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BIF NIGERIA

MARKET ANALYSIS AND STRATEGY -MAIZE

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1 Executive Summary



Maize is highly relevant to poor smallholder farmers in Northern Nigeria with an estimated 3,600,000 farmers cultivating the crop as a means of sustenance and to generate income for themselves and their families. Growing demand for maize from different industrial uses within the country is also creating opportunities for maize farmers to increase their production and income.

However the current market structure and performance is not optimum for smallholder farmers to benefit from such opportunities. This report commences with a detailed assessment of the current state of the maize market in Nigeria. The analysis begins by looking at the maize market to identify the structure of the market and the key actors within it, with a view to understanding their functions and roles and the areas where the market is underperforming in respect of smallholder farmers.

The analysis identified the key constraints affecting the maize market which are also significant symptoms of this underperformance. A causation tree was used to identify the root causes of the underperformance and the feasibility of a BIF Nigeria intervention. Out of this exercise emerged the potential area of intervention which can tackle the following constraints:

1. *Farmers have poor post-harvest handling practices which result in high post-harvest losses;*
2. *Farmers are unable to access the growing industrial demand for maize since they do not produce the quality or varieties required by processors;*
3. *Farmers employ poor agronomical practices which affect their productivity;*
4. *Farmers use limited amounts of key productivity enhancing inputs such as fertilisers.*

BIF Nigeria seeks to bring about a market change to the benefit of the smallholder farmers. BIF Nigeria's vision for the Maize Market is enhancing smallholder farmers' income through higher productivity such that they benefit from the increasing utilisation of maize in different industries. This will be achieved through the adoption of improved farming methods and the creation of premium earning marketing channels to sell their produce to the industrial users of maize.

Specific areas of interventions detailed in the report include: improvement in access to viable and sustainable storage options through warehouse receipt systems; promotion of seed multiplication of improved varieties required by industrial processors by seed companies; and improvement in linkages between smallholder farmers and processors through cascading contracts or contract farming with embedded information services.

2 Introduction to the Market



Maize is a subsistence crop of great socio-economic importance because of its many uses and different methods of preparation, ranging from cooking, roasting, frying, grounding or crushing to prepare local food items eaten in different parts of the country. Its industrial uses are also diverse and cut across industries such as flour production, animal feed, baked foods and beverages, sugar and pharmaceutical production and brewing of malt and beer¹.

The demand for maize, which far outstrips supply, is being driven by the increasing utilization of maize, especially in developing new products by the aforementioned food processing industries and processors². However, researches have shown that smallholder farmers, who constitute about 90% of the total farmers in Nigeria, have been producing

¹ Abdulrahman, A. A.1 and Kolawole, O. M.2 Traditional Preparations and Uses of Maize in Nigeria *Ethnobotanical Leaflets* 10: 219-227. 2006.

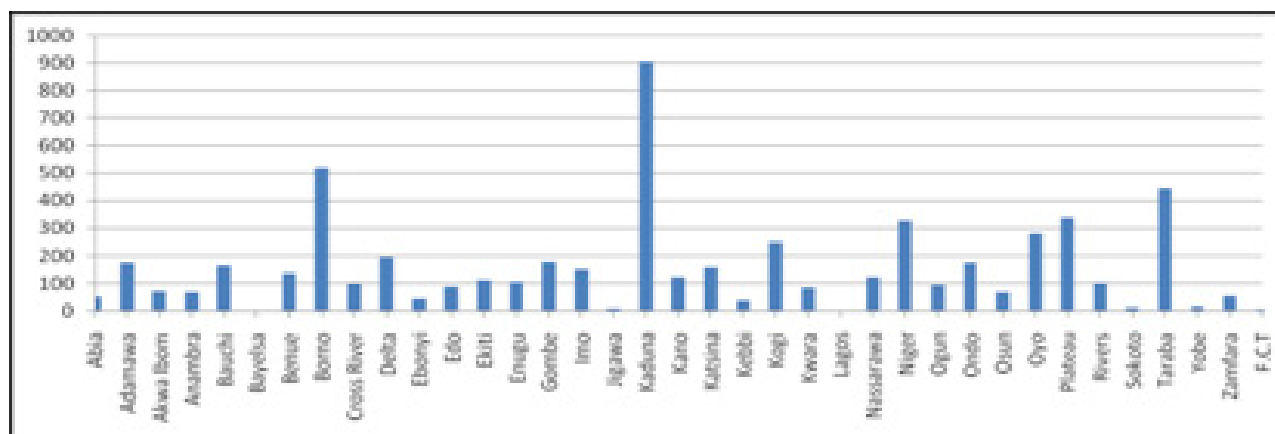
² M.A. Badmus and O.S. Ariyo Forecasting Cultivated Areas and Production of Maize in Nigerian using ARIMA Model, *Asian Journal of Agricultural Sciences* 3(3): 171-176, 2011

well below what they are capable of. The average yield in Nigeria is 1.5 tonnes/ha compared to much higher yields in other African countries such as Egypt (5.8 tonnes/ha) and Mauritius (7.1 tonnes/ha)³.

BIF's entry point to making the market work better for the poor will be to enhance smallholder farmer's income through higher productivity channelled to meet the growing industrial users' needs. Thus the target beneficiaries are likely to be smallholder maize farmers in states such as Kano, Kaduna, Lagos, Ogun, Oyo and Cross Rivers States which have a large concentration of industries that utilize maize as a raw material. A change in the market system will result in an increase in smallholder farmers' productivity and incomes as they meet the growing demand for industrial uses by supplying more maize required by the processing mills in Southern Nigeria (Lagos, Ogun and Oyo States) and a few in the North (Kano and Kaduna States)⁴

BIF will focus on Northern Nigeria, which has the five largest producing areas of maize in the country, accounting for approximately 65% of maize production (NBS2005) as shown in the Figure 1: Maize production by states ('000 Mt). 2005/2006.

Figure 1: Maize production by states ('000 Mt). 2005/2006



³FAOSTATS 2009

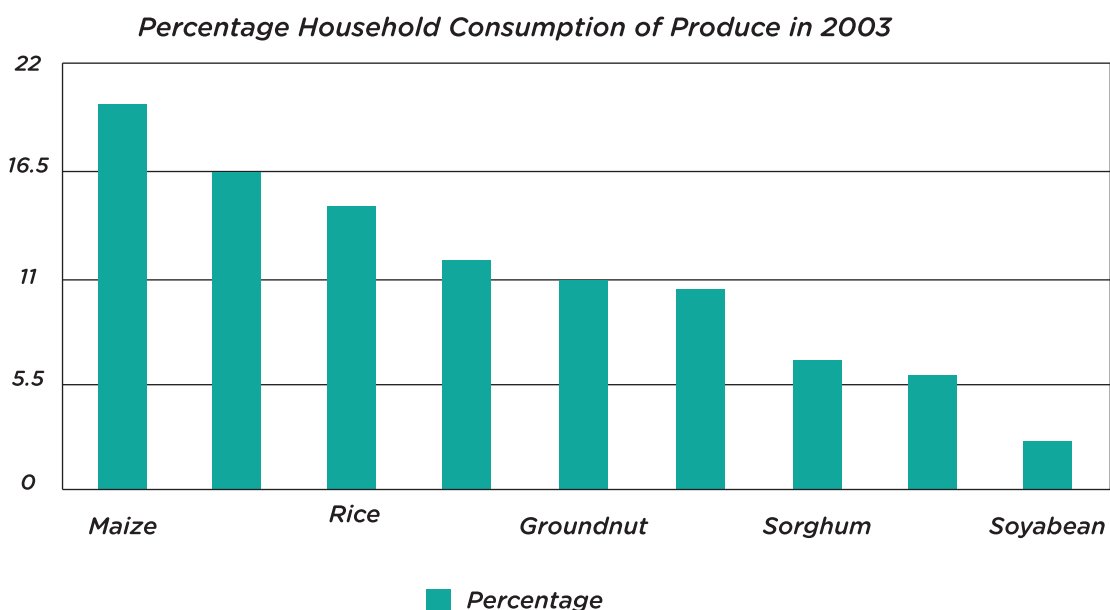
⁴O.O. Alabi, 2008 - Comparative Analysis of Industrial Demand and Supply of maize and Sorghum in Kaduna and Kano States of Nigeria

2.1 Relevance to the poor

Given the multiplicity of its uses, the relevance of maize to the poor can be viewed from three major perspectives: nutrition, employment and poverty alleviation through income generation. Maize is a primary staple in Northern Nigeria and consumed by the majority of households in both urban and rural areas. It is most important to the latter group as it is an affordable means of nutrient intake as compared to other cereals such as sorghum or millet. Northern traditional dishes such as pap, tuwo, gwate, and dokunu are derived from maize which can be cooked, roasted, fried, ground, pounded or eaten in the crushed form. Maize also has a high nutritional value and is an important source of carbohydrate, protein, iron and Vitamin B, which augments the diet of the poor and provides vital nutrients to weaning children. Maize by-products such as leaves and stems are used in making fences and roofing at very low cost.

According to the National Food Consumption and Nutrition Survey conducted in 2003 by the International Institute of Tropical Agriculture (IITA), maize can be regarded as the most frequently consumed food staple in Nigeria. The survey found that maize is on the average consumed by the poor at least 4 days a week compared to three days for cassava its closest rival. It was also discovered that 20% of households preferred to consume maize as against cassava (16.5%), rice (11.9%) and cowpea grain (11.8%) as shown in Figure 2.

Figure 2: household consumption of staple crops



There are no definitive statistics on the number of people directly employed in cultivating maize, however it is estimated there are at least 4 million maize farmers⁵ in Northern Nigeria of which 3.6 million are smallholder farmers who cultivate land sizes of less than 2.5 hectares. Although there are different categories of farmers, BIF Nigeria will focus on smallholder farmers mainly working as primary producers of maize with farms smaller than 2.5 hectares. These farmers are poor and usually employ family members as labour on their farms. Women's participation in maize production is limited at the actual production, but is very significant after harvest. They are especially involved at the primary processing stages of the crop, assisting with preliminary processing tasks such as shelling and drying the maize before storage.

The smallholder farmers, who account for over 90% of total maize production in Nigeria, sell surplus produce for household upkeep. The average yield of an average smallholder farmer is between 1 to 1.5 tonnes per hectare which currently fetches about N50, 000 per tonne at current market price⁶. Maize is also inter-cropped with sorghum and soyabeans in the North which underlines an effective utilisation of small land holdings by poor farmers. If a farmer's productivity is raised, the farmer should be able to benefit from increased income accordingly. Poor farmers also often serve as labourers in the large and medium scale farmers, earning additional income.

This group of farmers face several challenges to their livelihood as a result of low prices, limited landholding, insufficient funds, poor health of family members or frequent droughts exacerbated by climate change. New technology in seed development is however helping to curb the negative impact of drought and pest, such as the recent introduction into the market of seed varieties that are drought resistant as well as those resistant to striga and downey mildew diseases.

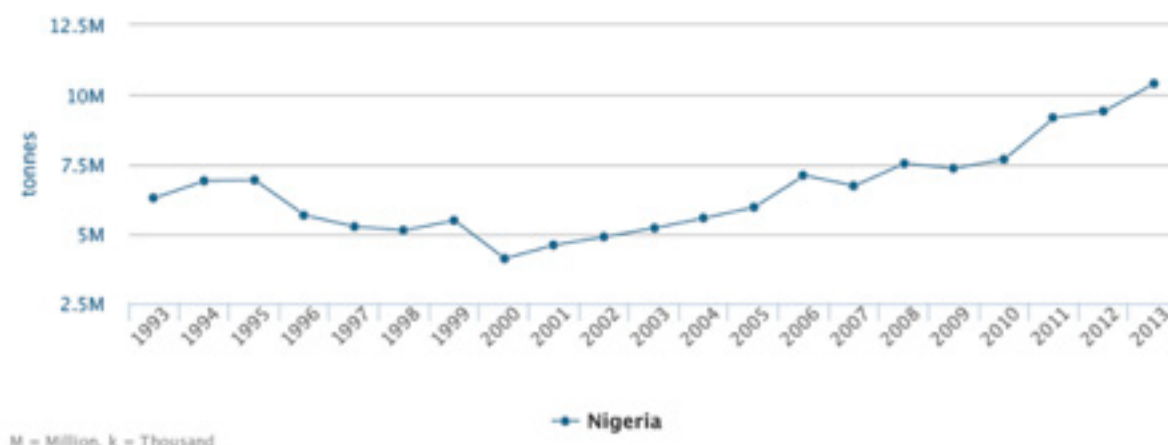
2.2 Opportunities for pro-poor growth

The majority of Northern Nigeria's rural dwellers rely in agriculture as a means of subsistence and food security. Maize is the third most important cash crop in Nigeria with a total output of 10.4 million tonnes in 2013 according to FAO⁷ with an increase in output of approximately 25% from the 2010 figure of 7,770,000 tonnes⁸ as shown in Figure 3: Total maize production in Nigeria (1993-2013) FAO STAT 2014.

⁵ Author's extrapolation based on number of total maize production 2013 divided by total number of yield per hectare.

⁶ Nigeria Price Bulletin, Fewsnet, July 2014

Figure 3: Total maize production in Nigeria (1993-2013) FAO STAT 2014



Data on production, yields and area harvested suggest that maize farmer are getting more efficient in their use of land, with production increasing significantly at an average of 5.52% per year from 2000 till 2010⁹. Maize is been produced to meet the increasing demand for the crop with multiple uses and several opportunities exist for the poor farmers as producer of the crop to benefit from such demand. The volume of maize crops produced in Nigeria in 2013 was about 10.4 million tonnes at the value of over \$1 billion dollars¹⁰, which signifies a huge volume of business for actors along the value chain. The major drivers of the growth are the increasing urbanization, the growing middle class, and the resulting changing consumer preferences for different new maize based products. According to FAO, 40% of the national maize production is for human consumption and the remainder is dedicated towards industrial uses of the crop that have been growing over the years.

The growing population has positively affected the increasing industrial uses of maize. A recent study¹¹ suggests that consumer spending in Nigeria will rise at the rate of 7.1% annually, mainly driven by rapidly rising household consumption, which creates growing demand for processed food and meat. Over the last decade, the industrial uses of maize have been growing in different sectors such as poultry feed and brewery, which has traditionally used maize in grain and grit forms for their industrial processes. The growth in both industries was boosted by the Government imposition of import bans. In the case of the breweries, the ban on importation of maize led to backward integration in the cultivation of maize to guarantee constant supplies. In the animal feed industry on the other hand, an imposition of ban on maize exports was fundamental in protecting and stimulating local demand to ensure adequate and constant supply of maize to poultry and animal feed manufacturers.

⁷ <http://faostat3.fao.org/faostat-gateway/go/to/browse/Q/QC/E>

⁸ Cadoni P., Angelucci F., 2013. *Analysis of incentives and disincentives for Maize in Nigeria. Technical notes series, MAFAP, FAO, Rome.*

⁹ FAOSTAT 2012

¹⁰ Own calculation using Average Price per tonne for 2013

Industry experts estimate that 60% of maize produced in the country is used in industrial processes as captured in Figure 4. Demand for maize by poultry feed manufacturers accounts for almost 20% of the total national production¹² as the crop is the main ingredient in poultry feed, constituting between 60%-70% of the total. There is a dearth of data on market share and other industry figures but factory size capacity is a key indicator on size and scale of operations of companies in this sector and is characterised by a few big players such as Premier Feed Mill (a subsidiary of Flour Mills), Livestock Feeds and Signal Feeds.

The disaggregated data on the major users of processed maize for human consumption in Nigeria is unavailable¹³, an estimate of the each heavy industrial user of maize is captured in Figure 5. It shows the food processing sector as the highest user of the crop with 40%, followed by the animal feed Industry at 33%, after which we have the brewery/beverage Industry with an estimated 20% and other industrial users with the remaining 7%.

Figure 4: Uses of maize in Nigeria

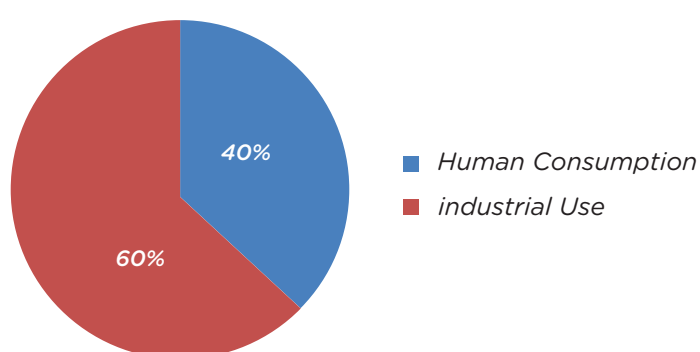
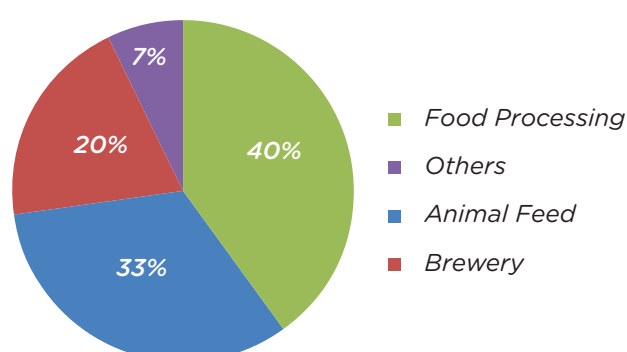


Figure 5: Industrial use of Maize



Maize is used across different industries as a main ingredient or an additive to bulk up industrial production processes to manufacture different products such as baby food, breakfast cereals, biscuits and snacks in the food processing. Corn starch, dextrose and syrup are also variants of products derived from maize used during food processing. Meals derived from maize flour are consumed in various forms and sometimes fortified with vitamin A. These are popular in Northern Nigeria. The breweries in the country are also major users of maize grits during their production processes.

¹¹ Dobbs et al. 2014. *Nigeria's renewal: Delivering inclusive growth in Africa's largest economy*. McKinsey Global Institute.

¹² USDA, 2005-2010

¹³ Author's estimate calculated with inputs from primary and desk research

Growing purchasing power and changing consumer preferences are also dictating the exploration of new products which require maize as raw materials. The growth of the snack industry with the manufacturing of tortillas and cheese balls underlines efforts by food manufacturers to key into changing consumer tastes to develop new products for the market that require maize as a raw material input.

The increasing state of insecurity with the growing terrorist activities of Boko Haram in the North Eastern corner of the country poses a threat to growth of the market, however, with adverse impact on the social and economic lives in the area. Farmers have stayed away from their farms in two of the country's large maize producing states because of the instability which is impeding production, and distribution of maize across the country has been severely hindered with a negative impact on livelihood and food security of households in the area.

There is a high level of competition to secure constant streams of maize supply by industry players. Each major player organises its activities to suit its operations through its own channels. Out grower schemes are on the rise as large industrial users such as Nestle and Flour Mills are creating linkages from farm to firm to guarantee their supply of maize. Other companies such as Guinness work through their agents and suppliers to ensure sustainability of its supply chain.

3 Market Structure and Performance

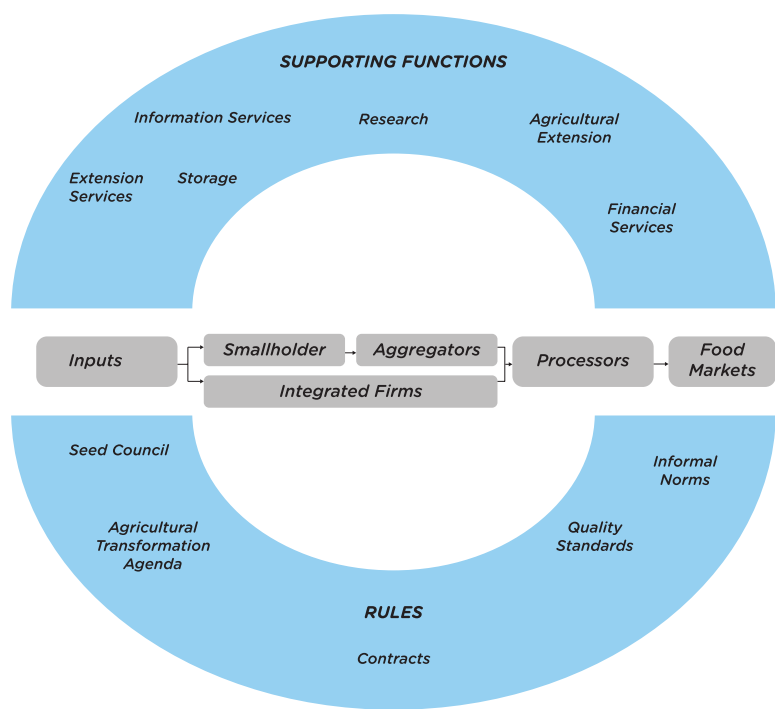


3.1. Overview of the market system

Figure 6 shows our mapping of the cassava market in Nigeria. The three main components of this map – the core market function represented in the centre, the supporting functions and the rules that govern the market – are analysed in the following sections¹⁴.

¹⁴ The narrative on the value chain draws on information collated through primary research and article by Ahmed, B and Rikko, L (2005) *Market Institutions for Maize in Northern Nigeria*.

Figure 6: the maize market system

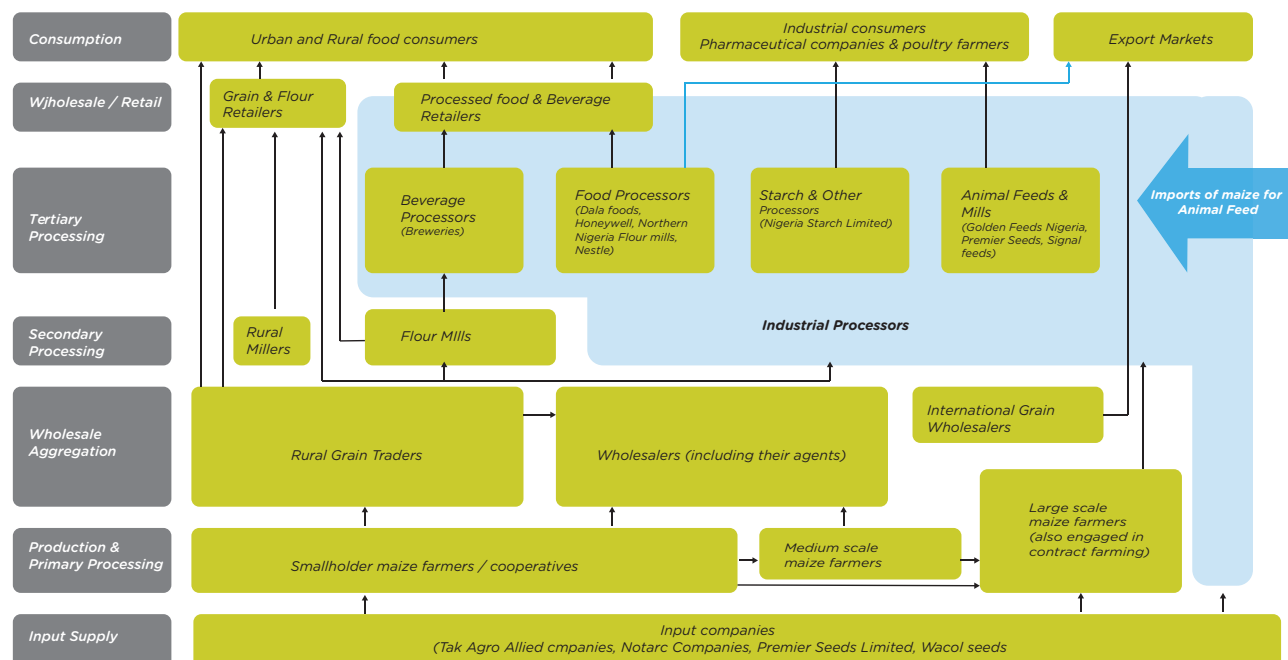


3.2 Core market performance

Figure 7 shows the maize value chain. The diagram highlights the functions at each stage of the value chain which are colour coded in grey, and the key actors in each channels who carry out the activities at each stage of the value chain are coloured green. The blue box at the top right hand corner highlights the importation activities of top processing companies and the arrows identify the transactional flow of inputs at the first level and thereafter, as maize in its varying forms from grain to finished goods flows through each stage of the value chain.

Please also refer to the BIF Nigeria Political Economy Analysis for further information on general constraints that impact on the aquaculture market, especially in regard to issues covered in section 3.2.1

Figure 7: Maize market value chain



The following section discusses key functions in the core market as follows: (1) input supply; (2) production and primary processing; (3) secondary processing; (4) trading and wholesale; and (5) retail and consumption. The role of each major actor within these core functions is also described.

3.2.1 Input suppliers

The first stage of maize cultivation starts with the farmer acquiring key inputs such as land, seeds, fertilizer and agro-chemicals from inputs vendors.

Access to land is a major constraint to smallholder farmers. Land in Nigeria is statutorily owned by the Federal Government (FG) with state Governors being vested with powers to hold such land in trust for the people and carrying the responsibility for the administration and allocation of land.

This power has seen allocation of land, and especially high quality farmland, to the politically connected and rich to the detriment of the poor.

Inputs are key requirements for improving productivity of maize but the lack of availability of, and easy access to, inputs means that farmers do not have regular access to them at a price they can afford. Government at different levels participate in the provision of inputs to farms¹⁵. Private companies are also engaged in production and distribution of inputs business, and large companies trading inputs are increasingly focusing on the smallholder farmers through their distribution networks, which are expanding but are still limited to major towns and cities.

The following sections analyse the key inputs required by maize farmers and the extent to which the market is underperforming with regard poor farmers.

Fertiliser suppliers perform a key role because fertilise is an important input to maize cultivation because for good growth and corresponding yield the plant must be supplied with adequate nutrients such as nitrogen, phosphorous and potassium. The most common varieties of fertiliser widely applied on farms are inorganic varieties such as nitrogen, phosphorous and potassium fertiliser (NPK) and uea, but organic varieties are also applied on farm lands. The distribution of fertiliser usage by maize farmers is as follows NPK (60%), urea (30%) and others (10%)¹⁶.

Seed suppliers: according to a study¹⁷ conducted on maize farmers, Yar Kassa and Yar Acre were identified as the long standing, commonly cultivated maize varieties in Northern Nigeria. Local maize varieties are identified by the locality of cultivation which many believe influence the quality of the crop. Local farmers prefer planting the local seeds but there is a high level of adoption of the Open Pollinated Varieties (OPV) which farmers receive from their State Agricultural Development Programmes (ADP) and development projects such as IITA. Maize produced from OPV are generally of a lower quality than the hybrids as they are not uniform in colour, have varying maturity times and lower flour yield. Traditionally, maize farmers in Nigeria reuse saved seeds or obtain seeds from neighbours, friends and the open market for the next planting season¹⁸.

Farmers' lack of adoption of new seed varieties stem from many factors. A study¹⁹ summed up the key reasons which include: affordability of the seeds in cases where

¹⁵Phillip, et al (2009). *Constraints to Increasing Agricultural Productivity in Nigeria: A Review*, NSSP Background Paper 6, International Food Policy Research Institute.

¹⁶Okuku, I (undated). *Private Sector and Input Supply in Nigeria: Notore's Perspective*.

¹⁷Bamire, A.S et al. 2010 *Characterisation of MaizeProducing Housholds in the Dry Savanna of Nigeria. Country Report-Nigeria: IITA Ibadan, Nigeria* 46pp

¹⁸Fakorede M, (2001). *Revolutionizing Nigerian Agriculture with the Golden Seed*.

¹⁹Kudi, T et al. 2010. *Analysis of adoption of improved maize varieties among farmers in Kwara State, Nigeria*

farmers are aware of the benefits of improved maize varieties but are unable to pay the higher price above that for the readily available OPV seeds. Though there is also growing dissemination of the hybrid varieties with higher yields, these improved varieties of maize are more expensive to grow due to their high requirements for productivity enhancing inputs such as fertiliser. This makes these varieties costly and out of reach of many smallholder farmers, who often do not understand the benefits of investing in them either. Maize farmers have also failed to adopt the cultivation practices needed for such seeds and prefer the open pollinated varieties to the higher yielding hybrids which have cultivation requirements that they are more familiar with.

Distribution of seeds under the GES has boosted the availability of improved maize seeds to farmers in some areas, but at the same time it has led to the emergence of corrupt seed contactors who supply adulterated and/or fake seeds .

Key Players

Premier Seeds Nigeria Limited is the country's largest commercial seed company. The company was initially formed in partnership with Pioneer Hi-bred Seed Company of USA, but the foreign partner pulled out after a few years due to the low demand for new seeds by local farmers. Premier Seeds produces both hybrid and OPV. The company has close relationship with the Institute of Agriculture Research in Zaria, but also has its own research and development department that has registered seed with the Crop Variety registration and Release Committee which protects the rights to its intellectual properties. The maize varieties it has released are Oba 98 and Oba 99, both hybrid seeds.

Value Seeds Nigeria Limited is a new seeds company that has expanded its business rapidly with the aid of the GES. The company operates a seed outgrower scheme with over 1,000 farmers and has demonstration plots in different maize producing areas of Kaduna and Niger States. The company works closely with the Institute of Agricultural Research and markets the Institute's bestselling sammaz 14 & 15 ranges. The future plans are to market other varieties that are currently being tested on its demonstration plots. Value Seeds recently opened a seeds factory in the outskirts of Zaria.

Agricultural Development Programmes (ADPSs) are in all States and provide a range of forms of support to local farmers. The ADPs supply Nigerian farmers with OPV seeds for maize cultivation. The seeds are subsidised by Government and the ADPs sell them

to local farmers in their regions. Kaduna and Kano ADPs produce a high level of OPVs, which they supply to the maize farmers in those areas, priced lower than the hybrids from private companies. The ADPs are not allowed by the Government to produce hybrid seeds²⁰.

The current business model of both the public and private sector companies largely depends on the continued existence of subsidies especially under the GES system. The seed companies make money by selling to GES registered farmers with the farmer paying 50% of the cost price and then collecting the other 50% from government as a subsidy.

Main market underperformance in this area are the lack of adoption of new seed varieties by farmers. This can also be explained by the limited distribution channels by the seed companies which under the GES is only through registered agents which often limits the access of farmers not registered under the scheme to the new seed varieties. Another constraint is lack of access to credit for the smallholder farmers to purchase improved seed and the inputs that they need to grow the seed successfully.

Crop protection products suppliers: maize farming requires effective farm management to reduce the number of losses during and after cultivation. Farmers lose some of their maize crop through ineffective use of agro-inputs such as herbicides, pesticides and insecticides, which are meant to protect the crop from different pests and diseases to which it is susceptible, or by not using such agro-chemicals at all.



Weed control is an important aspect of maize farming management, which requires many hands as the growth of weeds alongside the planted maize stifles its growth, reducing the yield and productivity for farmers. To address this situation, smallholder farmers have to incur extra expenses of hiring casual workers to clear their land. Labour is becoming scarce and expensive in rural areas as many youth are migrating to urban areas. Farmers also do not have access to the good quality herbicides, which are a cheaper and effective solution to the weed control process. Current strategies of controlling weeds adopted by many smallholder farmers often result in low farm yields.

²⁰Bentley et al. 2011. *Nigeria: Clustered Seed Companies*

Pests and disease control are an important aspect of maize farm

Pests and disease control are an important aspect of maize farm management as the crops are susceptible to attack during the different stages from cultivation to storage. Attacks from downy mildew, stem borers and striga parasite weed are the main pests and diseases associated with maize. In some cases, where the farmer can afford the chemicals, they face danger posed by incorrect application of the chemicals as they do not possess adequate knowledge of chemical handling in the right proportions that is required to reduce the incidences of these diseases²¹.

Key Players are similar to the companies listed under the fertiliser sub-section. Farmers buy their crop protection products and technical advice on usage from their local agro-dealers who are their primary point of contact given the low extension worker to farmer ratio in Nigeria. Companies that import crop protection products for farmers in Northern Nigeria include TAK Agro Fertilizer & Chemical, Notore Chemical Industries and Kano Agricultural Supply Co. Limited.

The major issues causing market underperformance is that the market for crop protection products in Nigeria appears unorganised and not fully regulated²². Similar to fertilizer discussed above it is also characterized by limited distribution channels²³.

3.2.2 Production and primary processing

This is the stage in the value chain which maize is cultivated. The main activities at this stage involve land preparation, by clearing plot of weeds and breaking up ground. The next stage of activities is sowing the seeds after which the crop is weeded regularly. The final stage of farm activities is harvesting and primary processing which includes shelling, sorting and storing the cobs. These activities all take place on farms but the types of farmers and scale of operations differ as explained below.

²¹ Ogunlade et al 2012. *Capacity of agro-input dealers in advisory service delivery to maize farmers in Kwara State, Nigeria International Research Journal of Agricultural Science and Soil Science (ISSN: 2251-0044) Vol. 2(10) pp. 426-435, October 2012*

²² Agabi C (2013). [http://www.dailytrust.com.ng/sunday/index.php/business/13818-nigeria-s-agrochemical-industry-is-worth-\\$120m](http://www.dailytrust.com.ng/sunday/index.php/business/13818-nigeria-s-agrochemical-industry-is-worth-$120m) accessed 30/09/14

²³ Oruonye E. D et al. (2010). *Sustainable use of plant protection products in Nigeria and challenges. Journal of Plant Breeding and Crop Science Vol. 2(9). pp. 267-272, October 2010*

Smallholder farmers: as we have noted above, this group of farmers is often limited by their preference to use saved seeds or in some instance lower yielding OPV seeds and traditional methods of cultivation, which excludes practice of modern agronomy practices. They keep a substantial quantity of their produce of household consumption and sell the remainder to rural aggregators in the local market.

Farm-level losses amongst maize farmers has been estimated at £510 million in 2012 according to a GIZ study. This excessive wastage is as a result of the lack of appropriate handling and storage of crops²⁴ during preliminary harvesting activities and subsequent storage of the crops every planting season. The majority of such losses are caused by the improper timing and method of harvesting, threshing and storage, which expose the produce to pest and other pathogens which lead to quality loss estimated at almost 10% through the on-farm processing, rising to over 20% during storage. Timing of the harvest depends on maturity of the crop, and farmers often harvest the crop either too early or too late. Quality will deteriorate with shrinkage of the grains when the cob has not reached full maturity. When harvested late, the grains start dropping. Spillage, rodents, weevils and moisture cause the bulk of storage losses.

Our field survey has shown that smallholder farmers also do not achieve high productivity because they do not adopt improved farming practices. This is often caused by lack of funds to finance costly inputs. The incentive of smallholder farmers is both subsistence and earning of income from their produce, however smallholder farmers complain that they are basically price-takers because of the exploitative tendencies of aggregators and also because of their weak bargaining powers to negotiate with the aggregators²⁵. The farmers also have limited access to market information on prices, potential buyers, and premium markets for their produce. If they had access to this information it would enable them to increase the per unit price of sales, and ultimately their total income.

Women are not usually engaged in physical farming but are mainly responsible for the primary processing that takes place after harvesting of the maize. The important tasks they perform include drying, shelling and preservation of the crop.

The amount of harvested produce sold by a household ranges from 48% to 71% depending on factors such as the quantity reserved for home consumption, the number of produce given away as gifts, seeds reserved for subsequent seasons and post-harvest loss²⁶.

²⁴Ostermann, H 2013. *Losses in cassava and maize value chain in Nigeria and their ecological footprints*. GIZ Study in Kaduna State and Ondo State

²⁵Adeoti et al. 2014. *Determinants of Market Participation among Maize Producers in Oyo State*. *British Journal of Economics, Management & Trade* 4(7):1115-1127.

²⁶Adebayo Simeon Bamire, Tahirou Abdoulaye, Diakalia Sanogo, and Augustine Langyintuo (2010). *Characterization of Maize Producing Households in the Dry Savanna of Nigeria*

Medium scale farmers: this group of farmers has to 10 hectares of land. These farmers adopt modern farming practices and engage in mechanized farming, with better yields than the smallholder farmers. They often use improved hybrid seeds with better productivity for their maize crops. They either sell their produce to wholesalers or off-takers.

Large scale farming: there are few large scale private farmers in Nigeria with over 10 hectares of land who produce maize as a cash crop. Companies are also investing in large scale mechanised farming, mainly dedicated to supplying raw materials to their own processing industries in a form of backward integration. Some examples of this include Flour Mills of Nigeria that invested in Kaboji Farms, a 10,000 hectare farm as a backward integration supply channel to their animal feed subsidiary Premier Feeds. Other forms of large scale farming include contract farming with a large number of smallholder farmers, such as the Babangona Scheme that supplies Nestle Plc. and is managed by Doreo Partners.

Large and medium sized commercial farms engage with the small holder farmers in horizontal linkages where they act as input suppliers to the smaller farmers providing them with inputs. Their incentive is mainly to make higher returns from their produce and they are motivated by commercial considerations such as the return on investment on cost of their operations.

The major issues with these type of farms is that of unclear terms of engagement with their out growers, who feel that they do not get the best deals such as lower price, delayed payments or inadequate support and extension services from the company. This results in the farmers side-selling or diverting the produce to other buyers.

The level of innovation in the maize market is very limited with a potential to grow. However the Babangona contract farming project operated by Doreo Partners has recorded great achievements in linking the farmers to corporate bodies. Doreo Partners provides farmers with inputs, embedded information services, access to market for their products and in addition the farmers receive a quarterly dividend payment.

Flour Mills on the other hand, operates a different model as it engages in captive farming on a 10,000 hectare land to produce high yielding maize varieties. The farm is fully mechanised with the use of automated tractors, seed planters and combined harvester which improves efficiency and productivity, and operates integrated activities from its farm to feed factories. The produce from the farm does not meet the company's demand for maize so it purchases maize from the open market through aggregators.

3.2.3 Aggregation (from farm-gate to international grains market):

This is the stage the physical maize grain leave the farms and is exchanged by the farmers for money from the aggregators or is sold to the captive farms²⁷ or contract farming partners. The main activity at this stage is the assembling or collection of maize products from smallholder farmers by the rural aggregators, who are often agents of larger aggregators, for onward sale to the processing mills and wholesale markets. Medium sized farms sell directly to the wholesalers, sometimes through their agents. The aggregators also sell to their counterparts who supply the international markets to the North of the Nigerian border. Generally the aggregators are very powerful actors along the value chain because of their proximity to both farmers and markets, and the number of support services they provide the farmers such as provision of credit, inputs and information. Culture plays an important role in commercial relationships at the local level in Northern Nigeria and underpins the guiding principles in the informal trade of maize in the markets by the different categories of actors.

Rural grain traders: This group of aggregators are the first point of sale, and the closest in the value chain to the farmer. There are three methods operated by the rural traders. The first involves the farmer handing over to the trader an amount of grain to sell on his behalf for which he receives money after the sale, with the trader compensated for his effort through an agreed portion of grain from the farmer. The transaction is informal and often underpinned by trust between both parties through long established relationships between them or their close acquaintances. The second set of rural grain traders buy directly from the smallholder farmer, who brings his produce to the market. The trader buys at a price lower than the day's market price and the farmer receives his money immediately. The retailer resells the maize for a profit. In some areas of the North where women are retailers, they purchase directly from collection agents called Dillalai in bags or measures, depending how much they can afford. In such cases, the retailer does not have access to the farmers. The last set of rural grain aggregators act as collecting agents or assemblers for the medium and large-scale aggregators. They travel around maize producing villages to buy surpluses of farm produce in sacks. They normally cover a distance of up to 300 km or in some cases work through the Dillalai who collect maize and negotiate prices on their behalf.

Wholesalers: Regional and National grain wholesalers are the main linkage between the production zones in the North to the South Western parts of Nigeria where demand for

²⁷ The farms that have set up outgrower arrangements with smallholder farmers

industrial use of maize is high. These category of wholesalers in some cases own trucks or partner with trusted transportation companies to deliver bulk orders of 20-30 truckloads of maize packed in 120-125 kg sacks directly to client factories. Each truck carries between 217 bags to 226 bags depending on the weight of each sack.



This group of wholesalers also finance regional and national trade, by operating storehouses in key distribution markets, and operate in grains markets such as Saminaka, Giwa, Dandume and Kaura. They are key actors in the value chain as they procure maize through agents from farmers via input-financing and contract farming alongside other actors in both retailing and wholesaling along the value chain. These large wholesalers handle between 5,000 MT to 10,000 MT per year and have payment terms with customers of between 30-60 days.

The incentive of the wholesalers is to make profit on the sale of their grains though many operate on the informal level. The wholesalers engaged by multinationals or large corporations receive a Local Purchasing Order document that specifies the quality and specific characteristics of maize required by the companies. The business model of the wholesalers is built around their network of agents in on the rural grain aggregation level to guarantee their supplies. They also have arranged payment terms with the companies ranging from 30 days to 60 days.

Commission agents: commission agents are the agents to the wholesale grain dealers resident in markets. They facilitate large wholesale orders for a commission. Their different functions include: buying maize for contractors to processing companies; buying maize for company agents that make direct purchases in the market; assisting individuals who want large orders fulfilled; or making direct delivery to companies to fulfil orders.

International grain wholesalers: the international grain wholesalers handle the transnational trade on maize between Nigeria and countries such as Niger and Sudan in Dawanau Market, which is the largest grains wholesale market in Africa. This set of aggregators rely on the wholesale aggregators and regional market, such as Giwa, for their supply. Dawanau Market feeds or sells to major processors and big time buyers, while at the same time supplying buyers from neighbouring countries as far away as Sudan.



3.2.4 Rural and Industrial processors:

Processors are the next players in the value chain after aggregators. There are two major levels of processing at this point. There is secondary processing of maize into grits and powder for local consumption or for further processing. There is then a tertiary stage in which the processed maize from the secondary level is further processed into final product such as flour,

cheese balls and starch.

The rural processors operating at the secondary level serve a niche market within the local environs where they set up mills mainly to refine maize into grit or powdered grains for food consumption. The flour mills operate at both secondary and tertiary levels by processing maize into grit and then flour and other final products such as semolina, noodle and pasta. Feed mills also undertake secondary and tertiary processing as an additive to bulk up food manufacturing, starch and animal feed. The feed mills also produce grits for breweries who use the grits in the manufacture of beverages.

Processors can be classified into to three main categories of millers ranging from the artisanal mills found in local market places, through to semi-industrial, to modern industrial scale mills.

Artisans mills are rural hammer millers that mill maize with locally fabricated machines or mortars with their hand into flour for household consumption in rural areas and urban markets in Northern Nigeria. The milled flour is used to make local delicacies such as Tuwo, DaKunu and Masa The milling machine used by this set of millers have a capacity of between 0.5- 10 tonnes. Women form a large proportion of this group of actors as a means of generating income for their families. Customers come with their maize, which is processed for a fee based on the quantity milled.

Semi-industrial millers are established or growing commercial companies using mechanised equipment and modern production techniques for different processed meals for human and animal consumption. Maize constitutes about 60% of raw materials and is procured directly from aggregators or through suppliers. The method of procurement and payment differs for most of the companies. Some companies, perhaps because of their scale, pay on delivery of the maize, while others are able to bargain on payment

terms of about 1 month with the aggregators. Millers of this category process between 70 MT to 240MT of maize.

Industrial millers have large scale operations and are owned by multinational groups or large local corporations with state of the art equipment to process maize into different by-products for industrial use. These companies operate a registration scheme for maize aggregators to supply maize, and negotiate advantageous payment conditions of 30-60 days with stringent quality control inspections that often times lead to the refusal of low quality maize by the processors. Some of these companies also import maize for their poultry feed. Their capacity utilisation range from monthly usage of 50 tonnes and above.

Industrial processing is the transformation of the maize kernel into valuable food and industrial products. This is done by two processes. Dry milling yields grits, meal and flour as primary products and is used extensively in diverse industries such as animal feed, brewing, manufacturing of snack foods and breakfast cereal amongst others. Companies such as Nigerian Breweries, Grand Cereals and Dala Foods have dry milling processes. Wet milling of maize is where maize is milled to yield starch and other valuable by-products such as maize gluten meal and feed. The by-product is used for both food and no-food products. Industrial products of wet milling include starch, oil and animal feed.

Key Players

Golden Feed Limited: The company operates a 30,000 MT feed mill making different types of poultry feed under its Golden Feeds brand. The company does not engage with smallholder farmers but obtains its maize directly from aggregators it has worked with for a long period. The lack of consistent quality and the amount of impurities in the supplied maize is a source of concern for the company as it impacts upon the quality of its products.

Arewa Foods & Packaging Limited: The company manufactures its range of food products all derived from maize. It makes Garin Masara, Burabisco and MasaVita from a special local maize variety called Yar Aurre. All the products are fortified with vitamin A. The company purchases its maize grains from the open market directly from aggregators. Its products are packaged in family and economic sizes to improve accessibility of products to consumers.

3.2.5 Uses of maize

Maize is widely used in different industries; maize flour is used in tertiary processing after the value addition process of converting maize grains to flour for manufacture of different products. The section below identifies the key industries that require the refined maize products with profiles of key players in each of the sectors.

Beverages: the imposition of a ban by the Government on imported barley in the early eighties was instrumental in the conversion of local brewery companies to sorghum and maize in a bid to continue their business operations²⁸. Breweries adopted the use of maize grits as an input into their beer making process. The brewers initially invested in farms through backward integration to guarantee supply and control of their raw materials procurement. This was largely unsuccessful because of the brewers inability to effectively control their non-core farming operations in remote locations. Outsourcing the function of processing maize grits to flour mills/their contract millers has been more successful. Certain qualities such as high protein content, low fat matter and high degree of friability are set as standards for procurement of the grain by the brewers.

Key Players

Nigerian Breweries Plc (NBL) is the largest brewing company in Nigeria with factories in different parts of the country. The company produces a range of alcoholic and non-alcoholic beverages. NBL has also invested in the development of a special variety of sorghum for its malting operations and procures its refined maize products from a mixture of large and small suppliers.

Guinness Nigeria Plc is the second largest brewing company in Nigeria. The first factory built in Lagos was the company's first outside the British Isles. Guinness Nigeria produces alcoholic and non-alcoholic beverages. The company participated in a BIF 1 project which was not realised. The company has extensive logistics chain of local suppliers for maize.

Flour mills: although wheat is the preferred raw material of majority of Nigerian flour millers as it has a higher conversion rate of nutrients and profit margins than maize, there is scope for conversion to maize as attested to by the creation of new maize-based products. Demand is growing for semolina, grits and fortified flour with increasing export of finished products is supported by Government policies, which are encouraging such

²⁸ Oyelaran-Oyeyinka, B. (2002). *Manufacturing Response in a National System of Innovation: Evidence from Brewing Firms in Nigeria*. United Nations University

substitution to reduce food import bills. The large flour millers often procure their maize from registered agents who have to meet their quality specifications while the smaller firms have regular suppliers or in some cases, buy directly from wholesalers in the grains market.

Key Players

Grand Cereals is a subsidiary of United Africa Company (UAC), a Nigerian multi-national with interests in food processing. The Grand Cereals factory processes maize into flour, grits and offals²⁹ as by-product. It markets its maize flour as the best in the country. Grand Cereals has worked with MARKETS II (USAID) to include smallholder farmers amongst its registered suppliers. During the BIF pilot phase, the project worked on a smallholder finance scheme driven by Stanbic IBTC bank and Grand Cereals.

Animal feed: in Nigeria contains a high proportion of maize, especially in poultry feed where it comprises between 60-70% of the ingredients. Maize is an important source of energy hence its use as a major component of livestock feed. There are instances where maize is scarce because of the multiplicity of its uses. Large poultry farmers import maize during this period to assist their forward planning.

Key Players

Signal Feeds are a subsidiary company of UAC. They have two factories, one in Jos and the other in Kano of 18,000 MT and 6,000 MT respectively. Their factories process pelletised poultry feed. They receive their maize supplies from registered suppliers who may include wholesalers and farmer cooperatives. The company has in-house laboratory units on site at its factories to test the samples of maize before purchase.

Premier Feeds: The company is a subsidiary of Flour Mills of Nigeria, which specialises in the production of animal feed with its Top Feed brand. The company has two factories in the country with one of the factories producing 300,000 tonnes. Each of its factories is fitted with testing laboratories to ascertain the quality of the maize supplies. The company also receives some of its maize supply from Kaboji farms another subsidiary of the parent company. Other methods of maize procurement are through suppliers and wholesalers with formal contracts with the company.

²⁹ A technical term for the by-products of milled grains

Honeywell Flour mills: The group has invested significant amount to research the animal feed industry and will complete its multi million dollar animal feed factory in Southern Nigeria in 2016. The estimated capacity of the factory is 350,000 MT. The company has indicated that it will seek to build a supply chain but will not engage in captive farming.

Food processing: many popular processed infant foods in the country have a high proportion of maize in their ingredients. There are also new products being developed due to changing consumer tastes and preferences, which are driving the high industrial demand for maize in the country.

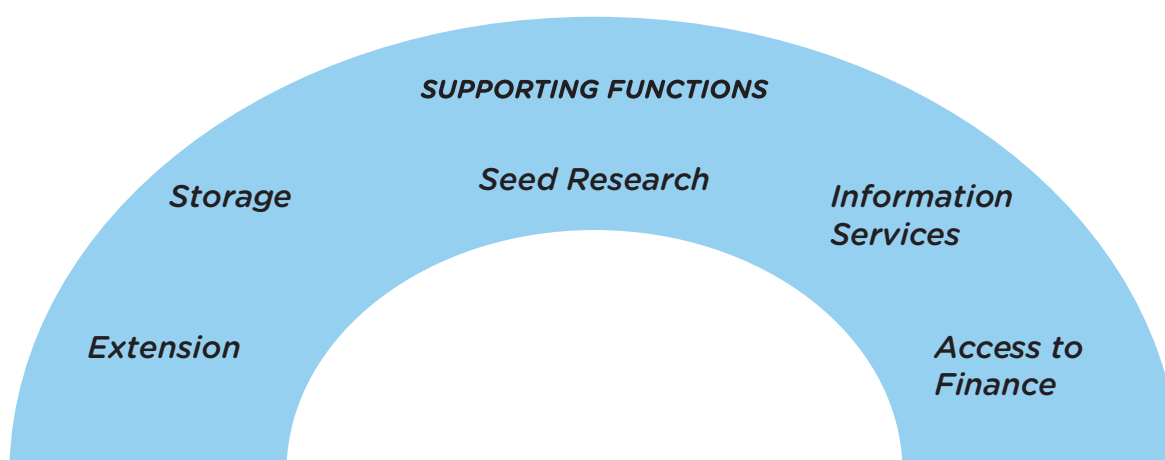
Nestle Nigeria Plc is one of the largest users of maize for its food processing activities. The company has a dedicated infant cereal line that uses maize as its main ingredient of all the products. The company has also been proactive in establishing linkages with local farmers through its different out grower schemes and purchase of maize from contract farmers. Nestle has also spearheaded efforts to improve the quality of its maize supplies by engaging with farmers to reduce of mycotoxins through its capacity building sessions that have been attended by over 4,000 farmers till date.

Dala Foods Nigeria Limited is an innovative food processing company based in Northern Nigeria. The company produces different local beverages and food products such as kunu and couscous derived from maize and other local crops. The company also produces food supplement for malnourish patients on contract from global health organisations. The company also exports its products to the neighbouring countries such as Niger, Sudan and Chad.

3.3 Supporting Functions

Figure 8 captures the range of functions that support the core market performance described in the earlier section. Please also refer to the BIF Nigeria Political Economy Analysis for further information on general constraints that impact on the aquaculture market, especially in regard to issues covered in section 3.3.2 and 3.3.5

Figure 8: Supporting Functions



3.3.1 Seed research and production

The International Institute of Tropical Agriculture (IITA) and Institute of Agriculture Research (IAR) have been responsible for introducing new varieties of both improved hybrid and OPV seeds to maize farmers in conjunction with private seed companies such as Premier Seeds. New varieties that have been developed include seeds resistant and those with genes that have tolerance for low soil-nitrogen and drought stress resistance at the most drought-sensitive stage (flowering and grain-filling periods) to improve incomes and livelihoods for farmers. The National Committee on Registration and Release of Crop Varieties, Livestock Breeds and Fisheries recently released new hybrid maize varieties, which were developed by the Institute of Agricultural Research Zaria, Seed Co West Africa, IITA, Institute of Agricultural Research and Training and DuPont Pioneer Seeds.

The new hybrid maize releases are SC719, 30Y87, 30F32, P48W01 and P48W03. The new varieties have different characteristics. Hybrid SC719 has high grain yield and large grain size. Maize hybrid 30Y87 has tolerance to lodging and high protein content. Maize Hybrid 30F32 has high grain yield resistant to root and stalk lodging and high protein content and Maize Hybrid P48W01 is resistant to striga and is endowed with characteristics for striga control³⁰. These seed varieties will meet industry specification on maize qualities by virtue of their characteristics of improved flour yield and dent.

There are several bottlenecks hindering the development and distribution of improved seed varieties to the farmers. The new seeds are often unavailable in commercial quantity, limiting the penetration of the seeds in rural areas where most of the farmers reside.

²⁹ www.Businessdayonline.com/2014/06/government-releases-11-high-yielding-crop-varieties-to-farmers/#.VAQJC_mwK5k accessed 07/09/14

There is also a lack of awareness of the available varieties and hybrids as the pilot seed testing are often limited to 30 participating farmers in the best field tests³¹.

The structure and ownership of the research institutions do not encourage these institutions to be proactive in engaging with seed companies to understand how to improve the level of collaboration between the parties that will enable them to develop customized seeds that will meet the differing needs of the various industrial processors. There also seems to be no concrete business plan by these institutions for multiplication and commercialisation of successful seed breeds, giving a window of opportunity to deepen the existing relationships between the institutes and companies marketing their seed varieties.

3.3.2 Extension services

Extension workers are a key source of information for farmers maize to adopt new and modern agronomic practices involving new methods of cultivation, application of inputs in the appropriate quantities and knowledge on better harvesting practices amongst other farming activities. This group of workers is normally attached to the State ADPs.

The work by public extension workers is being complemented by services provided by limited private sector extension workers for fee. These set of extension workers are mainly driven by commercial consideration and tend to be more knowledgeable and current in modern practices and therefore more expensive especially for smallholder farmers. Thus they are currently mainly serving only smallholder farmers in outgrower schemes, and medium and large scale farmers who are able to afford their services.

3.3.3 Information services

Information services are essential to smallholder farmers as they provide access to better cultivation methods, assist farmers to learn about how to effectively and efficiently apply agricultural inputs and provide access to current prices of maize grains in the market. Smallholder farmers in Northern Nigeria, currently have some access to radio programmes aired on radio such as from FRCN Kaduna and Farmers Radio as other forms of information provision are not as widespread due to the farmers' level of literacy and geographical dispersion.

³¹ Tahirou, A, Sanogo, D, Langyintuo, A, Bamire, S, Olanrewaju A (2009). *Assessing the constraints affecting production and deployment of maize seed in DTMA countries of West Africa.*

Despite the best efforts of the information producers, several vital bits of information are still not provided on the radio shows. Information such as weather forecasts, real time prices of agricultural produce and availability of new products on the market are not regularly aired. There are therefore profitable opportunities for radio stations to produce high quality programmes to fill the gaps. However what we found in our research is that they are constrained by lack of capacity in areas such as research and lack of avenues to generate revenue through advertisements. Our survey also showed that farmers are unable to access vital information that will bridge the gap created by the inadequate extension services and improve their productivity on their farms.

3.3.4 Collective action storage and warehousing services

In the past, Grains Marketing Boards provided the function of storage and collection alongside the provision of credit to farmers to buy inputs. These boards were also access points to the market. Because of the level of collusion between corrupt board officials and businessmen to the detriment of the farmers, they were scrapped, leaving the farmers to engage directly with the market.

Smallholder farmers in Nigeria are often fragmented and do not operate in associations or cooperatives so they are often price takers who are unable to form a critical mass to improve their bargaining power through collective negotiations. Smallholder farmers also do not realise the advantage of storing maize to sell at a later date, or possess the requisite storage infrastructure required to do this.

Farmers that engage in contract farming are able to benefit from aggregation schemes, for example the outgrowers in the Babangona franchise model. The warehouse receipts system is a more sophisticated form of aggregation. This is being developed in a public private partnership between Federal Ministry of Agriculture and Africa Exchange Holdings. Their plan is to privatize the Government-built specialised warehouse where crops are stored, and then hold grain until it is sold through electronic means. The aggregation will be done by large scale wholesalers to increase their profit margins on produce sold. Farmers have not demonstrated enough interest in such schemes yet because of their cultural beliefs, low level of organisation and pressing financial needs. This has often meant that poor smallholder farmers are unable to store their produce, and so maintain a preference for immediate sale of their produce shortly after harvest.

3.3.5 Access to finance

There are two major sources of access to finance for Nigerian smallholder farmers: formal and informal. The smallholder farmers prefer the informal channels of finance because of the proximity and ease of access of the lenders who are often relatives, friends, neighbours or local aggregator. There are other sources of funds such as the local moneylender and farm associations, which require some form of collateral or guarantee than the first group of local lenders. Generally the lending is based on trust and recognition.

Farmers may borrow cash or grains, inputs and equipment needed to cultivate their land on credit, and terms of repayment may be in kind or cash after the sale of the harvested produce. Informal borrowings are often limited and inadequate for financing major agricultural activities on a farm³².

The formal financial institutions such as deposit banks and microfinance banks do exist but are mainly urban based and highly averse to lending smallholder farmers. Most of these financial institutions systematically exclude smallholder farmers because of their loan requirements, farmers lack of collateral, high interest rates, high cost of loan administration and repayment terms without taking into account the agricultural production cycle. Government in recognizing the lack of inclusion of smallholder farmers in the formal financial system has implemented several credit schemes that have achieved very little success such as Agricultural Credit Guarantee Scheme.

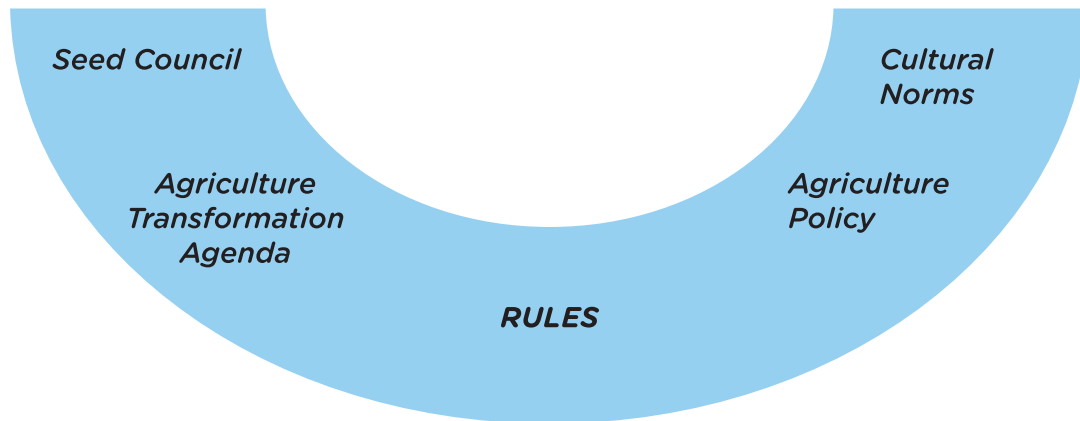
3.4 Rules

Figure 9 captures the major rules within which all players in the market are expected to operate. The rules are both formal and informal and influence the rules of engagement governing values, relationships and social norms within the market.

Please also refer to the BIF Nigeria Political Economy Analysis for further information on general constraints that impact on the aquaculture market, especially in regard to issues covered in section 3.4.1

³² Ejike. O.L. 2012. *Financing agriculture in Nigeria: Issues and Solutions*. *Journal of Research in Pure and Applied Sciences* Volume 1 No1 June 2012

Figure 9: Rules



3.4.1 Formal rules

The basic components of the Agricultural Transformation Agenda (ATA) of the present Government include the development of value chains in selected key crops: rice, cassava, sorghum, cocoa and cotton. Maize is not among the selected crops but the crop has benefitted from a similar initiative between 2006 and 2008 that sought to double crop production. Ultimately the weak links in the chain for each of the crops will be developed to ensure that the entire value chain from production to consumption is simultaneously developed.

Government lifted the ban on the importation of maize into Nigeria in 2008 and a 5% tariff is levied on corn imports and which is only allowed for animal feed use, particularly poultry feed. There was uncertainty after the lifting of the ban. Poultry farmers did not commence imports until there was a scarcity in the market after some farms were destroyed by flooding in 2012³³.

The price of locally produced maize has been competitive averaging \$400 per tonne in the last three years as compared to \$420 per tonne for the imported maize. During off-season, domestic maize prices can increase to more than \$600 per tonne. The Government reserves the right to revert to earlier restrictions as pressure from stakeholders mount to protect the local industry.

³³ USDA 2014

3.4.2 Informal Rules

Culture and social norms have a major role to play in the trading of maize in Northern Nigeria where most maize is traded. Smallholder farmers often exchange their maize produce in local markets where the norms of engagement have long been established and are mostly informal in nature, although they dictate the way that transactions are undertaken at all levels of the markets.

As mentioned above, rural aggregators are the first point of exchange for the traders and they hold bargaining powers in price negotiations over smallholder farmers, especially where farmers are not organized into groups. Aggregators are able to exploit the lack of information on process at other markets, lack of collective front and fragmented nature of smallholder farmers to set prices to their advantage or well below the buying prices of large aggregators.

There is also a high degree of informality between the rural aggregators and large aggregators as the former often act as agents to the latter, visiting rural areas to acquire maize on their behalf to acquire maize at an agreed price. The relationship between the large aggregators and the processing companies is formal as each supplier is registered under the contract laws of Nigeria and is issued a Local Purchasing Order that specifies the characteristics of maize required by the company. The document also states the price at which the produce will be bought and the terms for refusal if the produce does not meet specifications.

A small number of farmers are beginning to engage in contracts farming with signed agreements between them and the off-takers. However for the majority of smallholder farmers, they are mainly price takers and are unable to negotiate better prices as they run their businesses on individual basis limiting their ability to improve their negotiation in a collective way.

3.5 Cross-cutting issues

3.5.1 Gender equality and social inclusion

Culture and tradition play a major role in dictating the nature of activities that can be taken upon by both men and women in Northern Nigeria. This has influenced the nature

of economic activities that are carried out in the rural communities. Farmland in the North is mostly owned by males in the household³⁴, who are the key decision makers in the utilization of key resources in the home.

Labour allocation is divided between crop production and crop processing along gender lines as evidenced by a study³⁵, which found that 81% of adult male and 71% of male children engaged in crop production while 57% of adult females and 36% of female children engaged in crop processing.

Women are mainly involved in preliminary processes that take place on the farmland such as shelling, drying, cleaning, sorting and storing. The marketing activities are often carried out by the males in the households who take the sacks of maize to the closest market for sale. Women are not fully integrated into the maize value chain as they perform roles limited to their households and are not involved at the higher levels of the value chain.

3.5.2 Environmental and climate change

The Nigerian guinea savannah zone provides the best ecological condition for maize cultivation according to FAO (2013) and there is little evidence that the cultivation of maize has adverse effects on the environment. Rather it is the adverse climatic conditions in the zone that is stirring the development of innovations in the area.

Drought is a major devastating occurrence in Northern Nigeria as in recent years there have been uneven rainfall patterns or in some years a cessation of rain. This occurrence poses a great threat to the livelihood of the farmers. To address this, researchers from the IITA have developed drought resistant varieties of extra-early hybrid maize with optimum yield across areas of the country ravaged by drought, striga and low soil nitrogen content. The seeds are undergoing the seed certification and registration process before being commercialized for eventual distribution to farmers in the affected areas.

³⁴ Kamara et al 2013. *Baseline study of smallholder farmers in Striga infested maize and cowpea growing areas of Northern Nigeria*. International Institute of Tropical Agriculture.

³⁵ Chianu et al 2007. *Gender differences in Labour Allocation in West Africa: A Case Study of the Savannas of Northern Nigeria*.

4 Constraints Analysis



We have identified the following constraints to poor people benefitting as much as they could from the maize market system. The four key constraints are that:

1. *Farmers have poor post-harvest handling practices which result in high post-harvest losses;*
2. *Farmers are unable to access the growing industrial demand for maize since they do not produce the quality or varieties required by processors;*
3. *Farmers employ poor agronomical practices which affect their productivity;*
4. *Farmers use limited amounts of key productivity enhancing inputs such as fertilisers.*

Constraint 1: Farmers have poor post-harvest handling practices which result in high post-harvest losses.

Poor post-harvest handling practices by smallholder farmers often results in high level of impurities in maize supplied by farmers and high post-harvest losses which in turn results in smallholder farmers being unable to maximise income from maize farming. There are number of reasons for the poor practices. Farmers do not have appropriate knowledge of best practices in post-harvest handling of maize. They also do not have access to modern and affordable post-harvest handling equipment such as maize threshing machine which the farmers claim are not produced and supplied in adequate quantity and affordable prices by the input producers. Another reason is that farmers lack access to good storage/warehousing facilities because they cannot afford suitable storage facilities.

Constraint 2: Farmers are unable to access the growing industrial demand for maize since they do not produce the quality or varieties required by processors.

Small number of smallholder farmer are producing the specific quality or varieties of maize needed to meet the growing demand by industrial processors which results in farmers mainly producing for consumption and getting low price per tonne of output and consequently being unable to maximise income from maize farming.

There are a number of reasons why smallholder farmers are not supplying the required improved maize to processors. Smallholder farmers do not know nor have access to improved varieties of seeds which is attributed to the fact that appropriate varieties and adequate quantity of seeds are not being developed and supplied by seed producers. This in turn is due to seed multipliers not seeing a clear business case in investing in such a venture. Our discussions with seed multipliers and suppliers indicate that the lack of a clear business case is a result of the seed multiplier's, and supplier's, perception that smallholder farmers are not willing to pay for improved quality seeds as they tend to use saved seeds from previous farming. The farmers we met during our field trip, on the other hand, complained that they do not see the benefits of investing in improved seeds which translates to higher production cost and at same time they are unable to access the price premium for improved maize from the processors. The situation is further compounded by the fact that smallholder farmers do not know the specific maize varieties required by processors because of weak linkages between the smallholder farmers and processors as smallholder farmers usually deal directly only with aggregators.

Constraint 3: Farmers employ poor agronomical practices which affect their productivity.

Smallholder farmers employ poor agronomical practices. They adhere to traditional practice of cultivation which results in low yield per hectare and sub-optimal income. There are several causes for the poor agronomical practices, including weak knowledge of modern farming practices because of limited access to extension and information services, and insufficient Government funding of extension services. This insufficient funding is caused by the lack of Government priority given to smallholder farmer's needs.

Farmers have complained that private extension workers are limited in number and expensive, which can be attributed to high barriers to entry into the profession as well as the lack of a clear business case for engaging in private extension services which is generally seen as unrewarding.

Farmers' poor agronomical practices can also be traced to the limited number and outreach of existing contract farming because previous attempts at this approach have not delivered the results desired. There are a number of reasons for this, ranging from low incentives for major actors, to unclear terms and conditions of engagement, as well as side selling by some farmers and poor coordination among others. However, there are now renewed efforts to revive contract farming under clearer rules of engagement and incentives as evidenced by the Kaboji Farms and Babangona experiences discovered in our field study.

Constraint 4: Farmers use limited amounts of key productivity enhancing inputs such as fertilisers.

The limited use of key productivity enhancing inputs such as fertiliser causes low yield per hectare for farmers and suboptimal income. The limited use of inputs is attributable to a number of factors. First, subsidised inputs do not reach the farmers in sufficient quantities because of the prevailing political patronage and rent seeking behaviour of Government cronies that divert the fertiliser to the open markets where they are sold for higher prices resulting in poor farmers unable to purchase adequate quantity of such inputs.

Secondly, there is limited availability of affordable small sized packaged inputs as agro-dealers only make large sized packages which are too costly for the farmers to buy. Additionally, there are also limited distribution channels for these key inputs limited to urban areas and towns as against villages and rural areas where the majority of the smallholders farmers are located. The urban concentration of input distribution has often resulted in sales of adulterated inputs in the market with attendant low productivity for the farmers.

4.1. Root causes

We have analysed these constraints in order to identify the root causes of each constraint and to then design interventions that can remove these root causes and thereby address the constraint. Our analysis of the root causes, and proposed interventions, are presented in Table 3.

Table 3

Constraints	Underlying causes	Related supporting and enabling functions	Root causes	Intervention
Farmers have poor post-harvest handling practices which result in high post-harvest losses.	Farmers do not have access to good storage facilities	Storage Services Aggregation Services Financial Services	Farmers cannot afford to pay for good storage facilities as they do not use warehouse receipts system. Lack of private aggregation services to support farmers to access warehouses	Intervention 1: Work with warehouse storage service provider to improve access to viable storage options through a warehouse receipts systems e.g. working with models such as Africa Commodity Exchange and Stanbic IBTC. Intervention 2: Promote private aggregation services to facilitate farmer access to warehouse facilities. e.g. as is done by some of the middlemen in in Dawanu market.
	Farmers do not have appropriate knowledge and/or equipment for post-harvest handling	Equipment Services Extension & Information Services	Farmers do not have access to post harvest handling equipment because Producers of threshing equipment are not producing enough of the equipment for sale.	Intervention 3: Support equipment providers in the production, distribution and marketing of affordable post-harvest handling equipment to farmers e.g. supporting local technicians who fabricate thresher machines in Kano.
Limited farmers are producing the quality or varieties of maize demanded by industrial processors	Farmers do not have access to improved varieties of seeds and do not see the benefit in investing in them	Seed Services Extension & Information services Contract farming	Seed multipliers are not producing sufficient quantities of these seeds since there is an unclear business case Farmers have weak linkages to industrial producers and are unable to access price premiums for improved maize Farmers are not willing to pay for seeds and use saved seeds because farmers have higher inputs costs when using improved seeds	Intervention 4: Support seed companies to develop a sustainable model for the multiplication and distribution of maize seeds e.g. working with Value Seeds which runs an efficient service where it provides embedded services to farmers to justify the use of the right seeds . Intervention 5: Facilitate an expansion or development of the franchise model of contract farming where farmers get a cut of price premiums. e.g. helping to replicate The Doreo Partners Model of contract farming called Babangona Farms.

Table 3- cont'd

Constraints	Underlying causes	Related supporting and enabling functions	Root causes	Intervention
Farmers use limited amount of productivity enhancing inputs and employ poor agronomical practices which affect their productivity	Farmers have weak knowledge of modern farming practices and have limited access to fertiliser and other inputs.	Extension & Information Services Input supplies	Weak public provision of extension services and lack of private alternative. Limited outreach of contract farming arrangements. Existing arrangements do not always provide embedded information. Limited distribution of affordable small packed fertilizer Subsidised inputs are not reaching the farmers in sufficient quantities	Intervention 5: Facilitate an expansion or development of the franchise model of contract farming where farmers get a cut of price premiums. e.g. helping to replicate The Doreo Partners Model of contract farming called Babangona Farms. Intervention 6: Work with an input supplier with grassroots distribution network for appropriately sized input packages, to bundle a range of inputs needed by smallholder farmers embedding information and advice with such sales. e.g. expanding the model used by TAK Agro-Allied for inclusive distribution.

5 Market Strategy



5.1 Strategy statement

BIF Nigeria's vision for the Maize Market is enhancing smallholder farmers' income through higher productivity such that they benefit from the increasing utilisation of maize in different industries. This will be achieved through the adoption of improved farming methods and the creation of premium earning marketing channels to sell their produce to the industrial users of maize.

The market changes BIF envisages include improvement in access to viable and sustainable storage options through warehouse receipt systems, the promotion of seed multiplication of improved varieties required by industrial processors, and an improvement in linkages between smallholder farmers and processors through cascading contracts or contract farming with embedded information services.

BIF interventions are aimed at increasing the ability of farmers to leverage the growing needs of different processors that currently exist in the market but which the farmers have not yet been able to benefit from. For example, there is growing consumption of products such as tortillas, cheeseballs, baby food and cereals and new products being offered by flour mills in Northern Nigeria.

5.2 Opening portfolio of interventions

Intervention 1: Improve access to viable quality storage options through warehouse receipts system for storage facilities by working with private warehouse storage providers.

Market underperformance: Most smallholder farmers require good quality storage facilities as they need to preserve their harvested produce for 7-9 months or to the next farming season for sustenance. Furthermore, to maximize income the farmers need the storage as produce prices at harvest period are generally low due to over-supply. Prices within 90-180 days of harvest can improve between 50-100% depending on demand and supply.

As explained above, NAERLS surveys have found that smallholder farmers sustain a huge amount of losses, estimated often as high as 30% because the majority of the smallholder farmers do not have access to appropriate and modern storage facilities resulting in the harvested grains being exposed to insect infestation and contamination which renders the grains unfit for consumption. They also observed that given the high chance of the farmers losing a large chunk of produce to insect infestation they are forced to sell their produce during harvest at lower price (as low as 48% of the potential price) than would have been realized had the crop been warehoused and sold it after say 90-180 days. This price differential is most often passed to aggregators who buy and warehouse produce.

Vision of change: The envisioned change is the provision by private service providers of modern, good quality and affordable warehousing and a receipts services to smallholder farmers to enable them store maize for sale at a later date to earn higher income. Smallholder farmer can also be able to access finance using the warehousing receipt as collateral.

Overview of intervention: BIF aims to facilitate the development of commercially viable modern, good quality and affordable storage options with a warehouse receipts system by the private sector. This will create opportunities for groups of farmers to preserve their

produce, at the quality and grade required by the industrial users, for sale at appropriate time. This system can also serve as a platform for linkages with industrial buyers through bulk sales of the maize.

There are a number of models being considered that include the African Exchange (AFEX) Holdings model and the Stanbic-IBTC model.

The Stanbic model is in line with the larger plan by the Nigeria Commodity Exchange (NCX) to introduce a novel electronic warehouse receipts system (e-WRS) in Nigeria that will engender integrity of transactions, transparency, and sustainability. Stanbic IBTC is already acting as the settlement bank for transactions on the e-WRS³⁶. The e-WRS platform will enable farmers to place their commodities at a Stanbic accredited warehouse in different parts of the country and in turn the farmers will be issued an electronic receipt stating the produce details such as commodity type, quality and quantity, owner and other relevant information. The farmers have the choice of using the receipt as collateral to obtain bank loans or for trading on the exchange. Another option being offered by the new platform is for the farmers to keep such commodities in the warehouse until their prices stabilise or appreciate and they can then sell their produce thereby maximizing their income³⁷.

On the other hand, AFEX Holdings in July 2014 launched its two-year pilot phase of the warehouse receipt system covering seven states- Kano, Kaduna, Katsina, Zamfara, Kwara, Gombe and Oyo. AFEX is the pan-African commodity exchange company founded by Tony O. Elumelu, Chairman of Heirs Holdings, Nicolas Berggruen, Chairman of Berggruen Holdings, and Jendayi Frazer, President of 50 Ventures, which was started to establish commodity exchanges across Africa³⁸. Nigerian farmers may now use receipts for their produce as collateral for loans. The electronic warehouse receipt platform deployed by AFEX is meant to enable Nigerian farmers, cooperatives and traders to safely store their produce at accredited warehouses and access financing. When fully operational, the new warehousing project is expected to significantly reduce the risk of lending to stakeholders in the agriculture sector, by providing secure storage and real time online tracking of warehouse receipts; increasing speed and reducing transaction costs.

Our field study suggest that AFEX may have been granted concessions to a number of silos through its strong political connections. These were hitherto being used for the Nigerian Strategic Grain Reserve (SGR) under the Federal Ministry of Agriculture and Rural Development (FMARD). This may confer a competitive advantage on AFEX over other rivals in the market. It seems this is one of the key strong point that enable AFEX to be able to commence WRS operations within just two months of signing an MOU with FMARD which is surely a record speed in public private partnerships in Nigeria. The ware

³⁶ <http://dailyindependentnig.com/2014/08/stanbic-ibtc-assures-farmers-others-e-warehouse-receipt-system>

³⁷ <http://businessnews.com.ng/2014/06/26/exchange-boa-stanbic-ibtc-float-trading-platform-commodities/>

³⁸ <http://www.tonyelumelufoundation.org/pressreleases/african-exchange-holdings-delivers-receipts-system>

house receipt system for commodity crops is receiving interest from financial companies with Stanbic IBTC and AFEX having limited presence with plans to significantly scale up. This makes them prospective partners though neither has been contacted till date. We are likely to work with Propcom who are assisting AFEX in the implementation of their new warehouse receipt system. ENABLE 2 is also a potential partner in assisting the cooperative with sustainability and advocacy issues.

Activities for this intervention will include:

- Identification of interested farmer cooperatives and creation of awareness and buy-in in for adopting the warehouse receipt system;
- Provide TA, including building a clear business case and model, as support to private sector warehouse receipt services providers such as Stanbic IBTC and Africa Commodity Exchange which will enable them to engage smallholder farmers successfully;
- Facilitate improved and mutually beneficial relationship between the aggregators that take grain to the silos and farmer cooperatives.
- Potential results will include:
- A number of farmers cooperatives adopting the warehouse receipt services for storage and collateral;
- Increasing use/implementation of an improved and well defined strategic business plan by private sector warehouse receipt services providers such as Stanbic IBTC and AFEX; and
- Reduction of post-harvest losses for smallholder farmers, as well as higher premium obtained by these farmers from sales of maize to industrial users.

Intervention 2: Promote private aggregation services to facilitate farmer access to warehouse facilities.

Market underperformance: Smallholder farmers are unable to aggregate their maize produce for sale because of their inability to effectively run cooperatives and small size land holdings. Additionally, there are few private sector service aggregators providing such services.

Vision of change: The envisioned change is to increase in the number and activities of private sector aggregators within the maize value chain that can lead to farmers having trust in aggregators and use of their storage facilities, which may include contract farming arrangement.

Intervention overview: BIF aims to create effective linkages between smallholder farmers and private sector companies providing aggregation services to enable the farmers to benefit from such services. The model being considered here is provided by the Babban Gona scheme being run by Doreo Partners. The Babban Gona scheme, as detailed in the market analysis above, is an agricultural franchise developed by Doreo Partner aims at improving the livelihoods of smallholder farmers. It works by franchising grass root level farmer organizations known as 'Trust Groups,' which provide a sustainable, private sector channel for cost effective delivery of enhanced agricultural technologies, credit and services to farmers that optimize yields and labour productivity while simultaneously improving market access. The farmers sell their maize to Doreo at an agreed market price, Doreo then sells to uptakers and shares part of the profit made with the farmer.

The Trust Group model has been quite successful with smallholder farmers as co-owners of the aggregation business which enables them generate more income from their farming activities. We gathered that during the 2012 harvest season, the best performing Babban Gona farmer yields were 5 times higher than the national average and he earned \$1,350 per hectare net of his Babban Gona credit facility. We were also informed that as a result of its success Propcom Mai-karfi recently purchased Nigeria's first social impact bond known as the Raise Out of Poverty Bond (ROPO), making it the first international development agency to subscribe to the bond. The ROPO bond, issued by Babban Gona Farmer Services Limited finances the working capital requirements of the smallholder farmers in Kaduna³⁹.

Doreo Partners are the major drivers of the Babban Gona scheme and are a potential partner for BIF. Doreo Partners is an impact investment firm with a proven track record of exclusively investing in profitable, high growth, early stage businesses that improve the livelihoods of Nigerian smallholder farmers

The Dawanau market aggregators are also strong candidates to partner BIF, given their wealth of experience and contacts. Collaboration with ENABLE and PropCom will also be considered.

Activities for this intervention will include:

- Identifying interested farmer cooperatives and create awareness and buy-in in for them to sell direct to private sector aggregators that are supplying industrial users or the warehouse system;
- Provide TA to private sector aggregators which can create will enable them to engage smallholder farmers successfully; and
- Find way to support the replication of the Babban Gona model.

³⁹ <http://www.doreopartners.com/press-release-dfid-purchases-nigerias-first-social-impact-bond/>

Potential results will include:

- Farmers cooperatives selling directly to private aggregators supplying industrial users or increasingly using warehouses for storage;
- Increasing implementation of an improved and well defined supply chain business model and plan by private sector warehouse aggregators;
- higher premiums obtained by smallholder farmers from the private aggregators supplying industrial users; and
- Increased number of private aggregators offering various embedded services as incentives for smallholder farmers.

Intervention 3: Support agricultural equipment providers in the production, distribution and marketing of affordable post-harvest handling equipment to farmers.

Market underperformance: the majority of farmer have limited knowledge of, and insufficient access to, cost effective technologies for post-harvest activity such as threshing machine. This causes significant post-harvest losses. This situation is compounded by the limited quantity of the equipment being supplied and distributed.

Vision of change: The vision is adequate supply and widespread use of agricultural equipment to smallholder farmers in remote rural areas of Northern Nigeria. This will be achieved through support to agricultural equipment producers and suppliers in the production, distribution and marketing of modern and affordable post-harvest handling equipment to farmers.

Overview of intervention: BIF will support equipment providers through TA, such as developing a cost effective supply chain model in the production, distribution and marketing of affordable post-harvest handling equipment to farmers. BIF Nigeria has identified a number of local small and medium sized engineering enterprises in Kano and Kaduna presently supplying limited quantity who will serve as entry points to accessing the producers. They include Affordable Energy Solutions Limited, Kamilu Holdings Services, Tendency Technical Limited, Agricultural Technical Enterprises Kofa Falala Technologies, among others.

Activities for this intervention will include:

- Developing a network of equipment manufacturers interested in expanding their current market base for knowledge sharing and economies of scale, possibly using an industrial cluster and shared input procurement; and

- Provide TA support to the network to develop proactive and feasible marketing strategies to reach smallholder farmers with services such as after-sale services and embedded information services.

Potential results will include:

- Existence of a vibrant network of equipment manufacturers sharing knowledge enjoying economies of scale;
- Development and implementation of proactive distribution and marketing business model and plan by equipment providers;
- Improved knowledge of existence and use of post-harvest equipment and practices such as threshers by smallholder farmers; and
- Widespread access and use of affordable post-harvest equipment by farmers.

Intervention 4: Support seed companies to develop a sustainable model for the multiplication and distribution of maize seeds with embedded services.

Market underperformance: as stated earlier, appropriate varieties and adequate quantity of seeds are not being developed and supplied by seed producers due to lack of clear business case by suppliers and their perception that smallholder farmers are not willing to pay for improved quality seeds. The farmers also do not also see the benefits of investing in improved seeds which translates to higher production cost while they are unable to access the price premium for their produce. They also do not know the specific maize varieties required by processors because of weak linkages between the smallholder farmers and processors.

Vision of change: the vision is adequate supply and widespread use of improved maize seed varieties to smallholder farmers in remote rural areas of Northern Nigeria.

Overview of intervention: BIF will work with seed production companies to assist them in building sustainable business model to encourage farmers to increase their use of improved seed varieties required by industrial users.

Value Seeds is a potential partner. The company runs an out growers scheme with over 1,000 farmers in Kaduna and Niger States. The company has demonstration plots on a portion of each participating farmer's land. The company provides embedded information services alongside seeds and other inputs to farmers through its agents who regularly visit the plots to tend the land and ensure that the necessary inputs are being applied in

the right proportions. In addition, Value Seeds sponsors a programme on FRCN Kaduna and conducts road shows in rural areas to demonstrate the efficacy of its seeds to smallholder farmers.

Activities for this intervention will include:

- Developing a network of seed multipliers interested in expanding their current market base for knowledge sharing and economies of scale;
- Provide TA support to network to develop proactive and feasible production and marketing strategies to reach smallholder farmers including after-sale services and embedded information services.

Potential results will include:

- Existence of a vibrant network of seed multipliers and suppliers sharing knowledge enjoying economies of scale;
- Development and adoption of proactive production and marketing business models and plans by seed providers; and
- Widespread affordability, access and use of improved maize seed varieties capable of meeting the specific maize needs of different industrial users.

Intervention 5: Facilitate an expansion or development of contract farming arrangements with embedded services.

Market underperformance: in the analysis of the market above we identified several root causes for the market underperformance around weak knowledge of modern farming practices, insufficient Government funding in the provision of extension services, and limited number of private extension workers. Other root causes are limited number and outreach of existing contract farming, traditional methods of farming used by the farmers, limited crop enhancing inputs as well as a lack of linkages between smallholder farmers industrial users of maize. The net result is low productivity (0.8-1.5 tonnes per hectare against African average of 5 tonnes per hectare) of the average smallholder farmers compounded by low price per unit.

Vision of change: the vision for change is widespread subscription of farmers to modern and improved contract farming arrangements with embedded services between private providers and smallholder farmers cooperatives.

Overview of intervention: BIF Nigeria aims to increase smallholder farmers' participation in contract farming schemes with private providers to improve their access to markets,

productivity and income. One potential entry point for BIF Nigeria is the Babban Gona Farmer Franchise Scheme as detailed above.

The Kaboji Farm model is another potential entry point. Kaboji is a 10,00- hectares Farm is owned and operated by Flour Mills of Nigeria and is reputed to be the largest fully mechanised commercial farm in Nigeria with 4, 500 hectares fully cultivated (2,000 hectares of maize, 1,000 hectares of soybean, 1,000 hectares of cassava and a trial of 500 hectares of sorghum). In the last two years the company has been increasing its investment in agriculture as a backward integration strategy.

Honeywell Flour Mills is another potential partner.

Activities for this intervention will include:

- Identification and facilitation of relationship between smallholder farmers and contract farming service providers; and
- Provision of TA support to the contract farming provider to develop inclusive models with clearer incentives and terms and conditions of engagement with smallholder farmers.

Potential results will include:

- Existence of a number of viable and inclusive contract farming schemes with smallholder farmers increasing employment, productivity and income.

Intervention 6: Facilitate the development of grassroots inputs distribution channels to smallholder farmers.

Market underperformance: smallholder farmers do not use modern agronomical practices on their farms because they do not have access to public or private extension workers. This situation influences the kind of seeds they plant, their use of crop enhancing inputs and their ability to create better linkages with industrial users of maize.

Vision of change: the vision for change is for smallholder farmers to have improved knowledge and application of modern agronomical through improved provision of embedded information services through inputs suppliers that are closely proxim to the farmers.

Overview of intervention: BIF will work with input supply companies to assist them in building sustainable business model to encourage farmers to increase their knowledge

and use of quality and affordable inputs. We have identified an organic fertilizer company piloting such activities called Zenith Energy Enzymes Limited model. The company supplies organic fertiliser to farmers in northern Nigeria. The company has developed a business model using Peace FM radio Jos programme between 4:30pm and 5:00pm Mondays to offer its products along with embedded information and extension services especially on the use and application of organic fertilizer as well as access to premium market for its farmer customers. The company has in its payroll some agricultural extension workers who also double as its agents in each of the 17 local government councils in the state. It organizes monthly meetings and technical sessions for its agents and farmers to deepen their knowledge and also for feedback.

TAK Agro Allied is remodeling its business operations with a shift from wholesale of inputs to retail sales with the objective of building grassroots distribution channels. Notore Chemicals developed an inclusive business model with a vibrant grassroots distribution channel. The company created a network of private sector extension workers to educate farmers on improved farming practices and better application of farm inputs.

Activities for this intervention will include:

- Developing a network of input suppliers interested in expanding their current market base for knowledge sharing and economies of scale;
- Provide TA support to network to develop proactive and feasible production and marketing strategies to reach smallholder farmers, including after-sale services and embedded information services.

Potential results will include:

- Existence of a vibrant network of input suppliers sharing knowledge enjoying economies of scale;
- Development and implementation of proactive production and marketing business model and plan by input providers; and
- Widespread affordability, access and use of high quality and affordable inputs by smallholders which will increase their productivity and consequently their income.

