5-15tons	6 Weeks After Planting or 2 weeks after sprouting	130Kg Urea, 23Kg P2O5 or 144Kg of SSP, 60Kg K2O5 of MOP	300-400

Sources: FMARD

The fertilizers should be applied at 6-8 weeks after planting or 2 weeks after sprouting.

5.11.4 Fertilizer supply chain

It's very easy to cultivate. Cocoyam thrives better on a well-drained loamy soil and can be planted immediately the rain is steady. It produces optimum yields when planted in fertile soil with a good water retention capacity but on a poor soil fertilizer is required which are obtained from the open market.

5.11.5 Fertilizer consumption

Table 41: Fertilizer consumption for Cocoyam from 2015-2017

Fertilizers	2015	2016	2017
Urea	1,980.25	2,288.70	3,487.48
NPK 15 15 15	633.18	1,432.61	2,557.14
NPK 20 10 10	1,040.77	1,618.01	1,953.56
NPK 27 13 13	139.06	197.27	220.09
NPK 12 12 17 +MgO	77.11	75.53	194.70
SSP	287.42	239.79	232.16

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer usage for cocoyam which is Urea, NPK and SSP fertilizer. In 2015 the total fertilizer consumption was 4,157.79MT and this grew to 5,851.91MT in 2016 and grew to 8,625.13MT in the year 2017. Subsequently, other fertilizers shown on the table appeared to grow within the years except SSP which declined in 2016 and also declined a bit in 2017.

5.11.6 Comments on the quality of the data

The data for Cocoyam is reliable and easily accessible as it the data from NAERLS and it correlates with the data from NBS.

5.12 Ginger

5.12.1 The sector and its main actors

Nigeria is one of the top producers of ginger in the world produced by both small and large scale farmers. In the Nigerian market ginger is well known and on high demand even though it is quite expensive. It is also exported to Europe and neighboring Africa countries. Kaduna State stands as the highest producer of the crop while states like Gombe, Bauchi, Benue, Nassarawa among others are

major producers of the crop. In the market, ginger is available in various forms; fresh ginger rhizome, powder ginger and dry ginger rhizome. Due to its high demand both locally and internationally ginger production is increasing with corresponding increase in land under cultivation

5.12.2 Planted areas, production and yields

Table 42: Planted area, production and average yield for Ginger in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	55.92	309.5	4.8
2016	85.35	774.89	9.08
2017	96.06	834.64	8.69

Source: NAERLS

Ginger is an important specie produce in Nigeria. Kaduna State stands as the highest producer of the crop while Gombe, Bauchi, Benue, Nasarawa among other States are major producers. The table above reveals that production has increased from 309.5MT in 2015 to 834.64MT in 2017 as land area cultivated increased from 55.92Ha to 96.06Ha between 2015 and 2017.

5.12.3 Fertilization: Recommended Rates and Farmer Practices

Table 43: Fertilizer recommended application rate for Ginger

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Ginger	Countrywide	8-10tons	Land preparation and 12Weeks After Planting	100Kg Urea, 294Kg of SSP. 60Kg or 40Kg of MOP	450-600

Source: FMARD

The fertilizer materials should be applied by broadcast in 2 doses. Half should be applied during land preparation and the other half at 12 weeks after planting.

5.12.4 Fertilizer supply chain

In 2016 CBN Anchor Borrowers Program a public private partnership on Cassava, Potatoes, Yam, Ginger etc. This is a private large-scale integrated processors who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.12.5 Fertilizer consumption

Table 44: Fertilizer consumption for Ginger from 2015-2017

Fertilizers	2015	2016	2017
Urea	1,765.86	2,365.33	3,698.14
NPK 15 15 15	564.63	1,604.22	2,536.44
NPK 20 10 10	928.10	1,480.58	2,071.56
SSP	314.28	278.73	293.72

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer consumption for Ginger in Nigeria from 2015 – 2017. The above fertilizers allocated to the crop show subsequent significant increase for Urea, NPK 15 15 15 and NPK 20 10 10. The fertilizer for SSP in 2015 shows that 314.28 was utilized and it reduced in year 2016 to 278.73 but then increased in 2017 to 293.72. Ginger utilizes about 0.66% of fertilizer in the country.

5.12.6 Comments on the quality of the data

The data for Ginger is good and reliable.

5.13 Oil palm

5.13.1 The sector and its main actors

In Nigeria by contrast, 80% of production comes from dispersed small holders who use manual processing techniques. Because of the increased demand for palm oil resulting from an increase in population and income growth, relative to the low productivity of the oil palm sector, Nigeria has become a net importer of palm oil. There has been rising production (supply) and consumption (demand) of palm oil in Nigeria. However, in the last 10 years, demand has grown faster than the supply, leading to an increasingly widening gap.

5.13.2 Planted areas, production and yields

Table 45: Planted area, production and average yield for Oil palm in 2015-2017

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	1,831.60	1,432.10	0.7
2016	1,897.00	1,519.20	0.80
2017			

Source: NBS

The table above shows that in the year 2015, the land area was approximately 1,831.6Ha and in the following year which was 2016, it increased to about 1,897 Ha. Likewise, the production of 2015 was 1,432.1MT and in 2016, it increased to 1,519.20MT. However, we couldn't get the data for the year 2017 to properly analyze the consistency in the area of land and production.

5.13.3 Fertilization: Recommended Rates and Farmer Practices

Table 46: Fertilizer recommended application rate for Oil palm

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Oil Palm	Countrywide	1-1.6 tons	At time of planting and not later than 3 months after planting	Urea (6.67kg), SSP (6.5kg), NPK 12 12 17 +MgO (2.35kg) and NPK 15-15-15 MOP (34.8kg)	

Source: FMARD

Recent surveys of the Oil Palm resources of Nigeria showed that the country had about 2.1 million hectares of wild/natural oil palm grooves and about 440,000 Hectares planted with improved and unimproved varieties. Oil palm is planted in almost every geographical zone in Nigeria. The recommended fertilizer application for oil pam consists of Urea, SSP, NPK 12 12 17 +MgO and NPK 15 15 15. The fertilizer should be applied at either the time or planting and not later than 3 months after planting.

5.13.4 Fertilizer supply chain

In 2016 CBN Anchor Borrowers Program a public private partnership on oil palm. This is a private large-scale integrated processor who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.13.5 Fertilizer consumption

Table 47: Fertilizer consumption for Oil palm 2015-2017

Fertilizers	2015	2016	2017
Urea	1,696.93	1,839.09	
NPK 12 12 17	77.42	65.76	
NPK 15 15 15	542.59	1,305.76	

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer that was dispersed for Oil palm. In 2015, Urea usage was 1,696.93MT and it increased in 2016 to 1,839.09MT. The fertilizer usage for NPK 12 12 17 in 2015 was 77.47 MT but in 2016 it reduced due to the reduction of production for NPK 12 12 17 fertilizer in Nigeria. This affected the proportion of each crop using this particular fertilizer. NPK 15 15 15 increased significantly from 542.59 in 2015 to 1305.76 in 2016.

5.13.6 Comments on the quality of the data

Data for Oil palm wasn't readily available compare to other crops; and not too reliable, also no data was gotten in 2017.

5.14 Sugarcane

5.14.1 The sector and its main actors

The industry is dominated by small holders' farmers those are some recent investments by large scale farmers in the sub-sector. Nigeria still imports 90% of its sugar. Sugar, a one of the product gotten from the processing of sugar cane, Sugarcane production in Nigeria has declined over the past years, and because of this factor, most sugar processing companies in Nigeria imports sugarcane from other African countries and globally to complement the one locally grown in the country. Sugarcane is also consumed raw by the populace.

5.14.2 Planted areas, production and yields

Table 48: Planted area, production and average yield for Sugarcane

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	1,406.80	82	0.1
2016			
2017			

Source: NBS

There is not much data to really analyze the production and land area trend. Only that in 2015, 1406.8Ha was used for sugarcane production.

5.14.3 Fertilization: Recommended Rates and Farmer Practices

Table 49: Fertilizer recommended application rate for sugarcane

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Sugarcane	sahel, sudan and northern guinea savanna	7-38 tons	application at basal, other half after 6 months	Urea (217kg) and NPK 20-10-10 (500kg)	40-60

Source: FMARD

Half of fertilizer rate is applied at planting as basal and then the other half is applied at 5 – 6 months after planting during earthling up. Cow dung organic fertilizer at 5t/ha can also be incorporated into the soil a month before planting.

5.14.4 Fertilizer supply chain

The Agricultural Credit Guarantee Scheme Fund (ACGSF), administered by the Central Bank of Nigeria, guarantees up to 75% for all loans granted by commercial banks for sugarcane production and processing.

The Federal Government in furtherance of its policy on Sugar development instituted the National Sugar Development Council (NSDC) Fund for the establishment and resuscitation of companies engaged in the production of sugar, ethanol and sugar cane. The MOU between BOI and the National Sugar Development Council was signed on November 6, 2009. The Fund was established to support the development of the value chain through local inclusion to reduce the nation's dependency on imported refined sugar. The Fund will be accessed by Limited Liability Companies and Enterprises engaged in sugar value chain such as Sugar plants, Sugar Refineries.

5.14.5 Fertilizer consumption

Table 50: Fertilizer consumption for sugarcane from 2015-2017

Fertilizers	2015	2016	2017
Urea	1,468.59		
NPK 20 10 10	771.9		

Source: AfricaFertilizer.org calculation

Sugarcane is a cash crop that requires only Urea and NPK 20 10 10 for fertilization according to recommendation. The table above shows that in 2015, 2240.44MT was utilized for cultivation of sugarcane in Nigeria. There was no data given for years 2016 – 2017.

5.14.6 Comments on the quality of the data

Data for Sugarcane wasn't readily available; also no data was given for 2016-2017. Data was only given by NBS, and it couldn't be crosschecked by another source to determine its accuracy or reliability.

5.15 Cocoa

5.15.1 The sector and its main actors

Cocoa is farmed on a large scale in Nigeria; but the sector is dominated by small scale farmers and remains a critical source of livelihood for rural populations in states where the crop is produced. Cocoa production is important to the economy of Nigeria. Cocoa is the leading agricultural export of the country and Nigeria is currently the world's fourth largest producer of Cocoa, after Ivory Coast, Indonesia and Ghana, and the third largest exporter, after Ivory Coast and Ghana. The country is currently reported to be experiencing low and declining yields due to inconsistent production patterns, disease and pest attack.

5.15.2 Planted areas, production and yields

Table 51: Planted area, production and average yield for Cocoa

Date	Land Area (x1000ha)	Production (x1000mt)	Average Yield (t/ha)
2015	1,146.10	316	
2016	1,158.40	323.62	
2017			

Source: NBS

The land area for cultivation of cocoa in year 2015 was about 1,146.1Ha and production was 316MT. Subsequently, the land area cultivated in 2016 was 1,158.40Ha which led to an increased production of 323.62MT in 2016. No data was given for the year 2017.

5.15.3 Fertilization: Recommended Rates and Farmer Practices

Table 52: Fertilizer recommended application rate for Cocoa

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Cocoa	Countrywide		1-6 Years after planting	Urea (108-216g), 150g SSP, KCl (50g)	500

Source: FMARD

Cocoa is a major crop grown particularly in the South –Western part of Nigeria. It takes about 1- 6 years for cocoa to be harvested after planting. Fertilizer which is Urea, SSP and KCl (if available) should be applied on the first year of transplanting and through the 2nd to 6th year consecutively

after planting. Though, cocoa starts bearing fruits 3 - 5 years after transplanting but does not reach the peak of its productivity unit after the 10th year.

5.15.4 Fertilizer supply chain

The Cocoa Transformation agenda of the Federal Ministry of Agriculture and Rural Development set a national target for production at 500,000 MT by 2015 and 1 million MT by 2018 where fertilizers and seedlings were given to farmers.

In 2016 CBN Anchor Borrowers Program a public private partnership on oil palm. This is a private large-scale integrated processor who have entered into an agreement with the Small Holders Farmers to off-take the harvested produce at the agreed prices or as may be reviewed by the Project Management Team (PMT). In this arrangement fertilizer is supplied to the farmers in form of loan which will be paid back after harvest.

5.15.5 Fertilizer consumption

Table 53: Fertilizer consumption for Cocoa from 2015-2017

Fertilizers	2015	2016	2017
Urea	592.39	627.78	
NPK 20 10 10	311.35	392.96	
NPK 15 15 15	189.42	166.07	
SSP	75.96	61.15	

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer that was consumed for cocoa countrywide in Nigeria for the years 2015 and 2016. The application of fertilizer subsequently increased due to availability of fertilizer for the crop. Application of fertilizer in 2015 was 1169.11MT and in 2016 it increased to about 1247.96MT. No data was gotten for the year 2017.

5.15.6 Comments on the quality of the data

Data for cocoa was scarce and wasn't readily available compare to other crops, also no data was given in 2017.

5.16 Coffee

5.16.1 The sector and its main actors

Consumption of coffee has been on the rise in recent years because of our growing middle class and young population but there is still no market for coffee in Nigeria because the country's coffee is of low quality and that is why the local industries using it as raw materials are not buying from farmers which are basically small holders. Nigeria's coffee production which peaked in 1964 has been on a steady decline since 2000, producing 2,375 tons of unroasted coffee in 2014 with an average yield of 1.5 metric ton per hectare, according to the latest data from the Food and Agricultural Organization (FAO). In 2015, Nigeria recorded no export of coffee between January and July 2015. Nigeria has a lot of potential in coffee and can produce up to 10,000 tons per annum if provided with access to fund and adequate market information.

5.16.2 Planted areas, production and yields

Table 54: Planted areas, production and average yield for Coffee

Date	Land Area (x1000ha)	Production (X1000mt)	Average Yield (t/ha)
2015	48.07	31.025	
2016	47.71	31.49	
2017			

Source: NBS

The table above shows that land area cultivated for coffee in the year 2015 (48.07Ha) was slightly higher than the land area cultivated in the year 2016 (47.71Ha) however, there was a slight increase in production from 31.02MT in 2015 to 31.49MT IN 2016 despite the slight difference in the area cultivated. No data was found on coffee for year 2017.

5.16.3 Fertilization: Recommended Rates and Farmer Practices

Table 55: Fertilizer recommended application rates for Coffee

Crops	Agro ecological zone	Expected yield/ha	Time of application	Fertilizer product	RAR per product (kg/ha)
Coffee	Countrywide		6 Months after planting	Urea(293kg), NPK 15-15-15, SSP (189kg)	800-1500

Source: FMARD

Coffee is mostly grown in the lowlands of Southern Nigeria, it is grown from seed; seedlings are raised in nurseries and transplanted into the field 6 months after sowing. Fertilizer which is recommended to be applied to the coffee is Urea, NPK 15 15 15 and SSP for effective growth.

5.16.4 Fertilizer supply chain

No recorded Government intervention, the farmers get their fertilizer from the open market

5.16.5 Fertilizer consumption

Table 56: Fertilizer consumption for Coffee from 2015-2017

Fertilizers	2015	2016	2017
Urea	32.00	35.61	
NPK 20 10 10	16.82	22.29	
NPK 15 15 15	10.23	24.48	

Source: AfricaFertilizer.org calculation

The table above shows the fertilizer usage for coffee. Only little amount of fertilizer was dispersed according to the data that was provided, in 2015, it consumed 32MT and increased to 35.61 MT. NPK 20 10 10 usage was about 16.82 MT and in 2016 it increased to 22.29MT. NPK 15 15 15 also increased from 10.23 MT in 2015 to 24.48 MT in 2016.

5.16.6 Comments on the quality of the data

Data for coffee was scarce and wasn't readily available, compare to other crops and also no data was given in 2017 this is due to the fact that there is less concern about cultivation of coffee and attention is rather given to other crops.

6 Consolidation of data on fertilizer consumption in major crops in Nigeria

6.1 Recommendations for fertilizer use by crop type (summary)

Below, is the table showing the recommended fertilizer application rate per crop in Nigeria. The application rates have been distributed based on the fertilizer classes for the different crops cultivated across the different agro-ecological zones in the country. These recommendations can still be regarded as the semi specific form of the generalized fertilizer formulation because the recommended fertilizer rates are based on the mean chemical properties (fertilizer level) of a large area (sub-zone) of which the farm is just a small part.

Table 57: Fertilizer recommendations rates for fertilizer use by crop

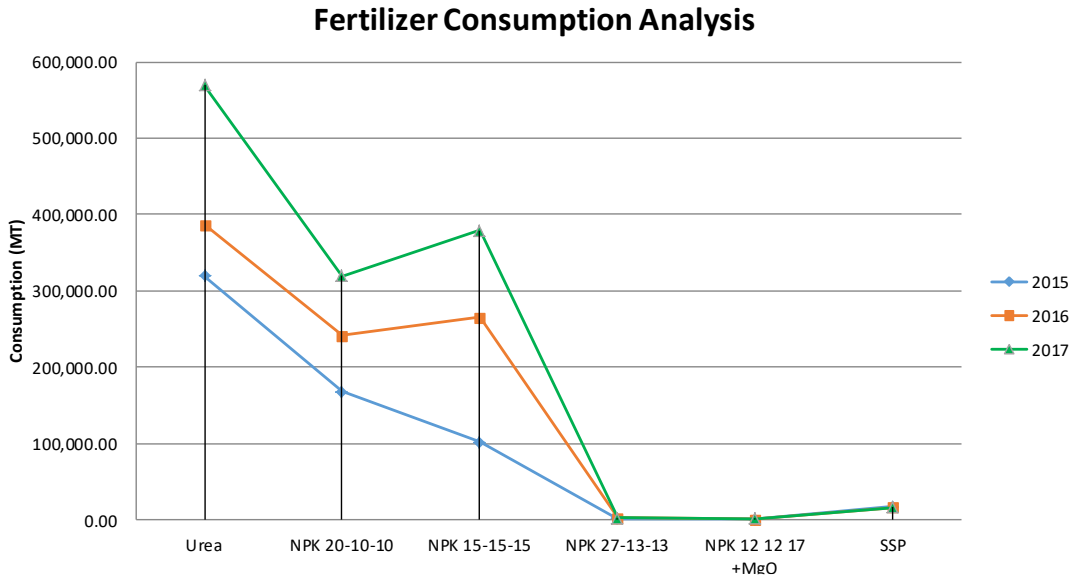
Crops	Agro ecological zone	Administrative zone	Expected yield	Time of application	Fertilizer product	RAR per product (kg/ha)	N	P2O5	K2O	Source	Date Realeased
Maize	sahel, sudan and northern guinea savanna	Northern zone	7-8tons/ha	At planting or 2-3 WAP and 5-6 WAP	Urea 260kg or CAN 462kg, 20-10-10 (300kg) at planting or 2 - 3 WAP and 125kg of Urea at 5 - 6 WAP SSP (333kg) MOP (50kg)	500	120	60	30	FMARD	2015
	Southern guinea and savanna and forest	southern zone	4-5tons/ha	At 2-3 WAP and 5-6 WAP	Urea (220kg) or CAN (385kg) or 20-10-10 (667kg) half N at planting or 2 - 3 WAP and half 5 - 6 WAP SSP (278kg) MOP (50kg)	400	100	50	30	FMARD	2015
Rice	Upland rice	All zones	2.5-3.0tons/ha	At 1-2 WAP and 6 WAP	80kg N. 30 - 40kg P205. 30 - 40kg K20	275-325	80	30-40	30-40	FMARD	2015
	Lowland rice	All zones	5-6tons/ha	At planting and 6-7 WAP	100kg N. 40 - 50kg P205 “b” 30 - 40kg K20	350-450	100	40-50	30-40	FMARD	2015
Sorghum	sahel, sudan and northern guinea savanna	Northern zone	0.6tons-1.7tons	2-3WAP and 6-8 WAP	Urea (142kg) or CAN (246kg) 20-10-10 (220kg) SSP (178kg) MOP (50kg)	475	64	32	30	FMARD	2015
	Southern guinea and savanna and forest	southern zone	0.6tons-1.7tons	2-3 WAP and 6-8 WAP	Urea (71kg) or CAN (123kg) or 20-10-10 (160kg) SSP (89kg) MOP (50kg)	237,5	32	16	15	FMARD	2015

Cowpea	sahel and sudan	Northern zone	1.5tons-2.0tons	At planting or 2 WAP	Urea (44kg) CAN (74kg) 20-10-10 (100kg) SSP (222kg), TSP (89kg) MOP (33kg)	325	20	40	25	FMARD	2015
	Guinea savanna and forest	Northern and southern zone	1.5tons-2.0tons	At planting or 2 WAP	Urea (22kg) CAN (37kg) SSP (200kg), TSP (80kg) MOP (33kg)	259	10	36	20	FMARD	2015
Soybeans	Countrywide	All zones	3tons	At planting or 2 WAP	30kgN/ha, 60kgP2O5/ha and 30kgK2O/ha. Mix 150kg of NPK 15:15:15 and 200kg of SSP properly and broadcast before harrowing or applied 4 weeks after planting by side dressing.	350	30	60	30	FMARD	2015
Cassava	Countrywide	All zones	11-15tons	8 WAP	196Kg Urea. 47Kg P2O5 or 288Kg, SSP. 90Kg K20 MOP	600-750	90	20	75	FMARD	2015
Groundnut	Countrywide	All zones	2.5tons-3tons	At planting or 2 WAP	SPP (300kg) or TSP (120kg) MOP (42kg)	300	0	54	25	FMARD	2015
Cotton	sahel, sudan and northern guinea savanna	Northern zone	2.5tons-3tons	2-3 WAP and 7-8 WAP	Urea (125kg) CAN (125kg) B SPP, 140kg KCl, 33kg (1 bag) or 20-10-10 in Boronated SSP	300	60	25	20	FMARD	2015
Millet	sahel, sudan and northern guinea savanna	Northern zone	0.45tons-1.4tons	At planting and 3 WAP	Urea (131kg) or CAN (231kg) 20-10-10 (300kg) SSP (167kg) MOP (50kg)	450	60	30	30	FMARD	2015
	Southern guinea savanna and forest	southern zone	0.45tons-1.4tons	At planting and 3 WAP	Urea (65kg) or CAN (115kg) or 20-10-10 (150kg) SSP (82kg) MOP (25kg)	225	30	15	15	FMARD	2015

Yam	Northern	Northern zone	7tons-40tons	8 WAP	196kg Urea, 278kg SSP 90kg K20 of MOP	450	90	50	75	FMARD	2015
	Southern	southern zone	7tons-40tons	9 WAP	NPK 15-15-15 600kg	600	60	60	60	FMARD	2015
Cocoyam	Countrywide	All zones	5-15tons	6 WAP or 2 weeks after sprouting	130Kg Urea, 23Kg P2O5 or 144Kg of SSP, 60Kg K2O5 of MOP	300-400	60	10	50	FMARD	2015
Ginger	Countrywide	All zones	8-10tons	Land preparation and 12WAP	100Kg Urea, 47Kg P2O5 or 294Kg of SSP. 60Kg K2O or 40Kg of MOP	450-600	45	20	50	FMARD	2015
Oil Palm	Countrywide	All zones		At time of planting an	Urea, NPK 12 12 17 +MgO and NPK 15-15-15		120	120	120	FMARD	
Coffee	Countrywide	All zones		6 Months after planting	Urea, NPK 15-15-15 and NPK 20-10-10	800-1500				FMARD	
Cocoa	Countrywide	All zones		1-6 Years after planting	Urea, NPK 15-15-15, NPK 20-10-10 and SSP	500				FMARD	
Sugarcane	Countrywide	All zones		Half fertilizer application at basal, other half after 6 months	Urea and NPK 20-10-10	40-60				FMARD	

6.2 Analysis of fertilizer consumption

Figure 8: Fertilizer consumption analysis 2015 - 2017



Source: IFDC AFO

The quantity of fertilizers consumed especially Urea, NPK 20 10 10 and NPK 15 15 15 has been on the increase while NPK 27 13 13, NPK 12 12 17 and SSP have hovered around the same quantity for the three years because they are predominantly used in the southern part of Nigeria for roots and tuber cultivation, with not much farming activities taking place as compared to the Northern part. While it can be observed that NPK 15 15 15 (basal application) which are usually imported has been increased from what it was in 2015 despite the fact that NPK 20 10 10 (basal application) is blended locally in the blending plants.

Urea production and use (for basal and top dressing application) has been on the increase and stiff competition between the two urea plant has pushed in a lot of products into the market amidst different marketing initiatives to encourage farmers to buy their products. With the expansion of both plants currently producing urea and the addition of dangote plant, it is being projected that Urea production and consumption would still increase from what it is currently.

6.2.1 Distribution of fertilizer consumption by crop (FUBC)

Table 58: Distribution of fertilizer consumption by crop from 2015-2017

Crop	Farming System	Types of Fertilizer Applied	Volumes of Fertilizer Applied(MT)		
			2015	2016	2017
Crop 1	Rainfed	Urea alone	6657.21	8306.56	11859.92
Cotton		NPK 15 15 15	2128.64	5702.17	7719.52
		NPK 20 10 10	3498.87	5199.48	6643.49
		TOTAL	**12284.72**	**19208.22**	**26222.93**
		%	2.02	2.10	2.03
Crop 2	Rainfed	Urea alone	1765.86	2365.33	3698.14
Ginger		NPK 15 15 15	564.63	1604.22	2536.44
		NPK 20 10 10	928.10	1480.58	2071.56
		SSP	314.28	278.73	293.72
		TOTAL	**3572.87**	**5728.86**	**8599.86**
		%	0.59	0.63	0.67
Crop 3	Rainfed	Urea alone	1696.93	1839.09	
Oil Palm		NPK 12 12 17 + MgO	77.42	65.76	
		NPK 15 15 15	542.59	1305.76	
		TOTAL	**2316.95**	**3210.61**	
		%	0.38	0.35	0.00
Crop 4	Rainfed	Urea alone	1468.59		
Sugar Cane		NPK 20 10 10	771.86		
		TOTAL	**2240.44**		
		%	0.37	0.00	0.00
Crop 5	Rainfed	Urea alone	74327.61	89770.22	129549.11
Sorghum		NPK 15 15 15	23766.23	61481.15	85359.49
		NPK 20 10 10	39064.88	56191.56	72568.66
		TOTAL	**137158.72**	**207442.93**	**287477.25**
		%	22.50	22.70	22.30
Crop 6	Rainfed	Urea alone	8069.88	13211.93	19374.51
Soya Beans		NPK 15 15 15	2580.34	9031.70	12901.14
		NPK 20 10 10	4241.34	8269.99	10852.89
		SSP	1861.69	2073.90	2038.83
		TOTAL	**16753.26**	**32587.53**	**45167.37**
		%	2.75	3.57	3.50
Crop 7	Rainfed	Urea alone	24570.65	32311.34	48662.35
Rice		NPK 15 15 15	7856.46	22170.53	32248.79
		NPK 20 10 10	12913.77	20225.25	27258.86
		TOTAL	**45340.87**	**74707.13**	**108170.01**
		%	7.44	8.18	8.39
Crop 8	Rainfed	Urea alone	51859.91	52906.81	81470.74
Maize		NPK 15 15 15	16582.19	36250.19	54182.86
		NPK 20 10 10	27256.37	33116.96	45636.92
		TOTAL	**95698.47**	**122273.96**	**181290.53**
		%	15.70	13.38	14.06
Crop 9	Rainfed	Urea alone	22323.36	36262.97	54603.10
Cassava		NPK 15 15 15	7137.89	25225.24	37305.17
		NPK 20 10 10	11732.64	22698.76	30586.65
		NPK 27 13 13	893.82	1203.86	1262.98
		NPK 12 12 17 + MgO	476.70	466.50	921.21
		SSP	4399.46	5218.54	5273.17
		TOTAL	**46963.87**	**91075.87**	**129952.28**
		%	7.71	9.97	10.08
Crop 10	Rainfed	Urea alone	12493.37	16678.77	25549.02
Yam		NPK 15 15 15	3994.75	11698.51	18027.76
		NPK 20 10 10	6566.22	10440.06	14339.63
		NPK 27 13 13	767.03	1000.18	1006.94
		NPK 12 12 17 + MgO	406.63	387.57	778.22
		SSP	1847.11	1810.08	1821.78
		TOTAL	**26075.11**	**42015.17**	**61523.35**
		%	4.28	4.60	4.77
Crop 11	Rainfed	Urea alone	20427.73	21118.07	30392.22
Millet		NPK 15 15 15	6531.76	14480.30	19694.08
		NPK 20 10 10	10736.34	13218.83	17024.61
		TOTAL	**37695.82**	**48817.20**	**67110.91**
		%	6.18	5.34	5.20
Crop 12	Rainfed	Urea alone	34153.67	39502.66	58010.59
Cowpea		NPK 15 15 15	10920.62	27103.30	38588.25
		NPK 20 10 10	17950.38	24726.64	32495.40
		SSP	8107.55	6550.75	6890.36
		TOTAL	**71132.23**	**97883.35**	**135984.60**
		%	11.67	10.71	10.55
Crop 13	Rainfed	Urea alone	1980.25	2288.70	3487.48
Cocoa Yam		NPK 15 15 15	633.18	1432.61	2557.14
		NPK 20 10 10	1040.77	1618.01	1953.56
		NPK 27 13 13	139.06	197.27	220.09
		NPK 12 12 17 + MgO	77.11	75.53	194.70
		SSP	287.42	239.79	232.16
		TOTAL	**4157.79**	**5851.90**	**8645.13**
		%	0.68	0.64	0.67
Crop 14	Rainfed	Urea alone	31051.16	39317.93	55947.36
Groundnut		NPK 15 15 15	9928.60	26916.84	37941.49
		NPK 20 10 10	16319.77	24611.01	32115.81
		SSP	1639.81	1689.10	1665.46
		TOTAL	**58939.34**	**92534.88**	**127670.12**
		%	9.67	10.13	9.90
Crop 15	Rainfed	Urea alone	7075.32	8944.64	13461.89
Benniseed		NPK 15 15 15	2262.33	6129.65	8937.19
		NPK 20 10 10	3718.62	5598.89	7542.58
		TOTAL	**13056.27**	**20673.17**	**29941.66**
		%	2.14	2.26	2.32
Crop 16	Rainfed	Urea alone	4930.25	5879.19	9231.18
Okra		NPK 15 15 15	1576.45	4163.62	6377.57
		NPK 20 10 10	2591.23	3680.07	5170.97
		TOTAL	**9097.92**	**13722.89**	**20779.72**
		%	1.49	1.50	1.61
Crop 17	Rainfed	Urea alone	8053.16	7665.20	11226.56
Onion		NPK 15 15 15	2575.00	5252.70	7262.10
		NPK 20 10 10	4232.56	4798.02	6288.71
		TOTAL	**14860.71**	**17715.93**	**24777.37**
		%	2.44	1.94	1.92
Crop 18	Rainfed	Urea alone	6127.08	7350.19	11764.33
Tomato		NPK 15 15 15	1959.13	5031.61	7752.89
		NPK 20 10 10	3220.25	4600.84	6589.94
		TOTAL	**11306.46**	**16982.65**	**26107.15**
		%	1.86	1.86	2.02
Crop 19	Rainfed	Urea alone	592.39	627.78	
Cocoa		NPK 20 10 10	311.35	392.96	
		NPK 15 15 15	189.42	166.07	
		SSP	75.96	61.15	
		TOTAL	**1169.11**	**1247.96**	
		%	0.19	0.14	0.00
Crop 20	Rainfed	Urea alone	32.00	35.61	
Coffee		NPK 20 10 10	16.82	22.29	
		NPK 15 1515	10.23	24.48	
		TOTAL	**59.05**	**82.37**	
		%	**0.01**	**0.01**	**0.00**
		OVERALL TOTAL	**609511.30**	**913790.00**	**1289420.25**

The table above shows the total fertilizer consumption for the years 2015, 2016 and 2017. It is evident that consumption has increased exponentially over the years. This can be attributed an increase in the cultivated land area across the country. Also, the federal government of Nigeria through their new agricultural policies has ensured that farmers have more access to fertilizer thereby, increasing national fertilizer consumption.

6.2.2 Quantities of fertilizers consumed by type and nutrients

Table 59: Quantities of fertilizer consumed by types

FERTILIZER	2015	2016	2017
Urea	319,656.38	386,383.00	569,727.17
NPK 20-10-10	168004	241,855.99	319,140.25
NPK 15-15-15	102,210.00	265,622.01	379,411.87
NPK 27-13-13	1,800	2400	2550
NPK 12 12 17 +MgO	960	930	1859.96
SSP	16881	16,599	16550
TOTAL	609,511.38	913,790.00	1,289,239.25

Source: AfricaFertilizer.org calculations

The Table above shows that there has been a tremendous growth of fertilizer consumption in Nigeria. Farmers often use whatever is available in the market to do their production, despite the fact that recommended application rates of various fertilizer products by FMARD includes micro nutrients, however most fertilizers blends in the market doesn't include this nutrients, aside from special blends which are usually requested by private farms in small quantity especially to be used for field trials. However, there have been talks ongoing about the addition of micronutrients. All these, with the emerging participation in private sector such as; Dangote, and expansion of existing fertilizer organizations such as Notore, Indorama, Golden and OCP blending plants. This will lead to more increment of fertilizer consumption in Nigeria in the following years.

Table 60: Quantities of fertilizer consumed by nutrients

	2015			2016			2017		
Crops	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Sorghum	45568.6	7471.4	7471.4	61754.8	14841.4	14841.4	86910.2	20060.8	20060.8
Maize	31794.2	5212.9	5212.9	36398	8749.2	8749.2	54731.3	12691.1	12691.1
Cowpea	20938.9	4892.5	3433.1	27182	7717.3	6538.2	38972.2	10278	9037.7
Groundnut	19036.8	3416.5	3121.3	27045.9	6802.6	6498.6	37850.2	9202.6	8902.8
Cassava	13984.4	3209.3	2441.2	25385.6	7205.5	6289.5	37282	9878.4	8975.3
Rice	15063.8	2469.9	2469.9	22233.8	5348.1	5348.1	32673.8	7563.2	7563.2
Millet	12523.9	2053.4	2053.4	14530.1	3493.9	3493.9	20339.4	4656.6	4656.6
Yam	7915.2	1736.8	1424.6	11831.5	3301.1	2994.7	17689.9	4690.4	4401.4
Soybeans	4947.5	1146.3	811.2	9086.3	2555.1	2181.8	13018.1	3387.5	3020.5
Cotton	4081.4	669.2	669.2	5716.2	1375.2	1375.2	7942.2	1822.3	1822.3
Cocoyam	1260.9	278.2	230.3	1653.7	454.6	415.1	2461.4	672.8	640.7
Ginger	897	141.3	84.7	1328.7	290.8	240.6	2081.5	433.3	380.4
Oilpalm	845.2	53.8	53.8	1059.7	204.4	204.4	0	0	0
Sugarcane	830	77.2	77.2	0	0	0	0	0	0
Cocoa	325.4	47.6	33.9	319.4	32.9	21.9	0	0	0
Coffee	19.6	3.2	3.2	24.6	5.9	5.9	0	0	0

Source: AfricaFertilizer.org calculations

Fertilizer consumption has changed over the years in Nigeria, with growing trends and the hope of more improvement in consumption in the face of emerging new crop varieties, new fertilizer players entering the market and better farmer knowledge on fertilizer use. Sorghum crops have so been the highest fertilizer consumer amongst other crops due to the fact there areas where there is a high intensity of fertilizer consumption plant sorghum. Maize on the other hand is the second highest consumer of fertilizer, even though its production quantity is higher than sorghum, this is because majority of the states in Nigeria Plants maize and even in area where there are little or no use of fertilizers. This allocation increase in land allocation towards maize production and various programs done specifically targeting maize including improved varieties puts maize ahead in terms of quantity produced.

In general Fertilizer products covering nitrogenous, potash, and phosphate fertilizers (including ground rock phosphate) are majorly consumed by cereals which are predominantly planted in the northern part of Nigeria, consuming more than 60% of the entire fertilizer used by crops. Despite the huge underutilization, improper and low fertilizer application by farmers, fertilizer use has been on the raise in Nigeria and is expected to keep this trend, as more and more programs are been rolled out to encourage better farmer practice and more accessibility to fertilizers.

6.3 Analysis of nutrient consumption by nutrients (IFA table)

Table 61: Analysis of Fertilizer Consumption by Nutrients

Fertilizer Use by Crop Statistics

Country : NIGERIA

Crops / gr	Planted Area		Average Yield		Percent of the Planted Area				Recommended Application				Actual Application Rate				Total Fertilizer Consumption		
					N	P_2O_5	K_2O		N	P_2O_5	K_2O		N	P_2O_5	K_2O		N	P_2O_5	K_2O
Rice																			
2014/15	2,626		1.72						80	30-40	30-40		5.74	0.94	0.94		15064	2470	2470
2015/16	3,651		1.89						80	30-40	30-40		6.09	1.46	1.46		22234	5348	5348
2016/17	3,899		2.01						80	30-40	30-40		8.38	1.94	1.94		32674	7563	7563
Maize																			
2014/15	5,672		1.72						120	60	60		5.61	0.92	0.92		31794	5213	5213
2015/16	5,484		1.97						120	60	60		6.64	1.60	1.60		36398	8749	8749
2016/17	5,961		2.03						120	60	60		9.18	2.13	2.13		54731	12691	12691
Soybean																			
2014/15	902		1.14						30	60	30		5.49	1.27	0.90		4948	1146	811
2015/16	1,071		0.88						30	60	30		8.48	2.39	2.04		9086	2555	2182
2016/17	1,120		0.93						30	60	30		11.62	3.02	2.70		13018	3388	3021
Cowpea																			
2014/15	4,155		0.86						20	40	25		5.04	1.18	0.83		20939	4893	3433
2015/16	4,815		0.78						20	40	25		5.65	1.60	1.36		27182	7717	6538
2016/17	8,929		0.77						20	40	25		4.36	1.15	1.01		38972	10278	9038
Millet																			
2014/15	1,784		0.82						60	30	30		7.02	1.15	1.15		12524	2053	2053
2015/16	1,737		0.86						60	30	30		8.37	2.01	2.01		14530	3494	3494
2016/17	1,800		2.01						60	30	30		11.30	2.59	2.59		20339	4657	4657
Cassava																			
2014/15	9,152		7.25						90	20	75		1.53	0.35	0.27		13984	3209	2441
2015/16	8,385		6.27						90	20	75		3.03	0.86	0.75		25386	7206	6290
2016/17	8,929		6.17						90	20	75		4.18	1.11	1.01		37282	9878	8975
Yam																			
2014/15	6,598		8.18						90	50	75		1.20	0.26	0.22		7915	1737	1425
2015/16	6,080		8.45						90	50	75		1.95	0.54	0.49		11832	3301	2995
2016/17	6,446		8.39						90	50	75		2.74	0.73	0.68		17690	4690	4401
Cocoa Yam																			
2014/15	1,232		3.08						60	10	50		1.02	0.23	0.19		1261	278	230
2015/16	949		7.55						60	10	50		1.74	0.48	0.44		1654	455	415
2016/17	1,066		7.11						60	10	50		2.31	0.63	0.60		2461	673	641
Sorghum																			
2014/15	4,587		1.23						64	32	30		9.93	1.63	1.63		45569	7471	7471
2015/16	5,472		1.19						64	32	30		11.29	2.71	2.71		61755	14841	14841
2016/17	5,666		1.19						64	32	30		15.34	3.54	3.54		86910	20061	20061
Sugarcane																			
2014/15	1,407		0.48										0.59	0.05	0.05		830	77	77
2015/16													0.00	0.00	0.00				
2016/17													0.00	0.00	0.00				
Cotton																			
2014/15	429		0.42						60	20	20		9.52	1.56	1.56		4081	669	669
2015/16	549		0.38						60	20	20		10.41	2.50	2.50		5716	1375	1375
2016/17	556		0.39						60	20	20		14.28	3.28	3.28		7942	1822	1822
Ginger																			
2014/15	56		4.83						60	30	30		16.04	2.53	1.51		897	141	85
2015/16	85		9.08						60	30	30		15.63	3.42	2.83		1329	291	241
2016/17	96		8.69						60	30	30		21.68	4.51	3.96		2082	433	380
Oil palm																			
2014/15	1,832		0.78						120	120	120		0.46	0.03	0.03		845	54	54
2015/16	1,897		0.80										0.56	0.11	0.11		1060	204	204
2016/17													0.00	0.00	0.00				
Groundnut																			
2014/15	2,923		1.14						0	54	25		6.51	1.17	1.07		19037	3417	3121
2015/16	3,459		1.26						0	54	25		7.82	1.97	1.88		27046	6803	6499
2016/17	3,597		1.26						0	54	25		10.52	2.56	2.48		37850	9203	8903
Cocoa																			
2014/15	1,146		0.27										0.28	0.04	0.03		325	48	34
2015/16	1,158		0.28										0.28	0.03	0.02		319	33	22
2016/17													0.00	0.00	0.00				
Coffee																			
2014/15	48		1.22										0.41	0.07	0.07		20	3	3
2016/16	48		1.25										0.51	0.12	0.12		25	6	6
2016/17													0.00	0.00	0.00				
TOTAL																			
2014/15	44,547.8	0.0	35.1										76.39	13.38	11.36	0.00	180,032.80	32,879.50	29,591.30
2015/16	44,840.5	0.0	42.9										88.43	21.81	20.32	0.00	245,550.30	62,378.00	59,198.50
2016/17	48,065.0	0.0	41.0										115.91	27.19	25.91	0.00	351,952.20	85,337.00	82,152.80

The table above is standard table used for the FUBC project to ascertain the actual application rate of fertilizer used by the individual crop in Nigeria. The amount of nutrients from fertilizers used by various crops in Nigeria is dependent on the area of crop planted, portions of planted area applied with fertilizer, and the rates of fertilizer application.

The recommended application rates for each crop and their season of planting was derived from the Federal Ministry of Agriculture and Rural Development (FMARD). For each crop and fertilizer type used, the total quantities of nutrients are calculated using the AFO/FAO fertilizer-nutrients calculation procedure which gives the actual application rate.

6.4 Limitations of the study

Despite the tremendous improvements in carrying out this study when compared to the previous studies, a few limitations/obstacles were observed and should be reported to allow the results of this study to be interpreted within these confines. The main limitations of this study stems from the low and delayed response rate from the industry. There were many cases of unwillingness to participate, non-response or delayed response to requests for information by players in fertilizer and output markets.

Due to lack of actual field surveys, it was not easy to establish actual sampling sizes, thus the study had to rely on proxy sample sizes reported by those who collected data. Due to time and financial constraints, the study team could not interview key informants and many cases of incomplete or missing information especially from the various farmer projects data collected.

6.4.1 Access to Missing Data - Quantity and Quality

It is assumed in general, that it is the overall responsibility of the government of Nigeria to manage and provide relevant, accurate and timely agricultural data to meet the demands of policy makers as well as other data users. Overall, access to data on fertilizer production, importation, distribution, export and utilization by crops is constrained by several factors such as.

i. Inadequate Staff Capacity: few number of staff in some stations at the field level that should be dealing with agricultural data collection; aging field extension officers at the grassroots thus affecting mobility and application of modern technologies.
ii. Limited technical knowledge owing to limited trainings on agriculture statistics and data management. This has led to, among others, generation of inaccurate data with non-probability based sampling methods, lack of the coefficient of variation, sampling errors as well as non-sampling errors.
iii. Lack of validated sampling frames. Partly, this is caused by lack of census of agriculture.
iv. Lack of basic tools and equipment for data collection and analysis.
v. Low application of modern technology including ITC tools and systems.
vi. There is a general low appreciation of the importance of data and quality statistics at various levels in the public sector.
vii. Limited networking and collaboration amongst relevant stakeholders and agencies. Poor planning leading to among others inadequate budgetary provision for data collection and management activities.

viii. Lack of understanding, hence poor cooperation by private sector in providing data when required.

These data are however available but with different organizations (private companies, NGO, associations etc) scattered all over the country although not in the best format. In the absence of a crop sensor survey, the easiest way to access these data is to advocate for the inclusion of these data to the NAERLS and NBS annual crop surveys which is being conducted yearly for the entire country. Secondly these data can also be gathered from the various organizations, updated yearly, through collaboration with the value chain associations and other organization.

6.4.2 Recommendations

- There is need to enhance the statistical and record-keeping competencies of staff in the public sector through regular training to improve the data collection, analysis, documentation, dissemination and retrieval process.
- There is the need for FTWG to collaborate with NAERLS and PRSD in future National Agricultural Performance Surveys so that they can include fertilizer consumption in there data capturing survey (tools) performed yearly.
- There is need to advocate and sensitize responded on the need for quality data and accurate information during data collection.
- Development of fertilizer agro input dealers associations at state level to assist in the collection of data, making easy to get the quantity of fertilizer distributed to the farmers
- There should be strong collaboration between the FTWG, the identified sources of primary data and other stakeholders through regular meetings, for collating, sharing, reviewing, developing and harmonizing the tools used in data collection.

7 Conclusions

The Fertilizer consumption in Nigeria in the last three years have been on the increase and has tremendously done so due to emerging factors such as the liberalization of the sector which has improved private sector participation in the country.

However it could be observed that despite the increases in crop consumption trends, Nigeria's average fertilizer use is still low at an average of about 20 - 30 kg/ha compared with 150kg/ha for Asia and 100kg/ha for the world's average. Fertilizer is still predominantly consumed in the northern part of the country with the south still playing little role in the sector, although some stakeholders in the sector had attributed this consumption pattern to ecological reasons.

The study has been able to show estimates of the patterns of fertilizer consumption and crop use by product and nutrient, but there is still a lot that needs to be done in terms of quality and willingness of organizations to take data capturing more serious than it is currently. Because even in the face of more awareness by the various stakeholders in information gathering and sharing, a lot of the data were fairly captured and no single organization interviewed kept records of the quantity and types of fertilizer that was applied by farmers on their crops and these hindered the accuracy of actual fertilizer use by crop figures, as the report had to rely on estimates to arrive at fertilizer usage by crop.