

BIF CASSAVA MARKET ANALYSIS & STRATEGY





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The Nigerian Cassava Sector

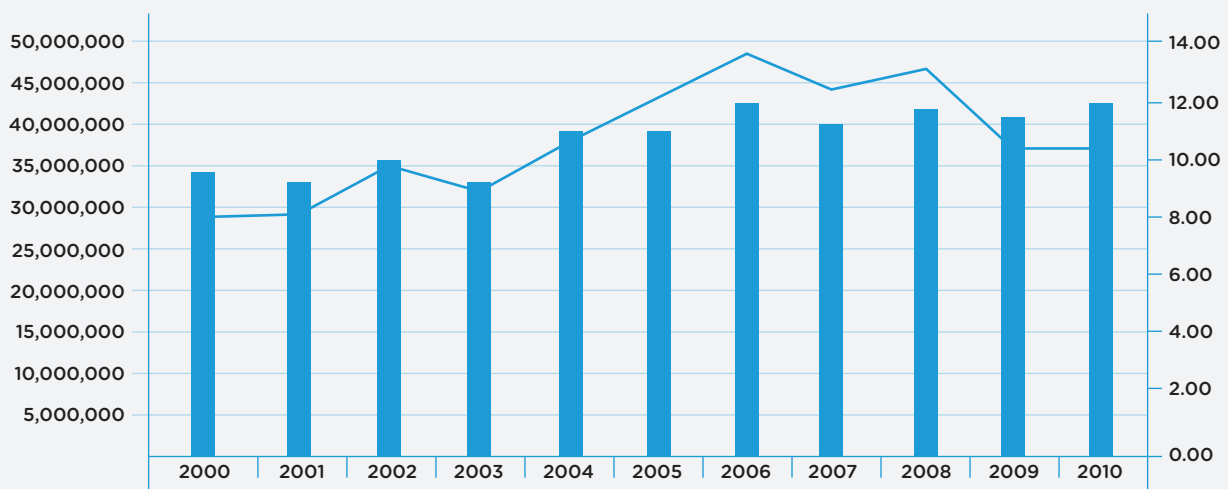
1.1 Introduction

Cassava (*Manihot esculenta*), is a perennial woody shrub with an edible root, which grows in tropical and subtropical areas of the world and is the basis of many products, including food.

Nigeria is the largest producer of cassava tubers in the world with production of about 45 million metric tons (about 19%) of

the world's production of 242 million metric tons in 2009. Between 2003 and 2008, the average annual production in the country was about 35 million metric tons and the total area under cassava cultivation in Nigeria is about 3.60 million hectares with an average yield of 11.7 t ha⁻¹ (FAOSTAT 2010).

Figure 1: The main production figures for cassava in Nigeria (2000-2010)



Cassava is produced predominantly by smallholder farmers, who account for 95% of production. These smallholders commonly cultivate 0.2 – 5 ha of land and the cassava is intercropped with yams, maize, or legumes, and are situated in the rainforest and savannah areas of Southern, Central, and lately Northern Nigeria.

The crop is produced in 24 of the country's 36 states. Planting occurs during four planting seasons in the various geo-ecological zones. The major cassava producing States are Kogi, Benue, Rivers, Enugu and Imo states. Cassava has the ability to grow on marginal lands where cereals and other crops do not grow well as it can tolerate drought and can grow in low-nutrient soils. Because cassava roots can be stored in the ground for up to 24 months, and some varieties for up to 36

months, harvest may be delayed until market, processing, or other conditions are favourable.

95% 

Cassava is produced predominantly by smallholder farmers, who account for 95% of production.

Figure 2: Map of cassava producing states in Nigeria

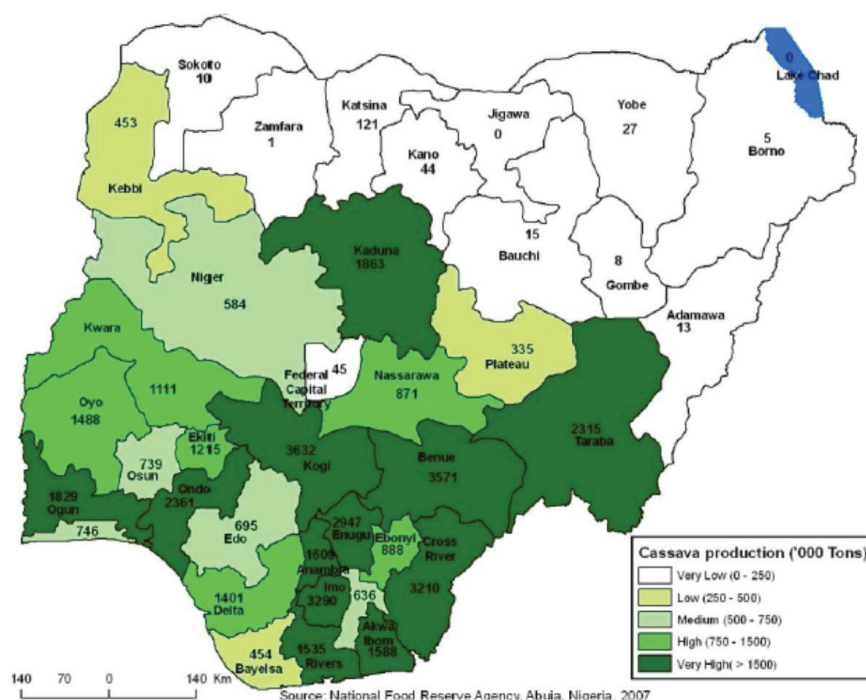


Table 1: Production of cassava by zone and state.

S/N	Zone	State	Production Level (MT)	Zonal Production (MT) / (% National Yield)
1	South South	Rivers	2,291,000	7,731,340 (23%)
		Cross River	1,881,000	
		Delta	994,500	
		Akwa Ibom	904,000	
		Edo	786,900	
		Bayelsa	513,940	
2	South East	Imo	2,940,500	7,705,700 (23%)
		Enugu	2,465,000	
		Abia	1,793,400	
		Ebonyi	442,900	
		Anambra	63,900	
3	South West	Ogun	1,923,400	7,474,110 (22%)
		Osun	1,467,000	
		Oyo	1,459,000	
		Ondo	1,357,000	
		Ekiti	854,100	
		Lagos	413,610	
4	North Central	Kogi	4,399,000	9,606,500 (29%)
		Benue	2,467,000	
		Kaduna	884,000	
		Niger	879,000	
		Kwara	856,700	
		FCT	120,800	
		Nasarawa	(No data)	
		Plateau	(No data)	
5	North West	Zamfara	129,900	239,600 (< 1%)
		Kebbi	33,800	
		Kano	18,900	
		Jigawa	24,800	
		Katsina	21,400	
		Sokoto	10,800	
6	North East	Adamawa	129,900	239,600 (< 1%)
		Bauchi	33,800	
		Gombe	18,900	

		Taraba	24,800	
		Katsina	21,400	
		Sokoto	10,800	
Total			33,701,950	

Source: New Nigeria Foundation report for Propcom, 2005

As shown in Table 1, the north central zone produces around 29% of Nigeria's cassava, making it the largest quantity production region. These figures are from 2005 but this remains the case today. This is mainly due to their longer sunshine months and a mono-modal rainfall pattern, which makes it a better place to grow cassava than the southern States. This zone is therefore the best area to source cassava and cassava product and a large number of industrial processors such as Cargill are situating their factories in that region.

1.2 Relevance to the poor

Cassava is cultivated in 24 states by about 6 million farmers, 90% of them being smallholders as noted above and is important not just as a food crop but as a source of cash income for producing households.

As a cash crop, cassava generates income for the largest number of households, in comparison with other staples, contributing

positively to poverty alleviation.

As a food crop, cassava fits well into the farming systems of the smallholder farmers in Nigeria because it is available all year round, thus providing household food security.

%

14

Table 3. Percentage distribution of food crop cash income of households producing major crops

Food Crops	Cassava		Yam		Sweet Potato		Plantain		Maize		Rice	13
	N	%	N	%	N	%	N	%	N	%	N	0
Cassava	329	21	269	23	90	14	176	26	315	19	124	0
Yam	269	15	276	18	75	14	168	16	266	13	93	11
Sweet potato	90	1	75	1	95	1	43	1	94	0	59	24
Plantain	176	1	43	2	43	1	181	3	175	1	47	38
Maize	315	14	94	13	94	8	175	15	343	13	139	100
Rice	124	12	59	12	59	10	47	9	139	15	143	
Others	-	34	-	31	-	52	-	30	-	39	-	
Total	-	100	-	100	-	100	-	100	-	100	-	

Source: Nweke et al., 1997

Cassava plays such an important role in food security because it is main source of dietary calories and family income for millions of farmers and is widely consumed in rural and urban areas with a per capita consumption of over 120kg/person/year (Nweke, et al 2002). It is very important as cash earner for rural and urban dwellers, and lately raw material for the livestock feed, starch, alcohol and flour industries, thereby providing livelihood for over 30 million farmers, processors and traders.

The role of women in the cassava market chain is substantial. Women play a central role in cassava production, processing and marketing, contributing to about 58% of the total agricultural labour in the southwest, 67% in the southeast and 58% in the central zones .

They are almost entirely responsible for small-scale (cottage) processing of cassava, which provides them with additional income-earning opportunities

and enhances their ability to contribute to household food security.

1.3 Opportunities for pro-poor growth

Since 1999 cassava output has increased by 17%, increasing at an average annual growth rate of just over 3% per annum, broadly in line with population growth.

There are significant opportunities for the development of a cassava sector that can meet both domestic food and industrial demands, and eventually lead to global competitiveness.

The vast majority of cassava output is used as food (90%) with much more limited deployment as a raw material for industrial users (10%) as detailed in Table 2



¹Nweke et al, 2001; Phillip et al, 2006

²A Cassava Industrial Revolution in Nigeria, IFAD 2004

Table 2: Cassava Commodity Balance for Nigeria (2000-2007)

	2000	2001	2002	2003	2004	2005	2006	2007
Production (tonnes) (I)	32010000	32068000	34120000	36304000	38845000	41565000	45721000	43410000
Import Quantity (tonnes) (I)	0	0	0	225	225	25	25	25
Stock variation (III)								
Export Quantity (tonnes) (IV)	0	0	11500	10975	375	6235	3970	8365
Domestic supply quantity (tonnes) (V: I+II+III+IV)	32010000	32068000	34108500	36293250	38844850	41558790	45717055	43401660
Feed (tonnes) (V: I+II+III+IV)	10755360	10774850	16923519	18006779	19267119	20616240	22677620	21531360
Waste (tonnes) (VII)	3928265	3935385	39144245	4164800	4456305	4768340	5245115	4979995
Processing (tonnes) (VIII)	0		1	5	1	0		0
Food (tonnes) (IX: V-VI-V-VIII)	17326375	17357772	13270735	14121666	15121425	16174210	177994324	16890305

Source: FAOSTAT 2012

Cassava can be processed into various traditional food products gari, lafu, lufu, kpokpo gari etc., and for industrial use it is processed into high quality cassava flour (HQCF), starch, sweeteners, chips and pellets and ethanol.

The crop is processed in many processing centres, which are usually located close to the areas of production while industrial end users are located close to the consumption areas in the urban centres.

The greatest consumption of cassava takes place in urban centres with high populations and high concentration of industrial end users. Opportunities for pro-poor growth include evidence of increasing local demand for food and other cassava-based products such as chips for

the livestock feed industry; starch for the beverage and pharmaceutical industries; dextrin and other adhesives for packaging industries, and ethanol for distilleries.

Because of the range of products that are obtained from cassava for human consumption and industrial utilisation prices have risen faster than the majority of staples (53% between 1999 and 2003). Increased population and urbanisation is driving up demand for cassava food products, particularly gari and fufu. Other factors that have also impacted on cassava prices include the increase in prices of alternative products like maize, the ATA and other government initiatives and policies targeted at the improving the agricultural sector, the directive for 10% inclusion of cassava flour in bread, ban on importation

of livestock feed, inclusion of gari in the strategic reserve and imposition of duty tariff on starch imports.

The size of the potential additional market for cassava is estimated as 1.15 million tones of cassava tubers to satisfy a potential demand of 250,000 ton/year in the High Quality Cassava Flour (HQCF), primarily from 10% replacement in bread flour and for use in bouillon, noodles, and the adhesive industry (dextrins); another 1 million tonnes of fresh roots to meet the 230,000 tons of native and modified starches required for food, paint, and pharmaceutical industries; 950,000 MT of roots needed to meet the 150,000 tons high fructose syrup, as part replacement for imported sugar, and 40,000 tons/year for glucose (40,000ton/year); 3.4 million tons of fresh roots required for 900,000 tons of dried cassava chips with 300, 000 tons going to the regional food market, an estimated 80,000 tons to the local animal feed market, and 520,000 tons destined for the China export market and lastly 2.3 million tons of fresh roots for ethanol blending,

These opportunities to improve productivity and efficiency in the cassava value chain and meet the demand that will be created for cassava products can increase incomes of key market players along the chain, particularly poor smallholder farmers.





2 BIF research methodology

The research methodology used for this MAS involved literature reviews and qualitative research. Documents from various sources were used for the research, such as Internet, newspapers, official documents and publications.

The qualitative component of the study was conducted by fieldwork, and in particular interviews with relevant stakeholders.



Source: Nweke et al., 1997



3

Market structure and performance

3.1 Overview of the market system

Figure 3: The cassava market system

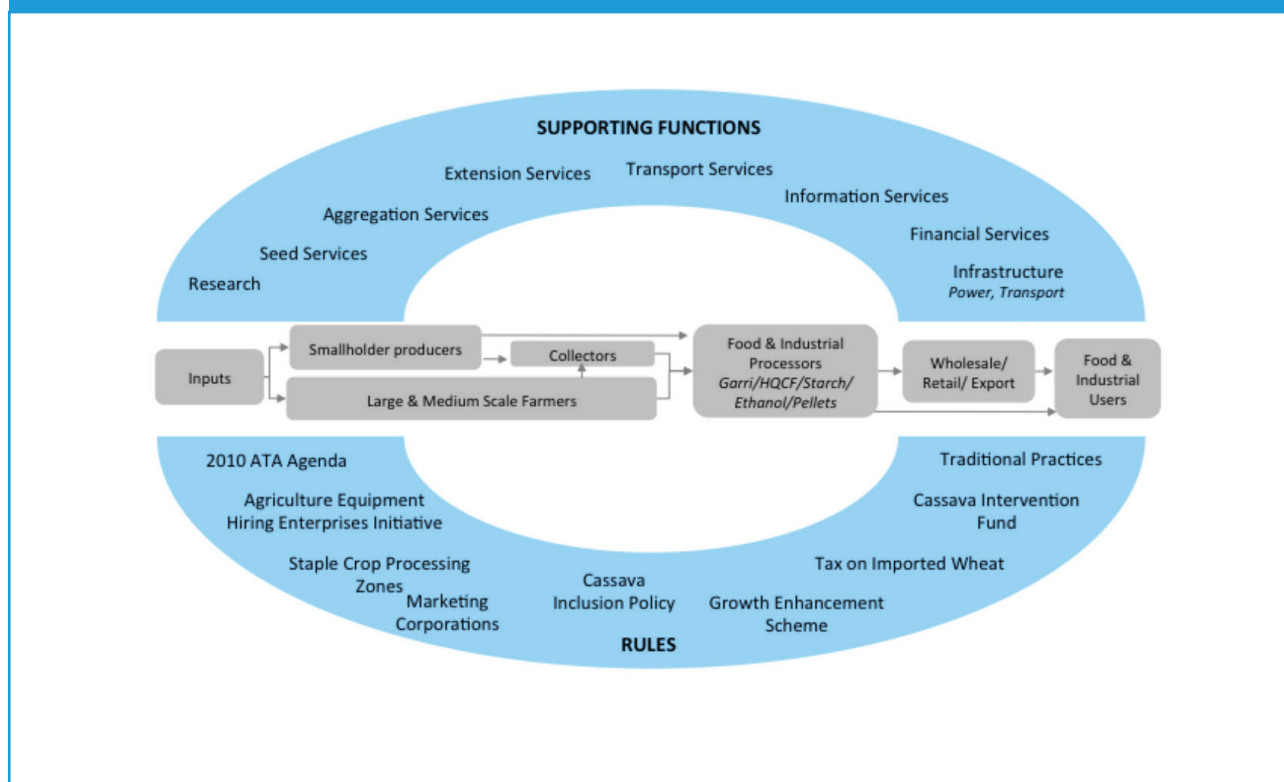


Figure 3 shows our mapping of the cassava market in Nigeria.

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 sections.

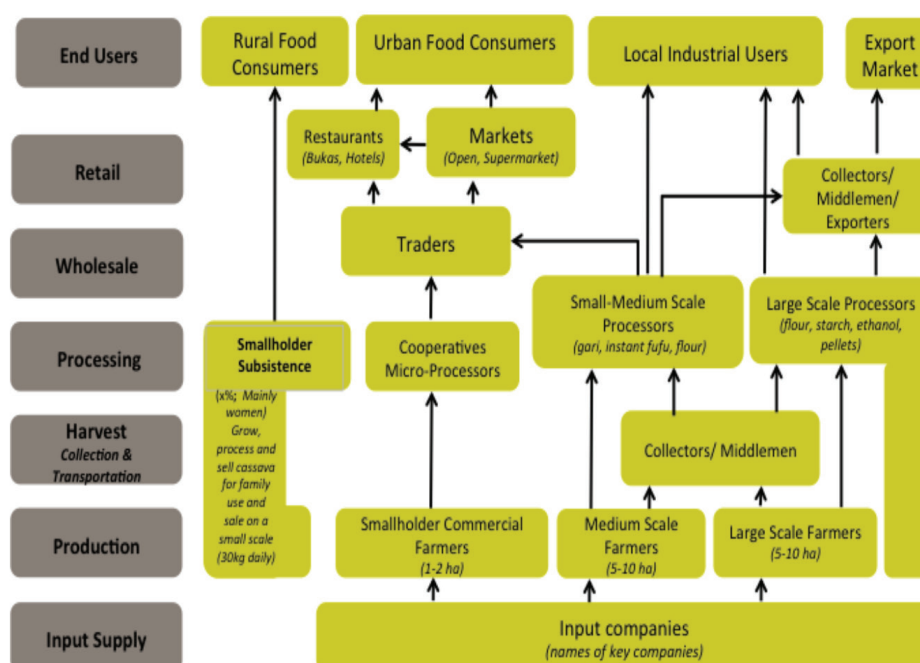
³Federal Ministry of Agriculture and Rural development, ATA 2011

3.2 Core market performance

The cassava value chain from production to end-user is shown in Figure 4. Each stage is described below with the main actors being input suppliers, producers, processors and traders/end-users.

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 4: Key functions in the cassava value chain



3.2.1 Input supply

The main inputs required in cassava cultivation include cassava stem cuttings, fertilizer, labour/ agro machinery and herbicide.

a. Cassava stem cuttings

Cassava is propagated through stem cuttings, which are taken from plants that are: (a) free from disease; (b) at least 10 months old and (c) have borne tubers. Each cutting has at least 1-2 nodes and are approximately 20 cm (7.9 in) long. High quality cassava varieties with multiple pest and disease resistance, high and stable root

yields and acceptable quality characteristics that meet end users' requirements for food and industrial raw material are required for propagation. However, these varieties are in short supply and cassava production in Nigeria has been characterized by dominant use of poor-quality planting materials of disease-prone local varieties with long maturation period and low yield potentials of 9-12 tons/ha. In response to this, the International Institute for Tropical Agriculture (IITA) in collaboration with the National Root Crops Research Institute (NRCRI) in 2010 released 40 high-yielding,

disease-resistant improved cassava varieties that have the potential to raise the low cassava productivity on farmers' farms by up to 30-40 MT/ha. Apart from resistance to major cassava plant diseases and pests such as CMD, as bacterial blight, anthracnose, cassava green mite, and the cassava mealy bug, they also experience early maturing, which is about 10-12 months compared to 18 to 24 months for the old varieties. Some of the characteristics of the 5 best cassava varieties are shown in Table

3. Cassava stem cuttings

Cassava is propagated through stem cuttings, which are taken from plants that are: (a) free from disease; (b) at least 10 months old and (c) have borne tubers. Each

cutting has at least 1-2 nodes and are approximately 20 cm (7.9 in) long. High quality cassava varieties with multiple pest and disease



Table 3: Characteristics of major cassava varieties

Traits	419	96/1632	98/0581	98/0505	92/0326	Traditiona
Months to maturity		12	12	12	10	
Root yield (t/ha)		25-45	30-45	25-40	25-41	8 -11
% Dry matter		30.5	34	33.2	30	
Export Quantity (tonnes) (IV)		65	66	67.1	62	
Domestic supply quantity (tonnes) (V: I+II+III+IV)		20	8	15	10	

Source: Cassava Value chain Analysis, PIND, 2011

⁴The most commonly grown include: TMS 30572, 4(2)1425, 92/0326, NR 8082, TMS 98/0510, TMS 98/0581, TMS 98/0505, TMS 97/2205, TME 419, TMS 92/0326, TMS 96/1632, TMS 98/0002, TMS 92/0057, NR87184, THS 96/1089, and NR 930199.

⁵Nigeria releases improved cassava varieties to boost productivity 14 Jan 2013, IITA Website, accessed August 2013

⁶Agricultural Transformation Agenda Mid-Term Report (2011 – 2013 Scorecard)

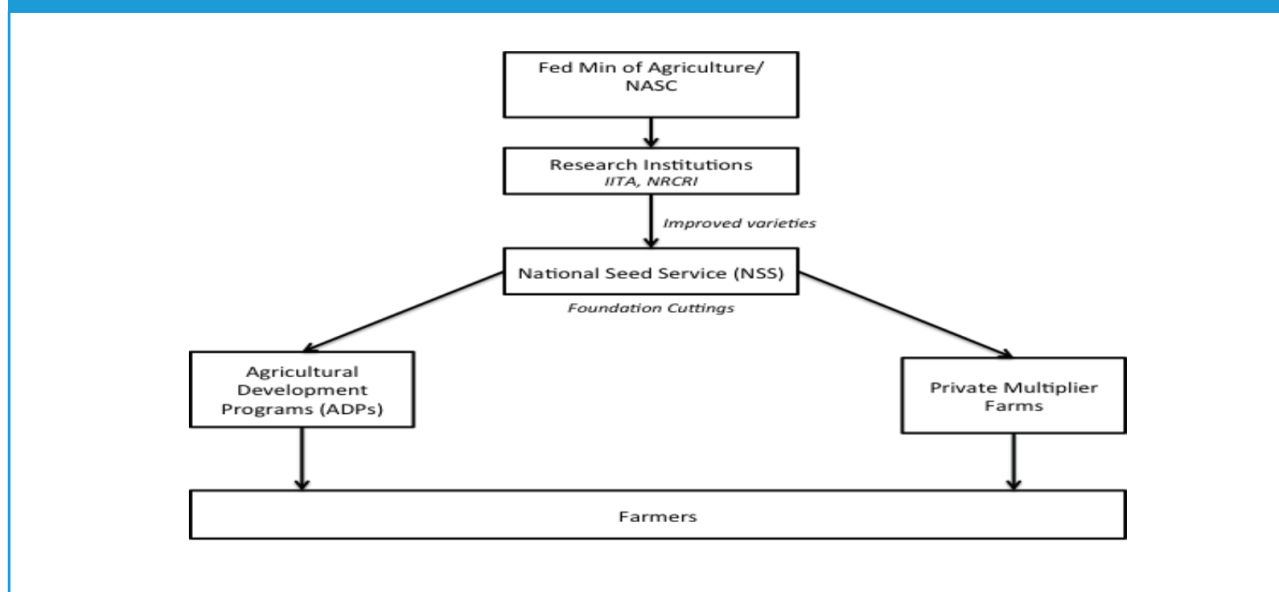
In 2013, IITA and NRCRI jointly released two new improved disease-resistant cassava varieties (UMUCASS 42 and UMUCASS 43) to farmers. The maximum yield of the two varieties was between 49 and 53 tonnes per hectare according to pre-varietal release trials that were conducted between 2008 and 2010. In addition, FG in 2013 distributed 30 million improved cassava stems nationwide for the cultivation of 10,000 ha of land.

Stem cuttings developed by IITA and NRCRI are passed on to the National Seed Service (NSS) who then pass them to the state offices of Agricultural Development Programs (ADP) and a few contract farms

for multiplication. Farmers, co-operative societies such as the Cassava Growers Association (CGA) and NGOs can then obtain stems of improved varieties from the ADPs and multiplier farms although the former is preferred. This is because prices are comparatively lower than those charged by multiplier farms/distributors/retailers and the ADPs are closest to the farmers, located in the rural areas.

Stems are usually tied in bundles each having 50 stems that are 1metre long. These bundles cost between N300 and N500. Approximately 50-60 of such bundles is needed to cultivate 1 hectare of land.

Figure 5: Structure of distribution of cassava stem cuttings in Nigeria



Unfortunately, the rates of adoption and diffusion of the new varieties by smallholder farmers are slow mainly due to affordability, supply and accessibility (only those who have received support either from a development partner project or government scheme or are part of an informal out growers/ contract farming scheme have access to some form of improved inputs).

Unfortunately, the rates of adoption and diffusion of the new varieties by

smallholder farmers are slow mainly due to affordability, supply and accessibility (only those who have received support either from a development partner project or government scheme or are part of an informal out growers/ contract farming scheme have access to some form of improved inputs).

Farmers have difficulty obtaining the necessary improved varieties on time, in good quality and at a reasonable price. Current estimates indicate that only

between 5 and 10% of total cuttings required to meet production are provided. Most cuttings planted by farmers come from local sources including farmers' own crop, neighbours, and relatives, local markets and a small percentage from the ADPs.

As a result, many of the improved varieties have been in use for between one and two decades. Another major problem is the lack of awareness by farmers of the advantages of improved varieties. Reasons for poor uptake can be summarised thus:

Weak farmer education: There are very few farmer education programs created to improve farmers' knowledge on the benefits of improved varieties.

High cost to farmers: Cassava cuttings cost between N300 and N500/bundle and farmers usually cannot afford the N18,000 – 30,000 cost for the improved varieties required for their hectareage.

Poor supply: due to non- functioning state Agricultural Development Programs and few private sector multiplier farms involved in the multiplication, distribution and marketing of cassava varieties. The limited private sector involvement is mainly as a result of the following:

Low demand for stems: The demand for improved varieties is still relatively low, due mainly to poor promotion and marketing efforts, high prices, and the farmers still using traditional agronomy practices.

Unhealthy price competition with the public sector: Government often subsidizes the prices of varieties distributed by the public sector, resulting in higher prices for seeds from the private seed industries

Business model for the commercial multiplication of cassava cuttings by private sector nurseries is unclear mainly because once farmers have purchased one time, they can multiply on their own and

don't need to purchase again, reducing the opportunity for repeat sales. Secondly cassava has a relatively low multiplication ratio in comparison to grain crops, which have very high multiplication ratios. In addition, the one-year-long period of producing cassava stem cuttings has a comparative cost disadvantage over that of the grain seeds, which are produced in 3-5 months. Transportation of improved stems to the markets also requires a significant amount of money. Finally,

- cassava stems are fairly fragile and there have been bad experiences with the transportation of planting material over long distances, leading to high mortality (and low acceptance by the farmers).

However, bank lending to agricultural input retailers and seed companies is increasing (it rose from zero in 2011 to \$10 million in 2012 and \$53 million in 2013).

b. Fertilizer

Although, cassava is able to grow and give reasonable yields in low fertility soils, adequate fertilization is needed for the crop to reach its maximum production potential. Research shows that phosphorus (in quantities of between 100 to 150kg/kg) and potassium (100kg/ ha or more) are the most important nutrients for obtaining yield increases in cassava especially in areas where the crop is grown continually in the same area. Potassium availability also affects quality of yield, since its deficiency leads to lower dry matter and starch content and consequently higher cyanide content. Other nutrients needed include: nitrogen, calcium, magnesium, and microelements – iron, manganese, boron and copper (all in smaller quantities).

c. Labour

Cassava cultivation requires the use of labour in the performance of land clearing; bed preparation; planting; weeding and harvesting. Labour is essentially manual and labour-intensive, involving the use of

rudimentary equipment - mainly simple tools such as hoes and cutlasses. There is usually a clearly defined division of labour along gender lines, with women more involved in weeding and food processing of harvested cassava.

Generally, the cultivation of cassava is thought to require less labour per unit of output than most crops grown by smallholder farmers.

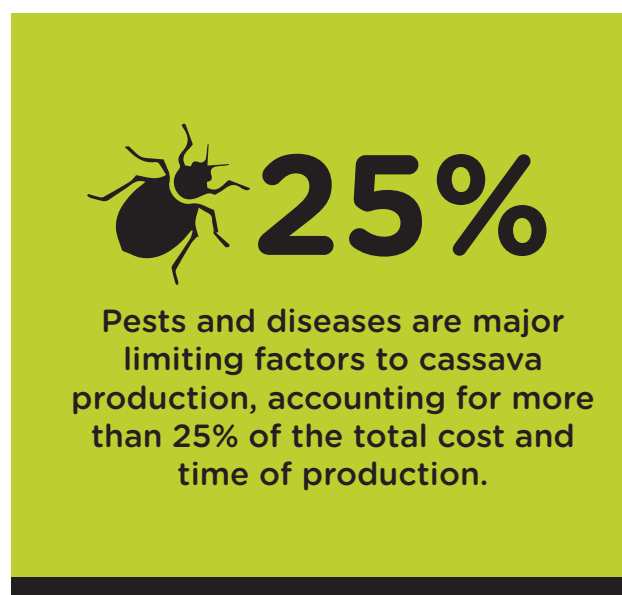
According to a PIND report, own farmer labour (which is the total cost of labour employed) is estimated at N94,000, although as the analysis in Table 4 shows, it can cost more than this. Land preparation constitutes approximately 60% of production cost.

Access to finance to hire labour is usually an issue here and so this limits the amount of land farmers can cultivate. Availability of labour (family or hired) governs the area of land that can be cultivated and the types of crops that can be grown. While family labour predominates, hired labour is employed during peak periods (labour demand is highest during the period before the onset of the rains and for weeding). Family labour is mostly used, as hired labour is expensive. Government has attempted to ease the labour constraint problem and stimulate expansion of farms through tractor-hiring services but the tractors are either inaccessible to the poor who need them most (due to cost) or in a state of disrepair.

d. Herbicides

Pests and diseases are major limiting factors to cassava production, accounting for more than 25% of the total cost and time of production. Weeds occurring in cassava farms can be grouped into three, namely - grasses, sedges, and broadleaf weeds.

There are two main methods employed by farmers to eliminate weeds manual and through the use of herbicides. Most herbicides are specific to certain weeds and



selection of the appropriate herbicides for specific weeds is necessary. In addition, the time of application of herbicides also affects selection. Pre-emergence herbicides will generally prevent the weeds listed on the herbicide label from emerging and Post-emergence herbicides target weeds already up and growing. Several herbicides exist but only few of them are available in Nigeria for controlling weeds in a cassava farm.

In the southern zones, herbicides like Premextra or Dual are used, while in the savanna zone, Primextra, Dual or Cotoran can be used immediately after planting to prevent weeds for up to 2 months. Post-emergence herbicides such as Paraquat or Gramoxone can be applied as soon as weeds begin to emerge after the pre-emergence herbicide treatment. These are non-selective, localised contact herbicides sprayed with a guard to ensure that only the weeds receive the chemical. For difficult-to-control weeds like Spear grass (*Imperata cylindrica*), systemic herbicides like Glyphosate, Fusilade or Sarosate are used.

Each herbicide has specific manufacturers' guidelines on how to apply. However, herbicide use is low amongst cassava farmers mainly due to poor knowledge on which one to use and how to use them.

Table 4: Analysis of cassava labour costs

Activity	No of persons required/ ha	Daily Rate Per Person (N)		Total (N)
Land clearing				40,000
Bed preparation	20		1,000 – 1,500	20,000 – 30,000
Weeding		Weeding is done at least 3 times during cultivation and costs N20, 000 per hectare each time		60,000
Herbicide Application		When herbicide is applied, weeding is not necessary		8,000-10,00
Total (range)				68,000 – 130,00

Source: Interviews conducted by BIF with Nigerian Cassava Growers Association & Markets II Coordinator

e. Land

However access to land is not a major issue for cassava farmers. Cassava thrives on most types of soil in Nigeria and the county has abundant suitable cassava cultivation lands. This is because less than half of available arable land for cassava farming is being put to use at any one time. According to the current Minister of Agriculture (Dr. Adeshina), Nigeria has over 84 million hectares of arable land but is only cultivating 40% so there is room for expansion.

The Federal Ministry of Agriculture (MoA) states that approximately 6 million farm families produce cassava at an average farm size of 0.5 Ha in the south to 2.5 ha in the middle belt. It is estimated that cassava is currently being cultivated on approximately 3 million ha.

However, the declining productivity of land in use is an issue for farmers. The soils are generally of poor quality, lacking in important nutrients and easily prone to erosion. Because of lack of ownership, there is a low incentive to invest in land quality maintenance or improvement. Poor farmers cannot afford alternative farmlands and do not have customary access to lands not inherited so they remain on depleted lands and further degrade these resources, which may result in declining productivity.



Nevertheless, cassava farmers have, over the years, have adopted systems of crop rotation and fallow they consider appropriate for their needs to address the issue of land degradation.

This is mainly reflected in the practice of subdividing the farmers' total land size into a number of separate plots, which is used interchangeably, or simultaneously for the production of different crops. They usually grow their crops in varied mixtures because their aim is to produce all the crops required by the household and thereby spread the risk in doing so.

Land allocated to crops varies from zone to zone but the general pattern is that of allocating more land to crops of higher relative importance. Farm sizes are larger for cassava in the southern states while yam traditionally takes a larger share of farmland in the Middle Belt, although this is gradually changing as cassava has become more popular.

3.2.2 Production, cultivation and harvest

As has been noted above, smallholder farmers using rudimentary implements produce over 90% of the cassava grown annually in Nigeria. The crop is mostly grown on small farms, usually intercropped with vegetables, grains (such as maize), other roots (yam, sweet potato), legumes or in some cases as a sole crop. Wide variations exist between communities and households in the practice of these systems. However, cassava is usually the last crop in the rotation cycle.

There are four planting seasons in Nigeria, which vary according to the geo-ecological zone; these are from March to November in the rain forest, April to August in the derived savanna, May to July in the Southern Guinea savanna (SGS) and July to August in the Northern Guinea savanna. Roots can be harvested between 6 months and 3 years after planting. Cassava production remains traditional with virtually no use of purchased inputs and very little use of mechanisation. Farmers are generally aware of the benefit of inputs, but the use remains limited as has been discussed above. This is a major constraint in cultivating improved varieties. The fact that cassava is considered resilient also adds to the perception that it does not require inputs, and is therefore planted in poor soils with little fertilizer.

There are four main types of producers of cassava: small scale subsistence farmers (also referred to as 'smallholder farmers' in this MAS), small-scale commercial farmers, medium scale commercial and large scale farmers.

- Small scale (Smallholder) farmers: this group of people grows 95% of cassava. In Nigeria They can be further subdivided into 2 groups – Subsistence farmers and Commercial farmers.
- o Small-scale Subsistence farmers: account for approximately 90% of

cassava farmers. They usually plant on 0.2 ha to less than 1 hectare (which is usually scattered plots) and the crop is usually intercropped with yams, maize, vegetables, etc.

They typically don't have access to improved varieties, inputs or mechanization and so commonly use a disease prone variety resulting in low yields of 8-10MT/ha and use manual labor and rudimentary farm instruments such as hoes, cutlass for weeding and harvesting.

Cassava for this group is mainly grown for their own consumption with the excess sold for income. Subsistence farmers typically do not invest much in the crops so productivity is low. Disease prone varieties are because of the lack of access to improved varieties, which affects the quality of cassava produced. In addition, cassava is perceived to be a hardy plant by this group of people. With very little input, cassava still produces a harvest (albeit low) so there is no real incentive to produce more. The majority of subsistence farmers do not belong to farmers associations.

- o Small-scale Commercial farmers: These farmers grow on between 1- 5 ha.

They are more aware of improved agronomy practices, and they see farming as a business. They use improved varieties and as such their yield is between 11-15 MT/ha. This is not optimum, as they don't use, other inputs such as herbicides and fertilizer because of their limited availability and high cost. Some of these farmers have benefited from a government or development agency scheme or programme in the past.

Others may be currently involved in an out-grower scheme supplying a major processor.

- Medium-scale commercial farmers: these farmers grow between 6-10 ha of land. They used improved varieties and some level of mechanization. Their output is between 27 – 30 MT/ha.
 - Large-scale farmers: these farmers grow between 10-1000 ha. A small number are large processing companies that have backward integrated to cultivate their own farms to assist in generating enough raw materials for their factories.
- companies utilising this practice, and other large-scale farmers include Obasanjo Farms, Ota, and Zimbabwe farmers in Kwara, and Ekha Agro Farms. Large-scale farmers typically use improved varieties and are highly mechanized. Their yields are as often between 27-35 MT/ha
- A PIND Field Study in Edo state in 2013 showed that yield per hectare improved with improved varieties, use of quality outputs and mechanisation. The results are presented in Table 5.

Nigerian Starch Mills is an example of a



Table 5: Example of a farm level budget

Level Budgets for Cassava Producers in Edo state (per hectare)			
	Subsistence farmers	Small scale commercial farmers	IITA supported scale commercial farmers' field
Yield per type of farmer	10	15	29
Price per mt	13,000	13,000	13,000
Activity	Cost (N)	Cost (N)	Cost (N)
Rental of farm land (N12,500/ha)	-	12,500	12,500
Tying ropes	-	37,500	37,500
Ridging manually (37.5 man days * N1,000)	-	12,500	12,500
Tying ropes	-	200	200
Transportation cost	-	1,000	1,000
Fertilizer App (N6,000/25kg * 150kg + 6 man day @ N1,500)	-	-	45,000
Chemical App (N1,200/litre * 13 litres + 2 man day @ N1,500)	-	-	18,600
Planting: 8 man-day/ha at the rate of N1,000	8,000	8,000	8,000
Weeding twice: N6,000 x 2 times	30,000	30,000	30,000
Harvesting labour	15,000	15,000	15,000
Sub production cost	123,000	174,700	238,300
Contingencies at 5%	6,150	8,735	11,915

Source: PIND Field survey 2013

Harvesting cassava is labour-intensive, and almost exclusively is not mechanized in Nigeria. Farmers sometimes choose to delay or stagger the harvest until they have buyers for the cassava. A few farmers sell their unharvested produce to collectors or middlemen who then organise the harvest using hired labour.

3.2.3 Processing

Cassava is a highly perishable commodity, with a post-harvest life of less than 72 hours and has to be processed almost immediately. As noted above, 95% of cassava roots are processed into food products which are mainly consumed domestically, and the remaining 5% is processed into products for industrial users. Because cassava is highly perishable, processors need to be set up close to their markets (storage/ transport), close to growers (access to raw materials) and close to good infrastructure (power, roads).

There are four main categories of cassava processors in Nigeria as follows:

- **Small-scale/cottage processors:** this is the most dominant form of processing and is done mainly by women for consumption and small-scale retail. It is based mainly in the rural areas and is labour intensive with the use of traditional methods for cassava peeling, grinding and pressing. Small quantities (30kg) are produced daily. Usually these methods are used for processing gari, wet akpu and starch.
- **Micro-processing centres:** larger processing units (200kg of dry products/day) that are mechanized with a grater, 1-2 presses and a modern roaster. These centres are co-operatively or individually owned and also produce gari, wet akpu and starch.
- **Medium processors:** factories that produce 1 tonne dried product/day and require a staff of 10. They typically have a mechanical drier, with investment costs of

at least N10mn (\$66,000). They are involved in the processing of cassava into HQCF, starch and high-grade fufu for export, and have also been established near cassava farming communities by local entrepreneurs. They purchase cassava from farmers, collectors at the factory gate and occasionally on farm. They have consistent truck owners that assist in delivering raw roots and also finished products to the end user markets. There are many examples of these medium processors.

- **Large processors:** these can handle 5-100 MT dry product/day and have investment costs of between N100mn (\$660,000) and N500 million. They employ a staff of more than 20 and require a steady flow of cassava to make their operations cost effective. A few also have their own cassava farms to guarantee the minimum throughput required for their businesses. However they also procure cassava from collectors and also engage contract farmers and/or out-growers. A few examples include Nigerian Starch Mills Ihalala; Matna Starch Industry Akure (both starch) and Ekha Agro Lagos-Ibadan (cassava sweetener).

Refer to Annex 1 for a detailed survey of cassava products, the method by which they are produced, the main players involved, and the significant constraints and challenges that processors of each product face.

3.2.4 Trade

Marketing can be a problem for poor farmers who most times do not have access to processors and wholesalers and usually go through middle-men. In addition, sale of cassava roots follows a seasonal pattern; it is as cheap as N4,000/MT during the rainy season or when there is a glut in harvest and as high as N17, 000/MT during the dry season when it is hard to harvest. In addition, there is a huge price variation in relation to type of processors. Currently farmers in the

South West sell cassava to food processors at N15,000/MT but sell to industrial processors at between N10,000- 12,000. There is also a price variation with respect to location of purchase (farm gate vs. factory gate). Farm gate prices are usually cheaper since the buyer bears the cost of transportation (for factory gate, the farmer bears the cost). There is also a strong geographic consideration in the farm gate price of cassava – cassava grown close to major transportation arteries captures a higher price than the cassava grown in the interior because of proximity and timeliness of supply. The marketing system for cassava and its products is characterized by fluctuations in supply and the principles of supply and demand determine product prices. Marketing activities are carried out by private sector players who operate in both rural and urban markets and is currently devoid of government intervention, so the market as it were, operates without distortion. However, the creation of marketing corporations in the Agricultural Transformation Agenda (ATA) may help to improve the marketing of cassava products. Issues that exist here are mainly:

- Unstable market prices
- Considerable variation in prices over time and geographical location
- Low pricing (at the mercy of industrial users)
- Insufficient quantity to meet requests from end-users

Cassava trade in Nigeria can be classified into three broad categories namely:

- Wholesale
 - o Local
 - o International
- Retail

Wholesale:

- Local: Wholesalers mainly sell large quantities of either cassava roots or processed cassava to end-users. There are three main groups of wholesalers – collectors, cooperatives and the processors themselves who sell direct to end-users.

- o Collectors/ Aggregators: Collectors (middlemen) are the most common buyers who go to rural areas noted for cassava production within the region to purchase unharvested and/or harvested cassava from farmers directly, though payment is usually made after sale of the product. They engage village labour to harvest and load cassava roots into hired vehicles for onward delivery to open markets and factories. Analysis shows that collectors make at least 15% profit after sales. It is estimated that the collectors account for about 20% of traded volumes of cassava roots.

Some collectors (about 5%) engage village labour to further process the cassava into garri or wet fufu, which they sell in markets. The collectors have the funds to be able to address the main challenge facing the harvesting of large quantities of product at one time: shortage of labour.

- o Cooperatives: account for between 2-8% of cassava traded as raw roots or products. They usually have cassava farmers as members and sell cassava roots to big processors and processed products (garri and fufu) to traders. The mode of payment by processors to cooperatives is cash on delivery and in some cases on credit based trust.

- International: The cassava export markets are primarily Europe and North America and a number of growing markets such as China, Korea and Japan. The major products traded are packaged food products such as gari and powdered fufu (which is about 1% of cassava exports and is targeted at Nigerian immigrants in big

European and North American cities), cassava chips/ pellets and starch.

The chips/ pellets market is characterised by high price and quality competition with the major exporters being Thailand and Indonesia. Although Nigeria recently signed an agreement with China for the supply of 3.2 million tonnes of cassava chips annually, the country has not been able to operate in this market because of non-competitiveness in price and quality. Currently Chinese industrial end-users buy cassava from Thailand (relatively close by) at \$250 /MT.

Thailand is the largest exporter of industrial cassava products and hence is the world market price setter (IFPRI, 2011). Thailand and Vietnam also presently dominate the cassava starch market, with Thailand controlling over 90% of market, while Vietnam is slowly gaining a foothold (IFPRI, 2011). However, the cost of production in Nigeria is \$350 - 400/ MT.

A major private sector player in the exportation of chips is LADMOK Nigerian Company Limited. The organisation is the first indigenous company to export cassava chips to China, which meet the quality standards required. Between 2006 and 2008, the company exported 20 forty-foot containers of high quality cassava chips at a cost-insurance-freight (CIF) price of \$120 per MT to China. At the time, the total cost of production for 1 MT of cassava chips was put at \$140 per MT, thus the venture was unprofitable and uncompetitive.

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⁹BIF Interview with Processors - Ladmok Company & Honeywell and Nigeria Cassava Growers Association

¹⁰BIF Interview with Processors - Ladmok Company & Honeywell and Nigeria Cassava Growers Association

Table 6: Comparison of cassava-farming methods in Nigeria and Thailand

Level Budgets for Cassava Producers in Edo state (per hectare)		
	Nigeria	Thailand
Cassava Production ('000t) 2009	36,804	30,088
Cassava harvested area ('000ha)	3,126	1,327
Cassava Yields (t/ha) 2009	11.7	22.7
Utilization	Gari (60%) Fufu (20%) Lafun (10%) Tapioca (5%) Starch (3%) Animal Feed (2%)	Starch - Native & modified (40%) Fuel/ ethanol (20%) Chips. Pellets (40%)
Crop System		
- Monocrop	10	95
- Intercrop	90	5
	-	18,600
Time of Planting	Apr - June	April - May
Land preparation	Manual	Tractor
Weed control	Manual	Herbicide/ Manual
Fertilization		
- Organic	None	Medium
Chemical	Very little	Medium
Labor cost (US \$/ day)	3 - 4	4 -5
Production costs (US \$/ ha)	450 - 900	28.68
Production costs (US \$/ t fresh roots)	37.99	28.68

Source: New Nigeria Foundation report for Propcom, 2005

Figure 6: Main importers of dried cassava and cassava starch respectively from Nigeria (by cumulative value) between 2005 and 2010

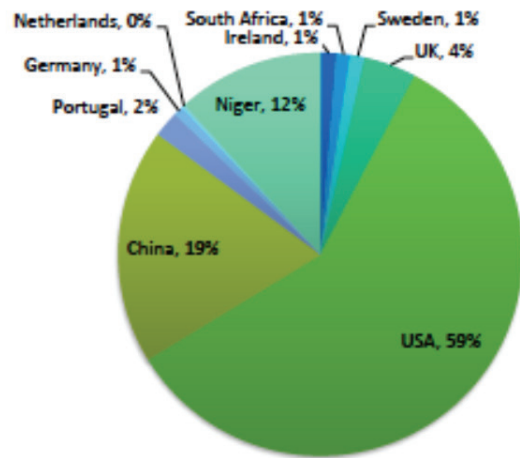
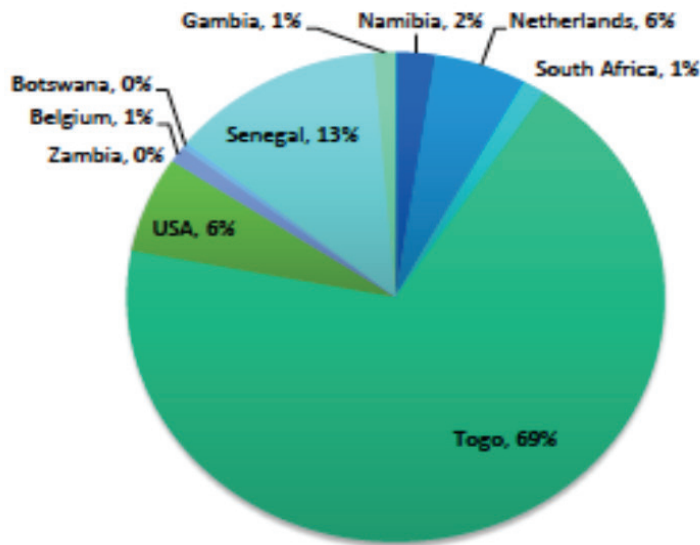


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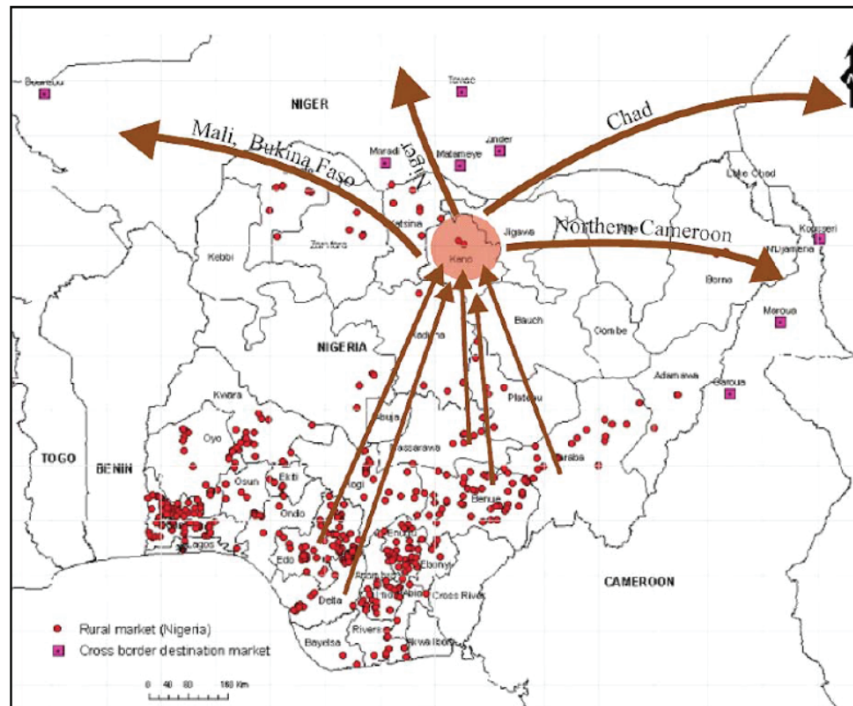


Although Nigeria is the main cassava producing country in the world, both import and export flows are negligible at less than 1% of production. However, research shows that formal export flows are higher than import flows, and the available literature, although limited, indicates a well-established informal export market, particularly towards neighbouring countries such as Mali, Burkina Faso, Cameroon, and Benin. Additionally, Nigeria formally exports dried/fresh cassava and starch to other African countries such as

Niger, Togo, Cote D'Ivoire and Europe, including Netherlands, Norway, and Belgium, and the USA and Canada.

In the past 5 years, factories in Nigeria have exported cassava starch to Côte d'Ivoire (Matna Company); cassava flour and instant fufu flour have also been exported to the USA, UK, Ireland, and Italy (Aquada Investment and Olu Olu Industries).

Figure 7: Cross-border trade in gari and chips: supply and demand zones to Dawanau market, Kano. (Ezedinma et al. 2007)



a. Retail:

Cassava retailers mainly deal in food products such as gari, fufu, lafun in both open markets and supermarkets. There are two types of retailers, those in the urban markets and those in the rural markets. Retailers in rural markets often set up their goods in the open market. Retailers in the urban market can further be classified into three groups: those that operate similarly to those in rural markets (i.e. sell in the open market); those that own the stall or have long leases from local authorities; and those who rent from the stall owners/tenants. Those who own stalls may be more affluent and hence their ability to obtain market stalls in the first instance, while other traders may be poorer or operating on a smaller scale. Retailers buy from wholesalers and sell to urban consumers and a small percentage of cottage

processors (5-7%) also function as retailers and sell mainly in rural markets.

A major stakeholder in the processing and marketing of cassava is the Nigerian Cassava Processors and Marketers Association (NICAPMA), an association of cassava processors and marketers.

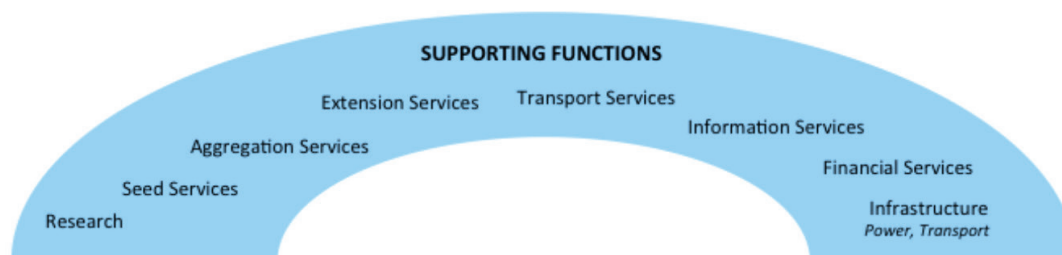
The recent agricultural transformation agenda, with more recent estimates from 2011, still suggests a significant industrial demand for cassava as substitution for imported raw materials and other semi-finished product classes. The table in Annex 2 summarises the annual demand for cassava products, users and key issues with marketing. Total demand of cassava food products is estimated as follows: Urban: 14,157, 438 MT (62% of total demand); Rural: 4.3 million MT (averages 19% of total demand).¹²

3.3 Supporting functions

This section analyses the key supporting functions in the cassava 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 3.3.1, 3.3.3 and 3.3.6

Figure 8: Supporting functions



3.3.1 Research

Agricultural research in the cassava value-chain is a major related service for farmers and is necessary for the development of improved cassava varieties and technology (production and processing).

Unfortunately, agricultural research in Nigeria, in general, is at a low and unstable level and the government budget process for funding agricultural research is complex and time-consuming.

This is due to the long time-span between submission of planned budgets by research agencies and approval. Furthermore, release of funds is lengthy and often out of tune with research work plans. The approved amounts often always fall far short of the planned budgets of the research agencies.

3.3.2 Seed services

The National Agricultural Seed Council regulates 5 bodies that are responsible for the development of seed services in Nigeria. They are:

- The National Seed Service Unit;
- The Crop Variety Registration and Release Committee;
- The Seeds Standards Committee;
- The Seed Industry and Skill Development Committee; and
- The Department of Training, Information and Seed Extension.

Furthermore, the National Agricultural Extension Research Liaison Service also assists in the function.

As mentioned under input supply, research institutes such as the National Root Crops Research Institute (NRCRI) and the State

¹¹IITA, 2005

¹²Agricultural Transformation Agenda

Agricultural Development Projects (ADPs) are responsible for the generation, multiplication and distribution of cassava-improved varieties with very little involvement by the private sector. As a result, the availability of cassava planting material for improved varieties to rural farmers is still very low. Private multiplier farms for cassava are very few, a many have stopped production, and there are scarcely any new entrants in the business. All these issues exist in spite of the agricultural seed policy, the legal framework, and the institutional arrangements put in place to ensure success of the seed system.

3.3.3 Agricultural extension services

Cassava farmers are primarily reliant on government extension agents, usually employed by the state ADPs for extension services.

3.3.4 Aggregation services

Currently, aggregation services are being provided by the collectors and

cooperatives and are done in an informal way. Aggregation occurs in 2 main ways: Farmer cooperatives/association such as state chapters of the Nigerian Cassava Growers Association (NCGA) collect fresh cassava from member farmers and sell to processors;

Collectors buy cassava (fresh or processed) from the farmers or processors from individual farmers or cooperatives, and transport the produce to urban markets.

3.3.5 Transport services

Because of the poor transportation system in Nigeria (especially rail and waterways), transportation of crops in Nigeria is mainly done by road. Nigeria has about 198,000 km of roads statistics show that 65% of these roads are in poor condition. In addition, most of the rural roads, which serve as feeders to the main roads, are unpaved and seasonal as movement on them is uncertain except for market days. Furthermore, the risks on the roads are high. Table 7 below illustrates unit price per kilometre and tonne by route and type of vehicle in 2003.



Table 7: Transport costs

Route	km	tonnes	Cost per km and tonne	Type of Vehicle
Ibadan - Abeokuta	77	14	3.25	3-Seater Bus
Ibadan - Abeokuta	77	18	3.25	Mazda Bus
Ibadan - Abuja	645	30	5.68	Trailer
Ibadan - Bauchi	1070	30	4.98	Trailer
Ibadan - Ilorin	162	14	2.47	3-Seater Bus
Ibadan - Ilorin	162	18	2.47	Mazda Bus
Ibadan - Iseyin	75	18	3.33	Mazda Bus
Ibadan - Iseyin	75	14	3.33	3-Seater Bus
Ibadan - Jos	928	30	4.49	Trailer
Ibadan - Kaduna	756	30	4.41	Trailer
Ibadan - Kano	1005	30	4.64	Trailer
Ibadan - Kano	1005	30	3.98	Trailer
Ibadan - Kastina	1065	30	4.07	Trailer
Ibadan - Lagos	141	30	3.55	9 11 Lorry
Ibadan - Maiduguri	1532	30	3.70	Trailer
Ibadan - Ogbomso	100	14	3.00	3-Seater Bus
Ibadan - Ogbomso	100	18	3.00	Mazda Bus
Ibadan - Oyo	42	18	3.57	Mazda Bus
Ibadan - Oyo	42	14	3.57	3-Seater Bus
Ibadan - Saki	165	14	2.73	3-Seater Bus
Ibadan - Saki	165	18	2.73	Mazda Bus
Ibadan - Sokoto	890	30	4.49	Trailer
Ibadan - Yola	1545	30	3.67	Trailer
Ibadan - Zaria	872	30	4.43	Trailer
Owerri - Lagos	574	15	8.13	9 11 Lorry
Owerri - Lagos	574	15	6.97	9 11 Lorry

Source: A Cassava Industrial Revolution in Nigeria, 2003.

Breakdowns, accidents, congestion and road closures all represent a substantial cost in the transportation of cassava roots and it represents a high percentage of the final product price.

In addition, the time it takes to hire a vehicle and roadblocks is another issue. In

a 2003 study, traders on the New Haven Express reported that it took them from 1630 hours on Friday 12 December 2003 until 0930 hours the following day to get a reasonably priced vehicle to transport their goods.

At that time, transporters typically

Table 8: Examples of roadblocks

Route	Road condtions
Ibadan - Abeokuta	7-10 Road blocks
Ibadan - Iseyin	6-8 Road blocks
Ibadan - Niger	Worst route many road blocks
Ibadan - Ogbomso	30 Road blocks
Ibadan - Ogbomso	8-10 Road blocks
Ibadan - Oyo	0-15 Road blocks
Ibadan - Oyo	Very difficult for some tribes to pass
Ibadan - Saki	7-10 Road blocks
Ibadan - Sokoto	Bad roads, numerous road blocks
Ibadan - Iwo	6 Road blocks
Ibadan - Mokola	7 Road blocks

Source: *A Cassava Industrial Revolution in Nigeria, 2003.*

charged between N10 000-N20 000 for 200 bags of gari (a full 9 11 lorry) depending on road conditions and frequency of security checks (road blocks) that demand money from drivers. An example of the number of roadblocks in 2003 is shown in Table 8.

Currently, a 30 tonne truck from Lagos to Sokoto costs about N300, 000.

Financial services

The financial needs of smallholder farmers are mainly skewed towards credit and agricultural insurance services which both formal and informal institutions mainly provide. Currently, agricultural lending accounts for only 2% of total lending in the financial services sector.

Formal financial services

Government and banks provide formal financial services to smallholder farmers,

including cassava farmers. The government institutions that are involved in the provision of financial services to the agricultural sector include the Central Bank of Nigeria (CBN). The CBN is regulator and supervisor of financial institutions including banks and MFBs. The bank works to increase the supply of finance to priority sectors and foster financial inclusion such as creating an enabling environment.

Many commercial banks have increased their lending base to the agricultural sector due to in-creased incentives from the CBN and FMARD, but lending is mostly done to large and more established agribusinesses. According to the CBN, credit to the agricultural sector has increased from 1.6% in 2009 to 3.7% in 2013. Active players in this sector include: Access Bank, Diamond Bank, Enterprise Bank, First City Monument Bank, First Bank of Nigeria, Sterling Bank, United

Bank for Africa, Unity Bank, Wema Bank, Zenith Bank, Stanbic IBTC (who currently have a partnership with DATCO and are supporting the company's rollout), Union Bank and Mainstreet Bank. Of the N20 billion that was disbursed in 2013, the bank is said to have committed N10 billion.

Very few Microfinance Banks (MFBs) provide financial services to the agricultural sector. The perception of the sector being high risk is a significant deterrent. Only one MFB was identified, which is Lift Above Poverty Organization (LAPO). LAPO is a Nigerian Microfinance institution (MFI) dedicated to self-employment through microfinance. It is grouped both as a bank and as an NGO as it provides both development and financial services to low income groups. LAPO also has a scheme called the LAPO Agricultural and Rural Development Initiative (LARDI) was established to improve the lives of the rural poor in Nigeria. It helps to generate youth employment, to promote infrastructural development, to facilitate farmer's access to capital and physical inputs such as credit, storing and processing facilities, to acquire information on relevant farming issues and to improve the farmers and rural households' health.

Non-Interest banks such as Jaiz bank, which is the first non-interest Islamic bank in Nigeria are also involved in funding agriculture. The bank recently informed the public on its interest in financing the agricultural sector.

The Fund for Agricultural Finance in Nigeria (FAFIN) managed by Sahel Capital which provides long term, tailored finance and associated technical assistance to high growth and commercially attractive SMEs across Nigeria and is also involved in the selection of intermediaries that catalyse additional funding for SMEs and 'Smallholder farmers. FAFIN has a target fund size of US\$100 million and was launched in January 2014 with a First Close of US\$34 million from three fund

sponsors: FMARD, the German government via KfW Development Bank, and the Nigeria Sovereign Investment Authority (NSIA). FAFIN is the only Nigerian private equity fund focused exclusively on agriculture.

The National Agricultural Insurance Company (NAIC) is the main organisation that mainly provides insurance services through the National Agricultural Insurance Scheme (NAIS). However, other private sector insurance companies such as Leadway Assurance and IGI play minimally in this sector (mainly due to lack of a proper system for measuring risk). NAIC is responsible for providing agricultural risks insurance cover to smallholder farmers at a subsidized rate.

The FG pays 35.5% of the premium; State govt. pays 14.5% while the farmer pays the last 50%. The scheme is operational in all states with 6 zonal offices.

However, only 3.5% of over 20 million farmers have been able to access agricultural insurance in the last 5 years.

b. Informal financial services

NGOs, trade associations and cooperatives provide informal financial services. They are not regulated and there is very little information about their reach, the size of the credit portfolio and the number of borrowers. However, they have grass-roots knowledge of the people, their language and their business. Issues with informal service providers include a lack of:

- Regulation and supervision, which results in indebtedness, loss of deposits and malicious loan recovery practices;

- Commercial orientation, as they are often unsustainable institutions;

- Professionalism and transparency over operations, which reduces the amount of investment; and

Economies of scale for larger investments in the financial infrastructure.

Several studies have shown the link between access to agricultural credit and productivity. Yet this vital input has eluded smallholder farmers generally in Nigeria. The majority of cassava farmers and processors live in areas that are resource-poor, highly heterogeneous and risk prone.

Consequently, conventional financial institutions are not inclined to provide credit to these without collateral. In addition, the high interest rates also frequently screen out most potential rural smallholder beneficiaries. Furthermore, agricultural loans are often short-term with fixed repayment periods, a loan structure that is not suitable for the cassava market. Government schemes that are in place do not meet the needs of the farmers. Only about 1% have benefited from formal credit schemes (an annual figure of approximately N3.5 billion in value) although the Minister of Agriculture recently stated that this figure increased to N20 billion in 2013. Farmers mainly rely on income from the farm and traditional sources of credit (relatives, friends, money-lenders and cooperative groups). The funds available at this level are limited and cannot meet the credit requirements of the farmers. Also, interest charged on credit obtained from money-lenders can be quite high. The low level of income of poor farmers prevents them from meeting the capital requirements of improved technology.

On the whole, farmers are generally poorly organized and poorly educated and find it difficult to gain access to agricultural support services.

Infrastructure

The main infrastructure that has an impact on the cassava value chain is transportation and power.

Nigeria has a transportation system that consists of: 198,00 km of roads (Federal – 34,120km: mainly interstate with high traffic density; State – 34,300km; Local government – 129,580km):

3,500 km of railways;
8,600 km of inland waterways;
22 airports.

Extensive market studies note that transportation infrastructural provisions are seriously lacking in the cassava value chain. Consistent supply of cassava to processors will require a more formal system that is flexible and stops the unpredictable nature of supply chain actors, which is seen through delay of harvest until truck arrives, extended loading time due to inadequate labour availability, and multiple stops that must be made by the truck. The poor transport system often causes substantial delays in moving goods over long distances, taking as much as 36 hours from farm to mill gate.

This also results in high transport costs that may exceed the value of the cassava produce. The poor road networks and transport system also has significant implications for product marketing and cost of inputs.

The poor state of electricity supply in Nigeria has imposed significant costs on manufacturing inputs such as fertilizer and herbicides, and processing.

The bulk of these costs relate to the company's acquisition of very expensive backup capacity to cushion them against the potential large losses arising from frequent and long power fluctuations. Currently, only about 40% of the population is connected to the energy grid and power supply is 60%. Generation capacity still hovers between 2500 megawatts (mw) and 4000mw. Most of the power costs from alternative sources

of power incurred by manufacturers are passed onto the consumer, which has a negative effect on demand. According to the Manufacturers Association of Nigeria (MAN), in 2009 its members spent N1.8 billion weekly on diesel used in production. It is believed this amount would have doubled following sharp increases in diesel prices within the last five years.

3.3.8 Information services

Poor information dissemination across the cassava value chain prevents cassava farmers' direct access to market partners, support institutions, price sources and technical information. Information such as farming methods and pricing, which are necessary for growth of the market and positively impact the income of smallholder farmers is not adequately passed across to them. Traditionally, extension workers from the state ADPs

provided information services to smallholder cassava farmers. Unfortunately, due to staffing issues in the ADPs, this function is non-existent. In recent times, radio stations (in the North and South East) have got involved in the provision of this service to smallholder farmers but this service is yet to scale up to achieve desired impact and only addresses general issues such as fertilizer etc. There is no radio program specifically targeting smallholder farmers.

3.4 Rules

This section analyses the key rules in the cassava 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

Figure 8: Supporting functions

Figure 9: Rules



Formal rules

The Presidential Initiative for Cassava: President Obasanjo initiated the Presidential Initiative of Cassava (PIC) implemented between 2002 and 2007 to promote cassava production and processing to satisfy domestic demand and for export markets. Actions were taken to increase cassava productivity while integrating the rural poor (especially

women and youths) into the value chain. Furthermore, new market opportunities were identified and developed to stimulate increased private sector investment in the establishment of export oriented cassava industries.

The specific objectives of the Nigerian Presidential initiative on cassava (PIC), which was to be achieved by 2007, include:

Enhance the productivity and production of cassava by increasing the area cultivated to 5 million ha, with the hope of harvesting 150 million MT of fresh cassava tuber annually;

Produce 37.5 million MT of processed cassava products (i.e. gari, HQCF, pellets, chips, starch, and ethanol) for local and export markets;

Organize the export of cassava and processed-cassava products as a revenue-generating project;

Earn about US \$5 billion annually from exporting value-added cassava products. The PIC helped create awareness about the multiple uses of cassava and also stimulated an increase in cassava production and processing activities. Although the initiative led to a tremendous supply response on the part of producers, there was not a subsequent market response to absorb the surplus of production. Without the development of new markets, beyond the traditional food market, there was a glut of cassava, much of which was actually thrown away, and led to dissatisfaction by the farmers and disinterest in new initiatives. A major component of the PIC was the mandatory inclusion of 10% HQCF in flours used for baking and confectionary products which was given political support to enhance public and industrial acceptance of HQCF and promote the production of cassava for industrial use. The policy was instituted to open additional market opportunities for smallholder farmers, creating a potential market for 330,000 tons of cassava flour yearly.

This encouraged farmers to produce more cassava, thus there was a significant supply response (national output of cassava in 2006 was 45 million MT). The growth in demand activated the industrial scale-up of HQCF and starch processing by about 48% and increased investments in the industry by foreign and local investors.

However, there were no good linkages into the improved food products and industrial products channels and farmers were not able to sell their cassava and it led to wastage.

Cassava Inclusion Policy: The policy focuses on blending 40% HQCF with 60% wheat flour. The FG has put in some measures to ensure that the Cassava Inclusion Policy succeeds. Listed below are some of such measures:

All equipment and machinery for processing high quality cassava flour and composite flours will attract zero taxes;

All flour mills producing HQCF will receive a 12% tax rebate;

With effect from March 31, 2012, the importation of cassava flour became prohibited;

All bakers have been given 18 months to move towards 40% substitution of HQCF; Increase in tariff and levy on wheat, and proceeds set aside to support promotion of HQCF and composite cassava bread. This will include technical training and equipment for corporate bakers and master bakers and support for the cassava enzymes that are needed;

Secured markets for cassava products, both locally and outside Nigeria.

Cassava Bread Intervention Fund: The FG launched a N10 billion special intervention fund to support and drive the cassava bread initiative in the country. This fund was created to assist the implementation of the Cassava Inclusion Policy. The funding would be available to stakeholders along the various cassava value chains for purchase of farm equipment suppliers through the Bank of Agriculture (BoA) and Bank of Industry (BoI) loans at an interest rate of 5 % over a three to four year period. Agriculture Equipment Hiring Enterprises (AEHE): As part of a FG initiative, 300

Agriculture Equipment Hiring Enterprises (AEHE):

As part of a FG initiative, 300 Agriculture AEHE were located in cassava production clusters are being set up by FMARD as part of the cassava initiative intervention fund.

AEHE, costing N300 billion naira and managed by the private sector, is a deliberate help to small-holder farmers to enable them raise their capacity, expand their acreage, perform timely farming operations, and achieve economies of scale in food production.

The funds in the first phase will make available 400 units of tractors, 500 power tillers, and various harvest and post-harvest equipment to set up 80 centres.

It is estimated that at the end of the first, second and third phases, the intervention scheme would have brought in 1050 units of tractors, 1500 power tillers and 2400 units of various harvest and post-harvest equipment such as rice reapers, grain threshers and cassava peelers.

Quality and Safety Standards for Cassava in Nigeria:

Standards for cassava roots, chips, high quality cassava flour, gari and starch have been developed and released by the Standard Organisation of Nigeria (SON) as outputs towards the attainment of the President Initiative on Cassava since 2006. It is expected that stakeholders including the supply side (producers, transporters, processors, and merchants), the government inspection and regulatory authorities, the support institutions (laboratories, R&D and training centres), and

consumers would implement these standards in order to ensure high quality and thus guarantee end users confidence.

Tax Regime:

Given the nature of cassava as a potential export food crop, and the potential as a substitute for starch imports, the various import duties are very important considerations to building up Nigeria's competitiveness. To date, Nigeria has taken an infant industry approach to protecting local production to build up domestic supply. This has included everything from absolute bans on import of products to heavy protection of certain industries. There are four main regimes for flour and starch related products:

1. Raw material for further processing in Nigeria, with low duties (5%);
2. Intermediate processed goods for further processing in sensitive categories (10%) e.g. pharmaceutical grade starch;
3. Processed goods such as tapioca, cassava and cassava flour (20%) where Nigeria should have a competitive edge; and
4. Protected industries with high duties (35%), where Nigeria is protecting its current industries in order to promote them.

This means that products such as wheat for milling into flour having little protection (5% duty) while wheat flour has a 35% duty to promote the local flour milling industry. The

protective duties for local starch industry (35% duty) are designed to protect and promote Nigerian production of starch.

However, there is often finagling of product definitions, as it was widely reported to the review team that imports of starch were assigned pharmaceutical grade rates (10%) but were used as regular starch inputs.

This trade regime has several impacts on the cassava industry. While it promotes the development of the processing industry through protection, it has the effect of raising the costs to the downstream industries (users of starch), which can have a negative effect for Nigeria as a whole by promoting higher prices to the end users.

It will not drive improved competitiveness in the industry unless the protective measures are gradually slated for removal.

E-10 Policy:

At the instigation of FG, the Renewable Energy Division (RED) of the National Nigerian Petroleum Corporation (NNPC) began working in 2005 on a plan to develop a programme to make ethanol in Nigeria from sugarcane and cassava, and biodiesel from palm oil.

The goal of the program was the adoption of E10+ standards across Nigeria, a potential demand for fuel ethanol greater than 1 billion litres per annum, as well as significant market penetration by biodiesel. We analyse the performance of some of the most important rules on the cassava market in Table 9.

Table 9.

Rules	Performance Status
Marketing Corporations	So far, not much has been done on establishing the Marketing Corporations
Staple Crop Processing Zone	So far, not much has been done on establishing the Marketing Corporations
Growth Enhancement Scheme	• The National Farmers Registration Exercise has captured data for close to 10 million farmers and collected them in the National Farmers' database • In 2013, about 6.5 million farmers received farm inputs of seeds and two bags of fertiliser each under the scheme. • Over 17 fertilizer suppliers are participating in the scheme • The draft bill on Fertilizer Quality Control is presently with the Ministry of Justice for vetting prior to its being forwarded to the National Assembly for consideration • Federal Ministry of Finance has signed MOU with banks and Federal Ministry of Agriculture and Rural Development for the provision of guarantee on 70% of the credit provided by banks participating in the scheme

Growth Enhancement Scheme	• 5 million E-wallet transactions were completed by farmers on their mobile phones in 2012, 45% of transactions were in Hausa, 25% was in English, 17% was in Yoruba, 12% was in pidgin while 1% was in Igbo. • Distribution of 24 million stems of improved cassava varieties, which resulted in 250,000 MT of fresh cassava roots.
Cassava Inclusion Policy	Launch of 20% cassava bread by four large industrial bakeries and four Master bakers.
Agriculture Equipment Hiring Enterprises	• Approval of N3.6 billion to support its establishment • Establishment of a N50bn Agricultural Mechanization Fund that will make credit available to farmers to mechanize their agricultural processes
Quality and Safety Standards for Cassava in Nigeria.	• Studies reveals that very few stakeholders are familiar with the standards and therefore do not adopt the standard requirement which they attribute to lack of awareness of such standards and lack of enforcement by the regulatory bodies (SON).
Tax Regimen	Although the tax regimens are in place, they are being poorly enforced largely as a result of poor systems and corruption.
E-10 Policy	• Investment of over \$3.86 billion has already been committed to the construction of 19 ethanol bio refineries, 10,000 units of mini-refineries and feedstock plantations for the production of over 2.66 billion litres of fuel grade ethanol per annum. Also an additional 14 new projects are in the offing. Of the 20 pioneer projects, 4 are at the conception phase, 8 are in the planning phase, and 7 are under construction with only 1 operational (Allied in Ogun state)

3.4.2 Informal rules

Informal rules that mainly govern the cassava sector exist mainly amongst farmers and mainly relate to the following:

- The traditional method of crop rotation (Bush fallowing). Bush fallowing is a type of subsistence agriculture in which land is cultivated for a period of time and then left uncultivated for several years so that its fertility will be restored. This results in low productivity;
- The perception that cassava is a 'low-effort' crop. It yields output with minimal effort so farmers don't see the need to invest in inputs.

3.5 Cross-cutting issues

3.5.1 Gender equality and social inclusion

Both men and women are involved in the production, processing and marketing of cassava, although men's emphasis is more on production and women's on processing.

Although some women are involved in cultivation of cassava, it is usually on a smaller scale and the extent of their involvement in agricultural production and their contribution to the household food basket varies from one ethnic group to another.

However, there are characteristics, which are common throughout. Women normally do weeding, planting and harvesting, although a few are involved in activities that are traditionally performed by men. Women are almost entirely responsible for processing agricultural commodities.

Small-scale cassava processing is the domain of women, although most of the mechanized equipment (graters and grinders) are owned and operated by men and the women have to pay for these services.

A large number of women are employed in medium scale intermediary processing enterprises to peel cassava used for producing HQCF. They work long hours and as casual workers, are not entitled to employment benefits, which are for permanent staff only.

There is a clear link between mechanised operations and permanent positions (mostly held by men), and manual jobs and casual positions (held by women). They also play a dominant role in marketing of cassava produce. They assist their husbands in marketing cassava and other crops and also market their own crops.

In many cases, women buy the agricultural produce from their husbands and other farmers and market this at a profit. At times, they buy cassava in the soil, harvest, process and market. Most times women's access to land is dependent on their husbands and fathers. In addition, women have limited control of appropriate technology to ease their processing workload.

Women's involvement is further constrained by access to available credits from financial institutions, which might lead to reduced scale of production.

In summary, the main constraints to participation of women and the poor in cassava value adding activities are social, economic and financial, associated with the limited time availability especially for

women with small children, technologies which are uncomfortable to use, limited capital to purchase raw materials and the lack of credit to invest in improved equipment.

3.5.2 Other investments

Other investments that are happening in cassava include:

- China Development Bank: loan of US \$1 billion to facilitate importation of 100 rice mills and 18 large high quality cassava plants is in process, with closure expected November 2012.

World Bank: funding of US \$150 million for FADAMA III has been negotiated awaiting presentation to Board. Funding will support rice, cassava, and horticulture value chains; infrastructure; linkage between research and extension; expansion of asset acquisition to promote gender and youth empowerment; and operational framework for Staple Crop Processing Zones (SCPZ).

A proposal for US \$150 million in funding via CADP is under consideration. Funding will support staple crop value chains of rice, cassava, and sorghum by focusing on SCPZ support in the following areas: agro-processing and marketing; rural infrastructure; rural energy; development of outgrower schemes; and capacity building, including monitoring and evaluation.

- African Development Bank: a pre-appraisal mission of the African Development Bank has been mounted with a view to finalize the project cycle for the US \$200 million facility for value chain work on cocoa, rice, sorghum and

cassava.

- International Fund for Agricultural Development (IFAD): a financial agreement was signed in August 2012 to provide US \$74 million to support value chain work in cassava and rice in Ogun, Niger, Taraba, Benue, Ebonyi, and Anambra. A \$500,000 grant for rice, cassava, cocoa, sorghum, and cotton value chain activities is also underway.
- United Nations Development Project (UNDP): a \$1.5 million grant for value chain support, technical advice, and other activities is under way.



Constraints Analysis

4.1 Main constraints

We have identified the following constraints to poor people benefitting as much as they could from the cassava market:

Constraint 1:

Weak incentives for farmers to increase production which leads to low productivity

Smallholder farmers are not encouraged to increase the amount of cassava that they produce, even though there is high demand for cassava.

One reason for this is that Industrial users often offer producers a low prices – averaging N10, 000 – 12,000/ MT – compared to food processors that offer better prices - as high as N18,000.

Food processors offer a higher price mainly because the cost of processing food products (gari, lafun, etc) is low, and the products have a high demand. Processors of industrial products typically have higher production costs because of lack of power supply which results in high diesel costs.

Since diesel costs are fixed and processors cannot do anything to address power supply, they try to reduce costs by attempting to purchase roots at a reduced price.

Uptake of processed cassava products by industrial end-users is quite low for many reasons, one of which is the high use of imported alternatives, which is mostly present in higher quantities at competitive prices for example high fructose corn syrup which costs the same as cassava sugar produced in Nigeria but is available in larger quantities.

Although, government has developed several policies to address this issue asuch as the E-10 policy which encourages blending of cassava ethanol with petroleum products, the Cassava Inclusion Policy, which promotes the use of cassava flour in bread, and increased

tax tariffs to reduce importation of these alternatives, poor implementation of the policies and enforcement of the tariffs has resulted in failures of these measures.

A further reason for low uptake of cassava is the inadequate quantity and quality of cassava intermediate products. To meet production needs, most industrial end users have required standards for cassava products such as HQCF and starch), and usually require it in large quantities. However, processors sometimes fail to meet these standards resulting in a low off-take.

For example, end users of HQCF such as master bakers complain that their customers don't really like bread baked with cassava as it is usually hard and spoils fast due to the large particle size and high water content of cassava, as opposed to that being produced by wheat.

This is the main reasons for the low uptake of HQCF in Nigeria. However, blending the cassava to smaller particles can address this issue.

Finally, although the Nigerian government claims to have secured off-take of 3.2 Million MT of cassava chips and pellets by the China, several exporters complain that this is yet to really gain momentum as pricing still remains and issue.

Thailand is Nigeria's biggest competitor in this market because of its close proximity to one another relative to Nigeria. The bulk of cassava is produced in cities outside Lagos (the port city). States such as Kogi and Kwara have the added intra-city transport costs, which add to the total

export cost. In addition, because of the use of improved inputs and mechanized services, the cassava yield from Thailand is significantly higher than that of Nigeria and production costs are significantly lower. As a result, Thailand offers a very competitive price (\$250-280 per MT). This doesn't really cover the cost of purchase from Nigerian processors and freight cost from Nigeria, which are usually borne by the exporter. According to a source, the ideal price for Nigeria producers would be between \$350 – 400 per MT, which is not attractive to international buyers. Demand from European markets (which is closer to Nigeria) has also reduced significantly in recent years due to a fall in production / manufacturing driven by high labour costs.

Thailand is Nigeria's biggest competitor in this market because of its close proximity to one another relative to Nigeria



Constraint 2:**Traditional agronomy practices still in use which leads to low crop productivity.**

Smallholder cassava farmers tend to practice inherited farming techniques, which impacts yield and productivity. Poor practices include: continuous replanting on soil continually without replacement of lost nutrients (with fertilizer); planting of cassava at the same time as other farmers which usually results in a glut in the market; inadequate spacing; and suboptimal timing of activities like weeding.

These poor practices are quite common amongst smallholder farmers. Farmers are not aware of improved farming techniques or the resultant benefits of improving their agronomy practices mainly because there are very few capacity building/ trainings available for smallholder farmers.

programs with diversion of the existing supply to larger farms that have bribed the officers.

In addition, small holders farmers based in rural areas usually have to travel a considerable distance to cities to purchase these inputs as there is a very weak supply system between multiplier farms and smallholder farmers, which adds to the cost and discourages them from using these inputs. Improved cassava varieties sell for between N300 and N500 per bundle and farmers need 60 bundles per hectare at a total cost N18- 0,000. which many smallholder farmers cannot afford.

The absence of finance from financial institutions that consider the sector risky due to lack of insurance and absence of collateral also further constrains supply. Furthermore, government interference in the fertilizer sector is a huge deterrent to private sector investment in this area.

Constraint 3:**Many farmers do not use the right quality and quantity of inputs.**

The main reasons that farmers are not utilising high quality and quantity of inputs such as improved varieties and fertilizer are poor access to these inputs, and in-affordability.

Only a small number of private sector multipliers propagate and sell planting material for improved varieties of cassava, mainly because a clear business case for income generation has not been established.

The state ADPs that traditionally supply farmers are not functioning and there is a high level of corruption in those

Constraint 4:**Farmers have high production costs.**

High production costs experienced by farmers can be mainly attributed to high labour cost and use of traditional low-yielding varieties.

According to a report by the IITA in 2014 current production costs can be reduced by as much as 40% with the use of improved varieties of stems and mechanisation of planting and harvesting.

In cassava farming, labour is mainly used for land preparation and weeding. Interviews with stakeholders revealed that it costs the farmer between N70,000- 80,000 / ha for land clearing and creation of heaps..

When mechanical services (mainly using tractors) are employed for this function it costs a maximum of N15 000 per hectare. In countries such as Asia, hand held devices are being used for land preparation. However, this is not being employed in Nigeria.

In fact, most farmers are of the opinion that mechanised services costs more than manual labour. This is mainly due to poor farmer education. Furthermore, they do not have access to these services.

Traditionally, mechanisation services are provided by state ADPS, which as mentioned above are not functioning. Private sector involvement is low and mainly targeted at the larger farms that have ability to pay for the service.

Additional labour cost is incurred by manual weeding as opposed to the use of herbicides. It costs smallholder farmers N60,000 to weed cassava farms during production.

With herbicide use, weeding is not necessary and it costs significantly less, between N 23,000 and N25,000 being the cost of purchasing the herbicide and labour costs for application. Again, the main issue here is most smallholder farmers lack knowledge on the appropriate herbicides to be used and in what quantity and the benefits.

Constraint 5:

High cost of transporting cassava leading to high go to market costs for the farmer.

Smallholder farmers also experience high cost in transporting harvested cassava roots to processors.

Transporters are usually independent and small-scale, owning 1-3 vehicles that have been in use for a number of years or converted from solely passenger to 'dual purpose' such as vans and small trucks.

Because of the wear and tear of constantly carrying heavy goods on bad roads, the cost of maintaining these vehicles is most times extremely high and these transporters tend to transfer these costs to the smallholder farmers who end up paying high additional costs.

In addition, the poor state of roads in Nigeria, high number of road blocks (which means a high number of tips to policemen) and non-functioning transport sector also adds to the cost.

Another reason for the high cost of transport is cassava's bulky nature. Because of the mass, it will take more trips or a bigger vehicle to move a harvest.

In response to that, and the difficulty encountered with trying to get the roots to the processors before degeneration starts, DATCO developed an Autonomous Mobile Processing Unit (AMPU), a self-contained mobile processing factory that can be used on the farms to process harvested roots into cake.

This is an intermediate product that contains 45% to 50% less water than

the roots and can be stored for six months (although for HQCF it only extends the time to processor period by a further 48 hours).

It is also smaller and easier to transport. Cassava cake can be further processed into beer, flour, starch and chips. Currently, DATCO is the only company doing this in Africa and is operational in 5 African countries. The company just completed a pilot in Rivers state and is scheduled to kick off shortly.

However, a major hindrance to the rollout is the inability to reach an agreed price for a tonne of cassava. Furthermore, CAVA provided smallholder farmers with on-site processing training. However, there are issues with the type of machinery used for processing such as machinery with stainless steel blades for cutting instead of iron, which adversely affect the colour of the cassava cake (yellowish instead of white).

Furthermore, once cassava has been processed to cake, it can no longer be used by the food processors and if there are any issues such as delays, there is a high risk of rejection by the processor.

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 11.

s/n	Constraints	Underlying causes	Related Supporting & Enabling Functions	Root causes	Intervention
1	Weak incentives for farmers to increase production which leads to low productivity	Low prices for cassava roots offered to farmers by middlemen	Aggregation Services Marketing Services	Weak linkages between farmers and processors	Intervention 1: Work with a cassava industrial processor to develop a contract -farming model with embedded linkages to input suppliers, and produce transportation to improve quality and yield from smallholder cassava farmers reaching the processors. <i>e.g. work with Crest Agro Products Ltd in Kogi State to develop a contract farming (out grower) business model that will guarantee a supply of cassava roots for their starch processing facility.</i>
		Low prices for processed cassava products offered to processors by industrial end users	Information Services Infrastructure – Power Marketing Services Export Services	- Poor flow of market information between key players – producers, processors and end users - High cost of production & transportation (internal and shipping) for industrial use adds to export cost	Intervention 2 : Work with an association of cassava industrial processors to device and deploy a campaign (such as the Switch Campaign for Oando in BIF1) to improve product uptake by industrial end users of cassava . <i>e.g. work with Flour Millers Association of Nigeria and Master Bakers to develop enlightenment programs on the benefits of cassava bread in order to encourage increased uptake.</i>
2	Farmers still use traditional agronomy practices which leads to low crop productivity	Benefits of improved agronomy practices not known by farmers	Extension Services	Weak farmer education	Intervention 3: Work with input suppliers to use goal congruence with other stakeholders such as broadcast media (e.g. radio stations), and cassava farmers association to devise sustainable models for financing outreach to smallholder farmers for their mutual benefit – e.g. increased sales for input supplier; expanded membership and dues for farmers association; increased long term revenues for broadcaster, improved agronomy information for the farmer . <i>e.g. Work with Notore Chemicals to develop content for radio programs for farmers on the use of fertilizer.</i>

3	Many farmers do not use the right quality and quantity of inputs	Benefits of improved agronomy practices not known by farmers	Extension Services Information Services	Weak farmer education	Intervention 3 : Work with input suppliers to use goal congruence with other stakeholders such as broadcast media (e.g. radio stations), and cassava farmers association to devise sustainable models for financing outreach to smallholder farmers for their mutual benefit – e.g. increased sales for input supplier; expanded membership and dues for farmers association; increased long term revenues for broadcaster, improved agronomy information for the farmer. <i>e.g. Work with Notore Chemicals to develop content for radio programs for farmers on the use of fertilizer.</i>
		Inadequate quantity of improved varieties available to farmers	Extension Services Seed Services	Business case for multiplier farms is unclear	Intervention 5: Further research the creation of a business case for a sustainable distribution model for improved varieties.
		Farmers cannot afford to pay for inputs	Financial Services Extension Services Seed Services	- Weak linkages between existing input suppliers and farmers - Lack of a functional credit system in place for poor farmers to access	Intervention 1 : Work with a cassava industrial processor to develop a contract -farming model with embedded linkages to input suppliers, and produce transportation to improve quality and yield from smallholder cassava farmers reaching the processors. <i>e.g. work with Crest Agro Products Ltd in Kogi State to develop a contract farming (out grower) business model that will guarantee a supply of cassava roots for their starch processing facility.</i> Follow-up on what DFID is doing on Financial Inclusion
		Few fertilizer suppliers	Extension Services	- Government interference distorts market - Poor alignment between Government's & Farmers objectives	Intervention 4 : Work with input suppliers to develop a distribution model based on franchising such as Agro -dealers schemes involving youth in villages. These models will provide youth with jobs as distributors and train them on how to train farmers on use of inputs (and other extension services). <i>e.g. Notore, established the Village Promoter Program which is focused on Nigeria's smallholder farmers in areas not covered by their formal distribution networks</i>

4	Farmers experience high production costs	Few farmers use herbicides	Extension Services Information Services	- Weak farmer education - Poor alignment between Government's & Farmers objectives	Intervention 3: Work with input suppliers to use goal congruence with other stakeholders such as broadcast media (e.g. radio stations), and cassava farmers association to devise sustainable models for financing outreach to smallholder farmers for their mutual benefit – e.g. increased sales for input supplier; expanded membership and dues for farmers association; increased long term revenues for broadcaster, improved agronomy information for the farmer. <i>e.g. Work with Notore Chemicals to develop content for radio programs for farmers on the use of fertilizer.</i>
		Most farmers use of manual labour for cultivation (instead of mechanized services)	Extension services Financial Services	High set-up costs for private sector players	Intervention 6: Work with mechanized services provider to device a model for aggregating, provisioning and maintaining hand held tractors / hoes for a fee. We can partner with Propcom for this intervention since they have a tractor scheme.
5	High cost of transporting cassava leading to high go to market costs for the farmer	Few road transporters	Transport Services Aggregation Services Financial Services	Poor access to finance for leasing & maintaining vehicles for transporters	Intervention 1 : Work with a cassava industrial processor to develop a contract -farming model with embedded linkages to input suppliers, and produce transportation to improve quality and yield from smallholder cassava farmers reaching the processors. <i>e.g. work with Crest Agro Products Ltd in Kogi State to develop a contract farming (out grower) business model that will guarantee a supply of cassava roots for their starch processing facility.</i>

Poor road infrastructure	Infrastructure - Road	Poor road infrastructure	Not to be dealt with by a BIF intervention. However, other DFID projects like NAIF are focusing on infrastructure and discussions with them on their interventions may identify areas that BIF can leverage on to improve the impact of other interventions related to transportation.
Bulky nature of cassava	Aggregation Services	Suitable way to process cassava that doesn't compromise quality hasn't been established	Intervention 7: Work with a cassava primary processor to explore the viability of intermediate cassava products to reduce bulkiness of the product and thus its transportation costs. E.g. DATCO is currently performing on-farm primary processing of cassava roots into cassava cake. However, there are issues with loss of product (especially with respect to most industrial end-users) if the cake is not transported within a stipulated time. More research is needed on a sustainable model that addresses all the issues.
Poor economies of scale by smallholder farmers	Aggregation Services	Lack of collaborative efforts between farmers	Intervention 1 : Work with a cassava industrial processor to develop a contract-farming model with embedded linkages to input suppliers, and produce transportation to improve quality and yield from smallholder cassava farmers reaching the processors. <i>e.g. work with Crest Agro Products Ltd in Kogi State to develop a contract farming (out grower) business model that will guarantee a supply of cassava roots for their starch processing facility.</i>



5 Market strategy

5.1 Strategy statement

BIF Nigeria's vision for the Nigerian Cassava market is 'To increase the incomes of smallholder cassava farmers by improving the quality and volumes of cassava produced and ensuring uptake of processed cassava products by end users'.

To overcome the constraints identified in the casualty tree and improve the income of smallholder farmers in the market, it is essential that BIF's interventions focus on improving the quality and quantity of cassava produced by smallholder farmers, and increase the uptake of cassava roots by processors, and processed products by end users.

A number of root causes responsible for the sub-optimal performance of the market have been identified. BIF will focus on only the ones that fall within its mandate and it has the capabilities, including resources and time, to realistically bring about change.

These key issues (if addressed) also have the ability to bring about systematic change in the cassava value chain. The root causes that will be addressed by interventions include: low use of quality inputs and extension services mainly due to poor access and affordability; a lack of

knowledge of improved farming techniques (which results in farmers still using traditional techniques and as such, low outputs); and weak market linkages between players in the value chain resulting in issues such as poor pricing and a low rate of uptake of cassava products by end users.

Furthermore, although the processing of cassava results in several products that are used in a large number of industries as raw materials, BIF will not be focusing on a particular product (i.e. chips/ pellets or starch) in order to have a wider impact on key players.

The identified interventions should assist in providing long term solutions to key issues limiting the sector and result in a increased uptake of cassava products, more productivity in the capacity of processors with a final outcome of better income for small holder farmers.

5.1 Opening portfolio of interventions

The main objective of BIF's intervention will be to increase the income of smallholder cassava farmers by increasing uptake of the crops by processors and end users. BIF will initially focus on strategies that are targeted at issues that can be easily addressed but will however,

continually assess the market (and review key learnings from interventions) for opportunities for new interventions that will further strengthen the value chain and build on the impact of the initial activities.

Intervention 1:

Work with a cassava industrial processor to develop a contract-farming model with embedded linkages to input suppliers and transportation of cassava, to improve quality and yield and the quantity of smallholder produced cassava reaching the processors.

5.1 Market Underperformance

As highlighted above, weak linkages between market players (input suppliers, smallholder farmers and processors) is the major cause of a number of constraints in the market such as:

- Low productivity as a result of weak incentives for farmers to increase production;
- Low usage of the right quality and quantity of inputs caused by poor linkages between smallholder and input suppliers;
- High cost of production for smallholder farmers as a result of low usage of mechanised services;
- High cost of transporting cassava leading to high go to market costs for the farmer.
- Vision of change: Improving linkages between key players in the market will facilitate the following market system changes:
 - Guarantee smallholder farmers access to the industrial users;
 - Improve the supply of cassava roots to processors;
 - Improve the flow of information between key players in the market;
 - Improve smallholder farmer access to inputs such as fertilizer, improved cassava varieties and herbicides.
 - These changes will assist in increasing smallholder farmer productivity and improving the quality and quantity of cassava roots supplied to processors, which will lead to improved incomes for smallholder farmers.

5.1 Market Underperformance

- BIF is proposing the development of a contract-farming model (out-growers scheme) between processors and smallholder farmers. Experience shows that the successful processors are those located close to cassava farmers and those who backward integrate by creating out grower arrangements where they off take harvested roots from smallholder farmers at an agreed price. Those arrangements sometime involve the off taker providing embedded services such as supply of inputs, mechanised services and transport.

Figure 12: Stakeholder mapping of the cassava market

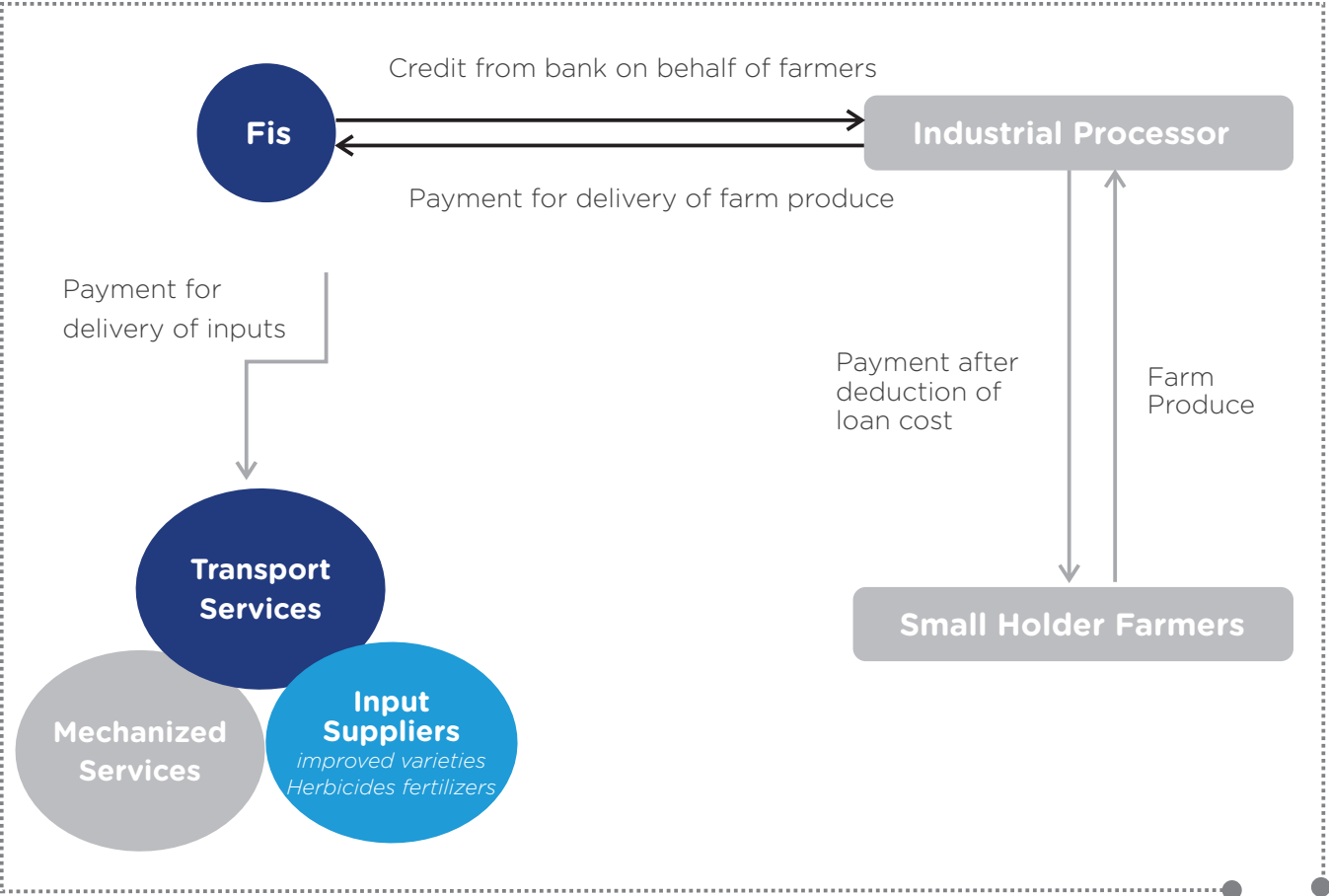


Figure 12: Stakeholder mapping of the cassava market describes the business model, which involves cassava production being undertaken via an agreement between processors and smallholder farmers.

The agreement will involve the smallholder farmer groups (or

Associations) undertaking to supply agreed quantities of cassava roots, based on the quality standards and delivery requirements of the processor.

In return, the processor will buy the product, often at a price that is established in advance.

The processor may also be responsible for providing embedded support services to the farmers such as supplying inputs, assisting with land preparation, providing production advice and transporting produce to its premises, or may engage partners (such as input suppliers and Financial Institutions (FIs) for credit) to provide this support.

An example of a company using this model in Nigeria is Fumman Agricultural Product Industries Plc., a fruit juice manufacturer that purchases 10,000t of fresh fruit per year from farmer cooperatives in the area. The company provides soft loans, planting materials; equipment and other agricultural inputs while the farmer cooperative groups supply their produce to the company at an agreed price, usually the average market price for that year.

BIF will assist in providing Technical Assistance (TA) to partner processors to develop this type of arrangement including assisting in partnership building with providers of embedded services. Examples of processors we can engage with include Ladmok Company Limited in Ogun state (process powdered fufu for export purposes) and Crest Agro Products Limited in Kogi state (process industrial cassava starch). Activities for this intervention will include:

- Development of business case for

contract farming for engagement of potential farmers;

- Identification and engagement of potential partners (processors and input suppliers);
 - Identification and engagement of consultants (TA Providers);
 - Identification of partner's needs (some have more specific needs);
 - Development / tailoring of a business model to address partner's needs/ issues;
- Identification and strengthening of farmer cooperatives;
- Partnership brokering between stakeholders (including support to contracting);
 - Implementation of pilot of the developed business model (adoption) by a lead company;
 - Monitoring and evaluation of the pilot, and review with partners;
 - TA to partner on adaption of model into mainstream business operations;
 - Case study on the pilot for dissemination and promotion to encourage expansion and market response.



Intervention 2:

Work with an Association of cassava industrial processors to device and deploy a campaign to improve product uptake by industrial end users of cassava

Market underperformance:

Currently, there is a low off take of industrial cassava products by industrial end users. This adversely impacts the price industrial end users are willing to pay for them. There is a high use of alternatives. A major reason for this is the limited awareness of cassava as a suitable alternative for corn and wheat.

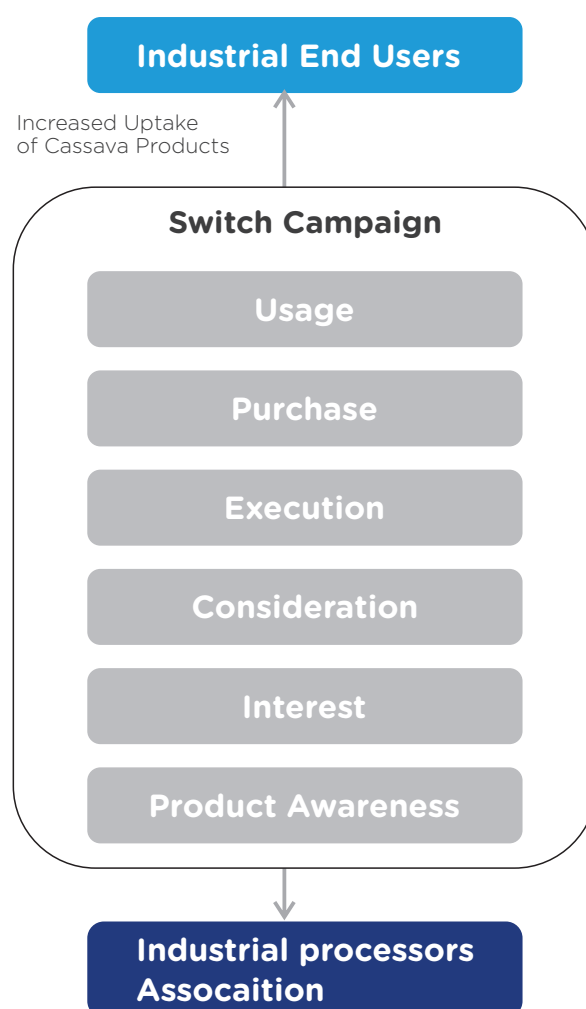
Market change:

Increased awareness of the benefits of cassava and how it can be used in their products will improve uptake by end users and consumers. This will improve prices offered by them, which will in turn improve the price offered to smallholder farmers, and encourage them to increase production, which will increase income and reduce poverty.

Overview of intervention:

BIF can provide TA to Associations such as the Flour Millers Association of Nigeria and Master Bakers to develop campaigns to encourage usage of industrial cassava products as illustrated in Figure 13: Schematic of a switch campaign. Examples of such campaigns include the Switch Campaign by Oando to encourage switch from firewood/ kerosene to cooking gas and Apple's Switch Campaign to encourage users switch to Mac and the Coke Test.

Figure 13: Schematic of a switch campaign



Activities for this intervention will include:

- Further research to understand consumers needs and end-user preferences;
- Development of business case for the switch campaign;
- Identification and engagement of potential partners;
- Identification and engagement of consultants (TA Providers);
- Design of an initial plan for a switch campaign, describing levers, activities and targets;
- Implementation of pilot of the switch campaign;
- Monitoring and evaluation of the pilot such as baselines, collection of post pilot data and analysis of results;
- Roll out of full switch campaign.

Intervention 3:

Work with input suppliers to use goal congruence with other stakeholders such as broadcast media (e.g. radio stations), and cassava farmers Association to devise sustainable models for financing outreach to smallholder farmers for their mutual benefit.

Market Underperformance:

Over the years, cassava farmers have relied indigenous or local knowledge practiced over many generations as their source for farming techniques.

As a result farmers experience poor farm yield, high incidence of pests and animal disease, resistant plant weeds, high cost of production and low income mainly as a result of low usage of mechanised services, improved varieties, fertiliser and herbicides.

They are not aware of the benefits of improving their practices because systems responsible for the provision of information to farmers (such as extension workers of state ADPs) are not functional.

Market change:

Extensive research shows the direct link between increased farmer knowledge and improved output and quality. From

analysis, yield can go as high as 40mt/ha, which will mean an increased income for smallholder farmers by at least 400%. As such, improving the knowledge base of cassava farmers will improve their productivity and incomes.

Overview of intervention:

Traditionally, capacity building for farmers is done via workshops and trainings on demonstration farms. However, this approach has been found to be very unsustainable, typically has a limited reach and is expensive for smallholder farmers. BIF is proposing an intervention that is focused on a longer-term approach to improving the agronomy practices amongst poor cassava farmers.

In this approach, BIF will work with input suppliers (whose interest is increased uptake of their products by farmers) to use goal congruence with other stakeholders such as broadcast media (e.g. radio stations), and cassava farmers Associations

to devise sustainable models for financing outreach to smallholder farmers for their mutual benefit.

Examples of such models include:

- **Notore Village Promoters Scheme:**

The scheme employs the use of Village Promoters, which are a team of local farmers trained by Notore to sell small packs of fertiliser to farmers in their surrounding communities.

They make sales through the use of demonstration plots where they educate farmers in their communities on the appropriate use of fertiliser and best farming practices. While introducing the 1kg bag of fertiliser, Notore selected sales men (most of who are accomplished farmers) as "Village Promoters", through a rigorous process. Notore Village Promoters undergo a training program conducted by the Notore Agricultural Services Department, with a curriculum developed by Notore and ProCom.

The Village Promoter Scheme is aimed at promoting agricultural best practices of proper fertiliser usage, which will lead to a higher yield for farmers. In January 2011, the training of farmers commenced in more than 400 locations nationwide. The scheme runs in over 20 states of the Federation.

- **Small Holder Farmers Foundation:**

The Smallholders Foundation promotes sustainable agriculture and environmental conservation through educational radio programmes. Smallholder Farmers Rural Radio broadcasts daily programs on agricultural management, environmental conservation, and market access, which reach over 250,000 smallholder farmers. Broadcasts are done in the local Igbo language, and reach listeners in three local

government catchments in Imo State, Nigeria.

Activities for this intervention will include:

- Development of sustainable business model for reaching out to the farmers;
- Identification and engagement of potential partners (input suppliers, media partners);
- Identification and engagement of consultants (TA providers such as content developers etc.);
- Partnership brokering between relevant stakeholders;
- Implementation of pilot (adoption by lead company/ies);
- Monitoring and evaluation of pilot and review of pilot with partners;
- Case study for dissemination and promotion to encourage adaption, expansion and response by other inputs suppliers and Associations.



Intervention 4:

Work with input suppliers to develop a distribution model based on franchising such as agro-dealers schemes involving youth in villages

Market Underperformance:

As mentioned in the constraints section of this report, poor access to fertilizers by the smallholder farmers as a result of few fertilizer suppliers, especially in rural areas, affects productivity and yield of smallholder farmers.

Research shows that poor farmers often receive inadequate supplies of fertilizer or none at all. For example some farmers that were interviewed on the E-wallet scheme complained that they only received one bag of fertilizer instead of the 6 that are required for 1 ha, and also fertiliser which are a bit expensive (sold in 50kg bags at N6,000 per bag and 4-6 bags are needed, which is often too pricey for the poor farmers) and often late (often towards the end of the season as a result of bureaucracy and corruption in the system).

In addition, there are very few fertilizer suppliers. Only 30 organisations are registered with FEPSAN) and they usually have poor distribution networks in rural areas.

Market change:

Improved access to fertilizer in the right quantity, at the right cost and on time. This will improve yield and productivity and essentially improves farmer's income

Overview of intervention:

BIF will work with input suppliers to develop a distribution model based on franchising for youth in the villages to work as Agro-dealers*. These models will

provide youth with jobs as distributors and train them on how to train farmers on use of inputs (and other extension services). Examples of such models include the Notore Distribution Model, which targets smallholder farmers in areas not covered by their formal distribution networks. The model was piloted in 2010 with 180 unemployed youth who were trained as Village Promoters in target communities. Their duties were to train farmers with practical tools such as demonstration plots while also driving sales of affordable 1kg pack fertilisers to farmers.

So far, the Village Promoters have successfully set up 917 demonstration plots and reached about 58,000 farmers in 15 states across Nigeria.

Activities for this intervention will include:

- Development of sustainable business model;
- Identification and engagement of potential partners (input suppliers, youth empowerment programs);
- Partnership brokering between relevant stakeholders;
- Implementation of pilot, review and case study (as with the other interventions).

Intervention 5:

Further research for the creation of a business case for a sustainable distribution model for improved varieties

Market Underperformance:

Farmers have poor access to improved varieties as a result of issues with the two main sources of these inputs. They include:

- Few multiplier farms available for cassava planting material; and
- State ADPs are not functioning.

The main reason why there are very few input suppliers is due to the fact that potential multiplier farms cannot see a viable and profitable business model for investing in this line of business.

Market change:

Increased number of multiplier farms with distribution models targeting smallholder farmers that will improve their access to improved varieties and therefore improve yield/ productivity and eventually their income.

Overview of intervention:

Further research will be done to determine the real reasons for failure in the existing models and to determine interests and incentives of stakeholders will need to be carried out. Activities will include field visits and focus group discussions

Intervention 6:

Work with mechanized services providers to devise a model for aggregating, provisioning and maintaining privately owned tractors

Market Underperformance:

Low utilisation of mechanised services by smallholder farmers due to high cost and lack of availability. Mechanised services are important for land preparation and makes up 60% of the cost of production.

Currently farmers use manual labour which research has shown is more expensive and adds to the high cost of production.

However, there are very few providers of mechanised services. The FG is by far the leading supplier of tractors in the country but is only able to satisfy about 4% of the need.¹⁵ And even with that, approximately half of the government-supplied tractors are broken.

Private sector participation is also low because the tractor leasing business is very capital intensive with high set-up costs,

¹⁵ Report by Hello Tractor

particular with the large conventional tractors that are expensive to purchase. Furthermore, unless subsidised by government, poor farmers cannot afford to pay the usually high fees charged by private sector players who are trying to recoup their investments and make a profit.

Market change:

: Improved access to mechanised services will assist in reducing the smallholder farmers cost of production and in the long run increase the profit gained by them.

Overview of intervention:

BIF will provide TA to organisations like Hello Tractor (a service company that provides two-wheel tractors to small farmers in Nigeria to increase crop yield and combat against income and food insecurity) and other local tractor providers to devise a sustainable business model for providing mechanised services through the use of hand operated tractors for a fee.

Examples of models that can be used include the Hello Tractor Model. Hello Tractor fits two-wheeled tractors with telematics and GPS in order to track the machines across the areas that it operates.

The company works with service providers who can deliver the tractors when individual farmers text message into the Hello Tractor's virtual cloud.

Hello Tractor pings the service provider when a farmer needs tractor service, and the machine is delivered in less than two weeks. The farmer then pays for the service via mobile money. Hello Tractor

hopes to reach 110,000 farmers with its tractors and employ more than 1,000 service providers with jobs, who will get paid three times the local wage rate within 5 years. The image below shows a two-wheel tractor that Hello Farmer is proposing. This two-wheeled tractor weighs roughly 300 pounds and operates similarly to a push lawn mower. It is estimated that 750,000 of these tractors are needed in Nigeria to bring it on par to global standards.

Hello Tractor hopes to reach 110,000 farmers with its tractors and employ more than 1,000 service providers with jobs, who will get paid three times the local wage rate within 5 years.



Activities in this intervention will include:

- Development of sustainable Business Model
- Identification and engagement of potential partners (input suppliers, youth empowerment programs)
- Identification and engagement of consultants (TA Providers)
- Partnership brokering between relevant stakeholders
- Monitoring and Evaluation (Development of indices, Collection of baseline data)
- Implementation of Pilot
- Monitoring and Evaluation (Collection of post pilot data, Analysis of results)
- Review of Pilot with partners
- Case Study on Pilot for dissemination and promotion (to encourage Expansion & Response by other Associations)

Intervention 7:

Work with a cassava primary processor and other stakeholders to explore the viability of intermediate cassava products to reduce bulkiness of the product and thus its transportation costs.

Market Underperformance:

High cost of transportation due to bulky nature of cassava is a major constraint for smallholder farmers. Cassava needs to be processed or cut up to smaller sizes that can be easily transported. Unfortunately, cassava roots are perishable, spoiling within three to four days after harvest so once harvested, it has to be transported to processing sites within 24hrs and this also affects the cost.

Market change:

Reducing the size of cassava will reduce transport costs and increase profit margins of smallholder farmers (and their incomes)

Overview of intervention:

BIF can work with a primary processor (and other stakeholders) to explore the

viability of intermediate cassava products to reduce bulkiness of the product and thus its transportation costs. There are a few models that will be explored to determine their feasibility. They include:

The DATCO Model:

DADTCO produces High Quality Cassava Cake (HQCC) via a split processing production method that enables root processing within 24 hours after harvesting. HQCC is an intermediate product, a high quality semi-wet cassava paste, which is the essential starting raw material to a number of downstream related businesses producing an array of high value end products, including High Quality Cassava Flour (HQCF), High Quality Cassava Starch (HQCS) or native cassava starch, cassava based syrups (maltose, dextrose and fructose as a sugar replacement), modified starches (used in food preparation), sorbitol (a component in toothpaste, a sweetener

and humectant in cosmetics), bio-ethanol (for heating fuel), beer, snacks and other foodstuffs.

The Autonomous Mobile Processing Unit (AMPU) is a small factory that transforms the root into high-quality cassava cake that can be stored for two years. The AMPU operates in a cargo container that can be moved from one rural area to another during harvesting.

DADTCO buys cassava roots from individual farmers living near the AMPU and processes the roots into cassava cake. The AMPU sources the locally produced cassava roots from smallholder farmers at farmers' gate and processes it into HQCC. All cassava growers can supply to the AMPU and get the same fair price for their products.

The AMPUs are located in cassava production areas, while the primary factory, the flash dryer, which processes the cake into flour or starch, is located near a low-cost energy source (three AMPUs can serve one flash dryer). The production of HQCC at farmer's level allows us to transport three times more dry matter content to the primary factory (and/or brewery) than when roots would have been transported, while at the same time extending the shelf life with at least 6 months. One AMPU moves to three to four sites per year staying at each site three to four months. When the harvest campaign is finished in one village, the AMPU will move to the next site in another village. The AMPU returns to the same site every year.

Box in a Truck:

This is a locally made freezer box alternative developed by Smallholders Foundation. The device was launched with a pilot grant from Bill and Melinda Gates Foundation and was designed to extend the shelf life of cassava from 24 hours to 21 days.

It works on the principle of using earth-friendly and affordable materials in preserving cassava and consists of three sections: the Base, Box and the Truck. All the sections are made of a flat metal bar of 0.2mm size and wire mesh of 0.02mm.

The Truck houses the Box, which carries up to 50kg of cassava tubers. The Box is placed in a sizeable L-shaped stand at the bottom of the Truck, which has a metal cover of 200mm. The Truck is placed on the rectangular flat base section that contains two wheels and a stand.

The device is detachable and uses sawdust as a preservative agent, which is used to fill the spaces in between the box and truck. Water is then sprinkled all over the sawdust to make it wet, this is done twice daily (morning and night). The sawdust with its dampness regulates the temperature of the box to be equivalent to that of the soil temperature.



Further extensive research would have to be done to determine interests and incentives of stakeholders and viability of these models will need to be carried out. Activities will include: Field visits, focus group discussions etc. Activities will include:

- Identification and engagement of consultants (TA Providers)
- Market feasibility study of identified models
- Development of business case
- Identification and engagement of potential partners (input suppliers, youth empowerment programs)



Risk theme	Risk	Likelihood	Impact to BIF (Severity)	Mitigating action
		5	5	
Financial	Cost of intervention significantly higher than estimated	2	3	Post intervention BIF work will involve detailed budgeting for each intervention. Finances will be monitored throughout the intervention and value for money will be emphasized.
Delivery	Lack of suitable processors to partner with (Interventions 1 & 7)	1	4	BIF already has good links with a number of players in the industry. In addition, BIF will continually identify potential partners that can be engaged.
	Inability to identify suitable consultants to provide technical support (or failure for them to deliver) (all Interventions)	1	4	The selected interventions are mainly business focused and there is a large number of qualified consultants to work with. Again here, BIF will continually identify potential consultants and create a database of them
	Duplication of efforts by other programs e.g. MARKETS II, PIND and MADE (all Interventions)	2	2	BIF will mitigate these risks by initiating dialogues with similar projects and looking for areas of mutual benefit that we can partner with them. E.g. Propcom is working with Tractors and we are already looking at a way to partner with them.

	Few input suppliers – cassava stem cuttings and fertilizer (Interventions 1, 3 & 4)	1	4	BIF already has good links with a number of players in the industry. In addition, BIF will continually identify potential partners that can be engaged.
	Few mechanised service providers (Interventions 5)	2	4	BIF already has good links with a In addition, BIF will leverage on Propcom's contacts since they have already kicked off on a similar intervention and will also continually identify potential partners that can be engaged.
	Failure of Associations to buy in (Intervention 2)	1	4	BIF will facilitate sessions focused on enlightenment of potential partners. In addition, the business case (and similar case studies) for this intervention will assist in further selling it to partners.
	Failure in the contracting / partnership (Intervention 1)	2	4	BIF will facilitate sessions focused between potential partners
	Inability to agree a minimum price with farmers (Intervention 1)	2.5	4	BIF will facilitate sessions focused between potential partners
	Risk of farmer cooperatives breaking the contract and selling to other partners (Intervention 1)	2.5	4	BIF will assist in the provision of contracting agreements and devise suitable mechanisms to discourage a breach of the agreements.
	Failure of farmers to purchase inputs	2.5	4	BIF will devise suitable strategies that will assist in encouraging adoption
	Failure of farmers to adopt improved agronomy practices	1.5	3	BIF will devise suitable strategies that will assist in encouraging adoption
Sustainability	Failure of adoption of interventions (all Interventions)	2.5	4	BIF will devise suitable strategies that will encourage adoption and will assist in the promotion of the benefits of the interventions (e.g. deep dive case studies etc.)

Annex 1: Types of cassava products

Product	End User	Annual Demand (MT)	Equivalent of Cassava Fresh Roots (MT)	Issues with Marketing
Garri	Supermarkets, Restaurants, Bukas Traders - Wholesalers, Petty traders Households: (Local - Rural, Urban) - International (Diaspora)	455,000 tons 65,000 tons from export to the diaspora 390,000 demand from super markets, Combined, opportunities for cassava in the industrial, export, and retail industries comes to 12.7 million tons of fresh roots from 510,337 ha of land; creating over a million jobs	2.73 million	Sales not reaching its potential scale due to: - Poor packaging - Inconsistent quality So product cannot be exported to markets in North America and Europe targeted at West Africans in the diaspora, and from large supermarkets. Inelastic demand; hence cycl ic glut every three years Inconsistent quality due to poor/ outdated processing techniques
High Quality Cassava Flour (HQCF)	Baking (biscuits, confectionaries, noodles), Brewing, Pharmaceutical Other sources of demand for HQCF are as substitutes to imported starch in the packaging, and soap industries and the use of HQCF could also be explored in the manufacture of weaning food s, pasta, glues, etc.	Potential: 400,000 MT (Current production is 50,000 MT) Thirty bakeries, including the largest international supermarket chains, Shoprite and Park and Shop, now regularly sell cassava-wheat flour bread	1.15 million	Fall in demand fo r HQCF due to lack of enforcement of government policy on the 10% replacement of wheat flour with HQCF in bread. (Nigeria imports approximately 3 million ton/year of wheat; 2.2 million ton/year is used for bread making; 500,000t for biscuits/ snacks; and 300,000t for noodles. At a 10% replacement rate, this translates to 220,000 tons of HQCF for the bread making industry and another 50,000tons for biscuits, and 30,000 tons for noodles. Scattered nature of farmlands and poor road infrastructure that increase s the transaction costs for supply of raw materials to HQCF processors.

Starch	Households, food manufacturers – convenience & baby, pharmaceutical, textile and chemical industries. Also used in corrugated cardboard, paper, furniture and plywood.	230,000 M T currently met by corn starch imports	1 million	The increasing demand for starch and starch - based products in Nigeria is reflected in the increase in quantity imported over the years (due to the inadequate local starch production). Starch is usually imported by the pharmaceutical firms who take undue advantage of the low tariff (5%) to import more than the amount they require for sale to other end users (the rate for general starch imports is 35%). Starch value suffers from similar raw material production constraints of high transaction costs due to poor road infrastructure, high prices of raw materials due to low productivity and uncertain availability of inputs (stems, fertilizer and other chemicals as at when due). At present, Matna and Nigeria Starch Mills sell cassava starch at 150,000 per mt (factory gate price) which is about the same price with imported cornstarch, thus many firms prefer to buy the imported starch due to their high volume requirement.
Sweetener	Soft drink bottlers, juice manufacturers. Also used in confectionaries, fruit canning and jam industry.	High Fructose Syrup -HFS: 150,000 MT as part replacement for imported sugar in the soft drink and juice industry Glucose: 40,000 MT Sorbitol: 14,000 MT	High Fructose Syrup-HFS: 750,000 Glucose: 200,000	Importation of glucose and dextrose in Nigeria tripled between 2006 and 2008. One metric ton of glucose produced from Ekha Agro is cheaper (N105, 000 per MT) than the imported glucose, which is about N115, 000 -120, 000 per MT, so there is an opportunity for local production of glucose.

Ethanol	Oil & Gas • Petrol and other products • Households – kerosene mixed with ethanol
Chips/ Pellets	2 types- 1. Food grade - used in pharmaceutical companies for drugs. In high demand in countries like China, Japan, Israel and other Asian countries 2. Animal grade - used by animal feed millers – Ruminants, Poultry, Aquaculture The principal market for chips currently is the Dawanu Market in Kano, a major food stuff market serving the Sahelian West African region; cassava chips and pellets are traded as far as Niger, Chad, Central African, and Southern Sudan republics (an estimated 300,000 MT of pellets are traded every year. Unfortunately, animal feed millers, the other potential users of dried chips, have not widely adopted the use of chips for animal feeds. Grand Cereal and Oil Company based in Jos are the only feed millers that use cassava pellets. The total estimate used for animal feed is 80,000 tons of pellets. China's demand is expected to exceed 12 mill tons by 2015/16 due to their large ethanol production. Anticipated demand is 520,000 tons per year from China and 400, 000 tons from local industries

Annex 2: Uses of cassava and marketing issues

Product	End User	Annual Demand (MT)	Equivalent of Cassava Fresh Roots (MT)	Issues with Marketing
Garri	Supermarkets, Restaurants, Bukas Traders – Wholesalers, Petty traders Households: • (Local – Rural, Urban) • International (Diaspora)	455,000 tons • 65,000 tons from export to the diaspora • 390,000 demand from super markets, Combined, opportunities for cassava in the industrial, export, and retail industries comes to 12.7 million tons of fresh roots from 510,337 ha of land; creating over a million jobs	2.73 million	Sales not reaching its potential scale due to: • Poor packaging • Inconsistent quality So product cannot be exported to markets in North America and Europe targeted at West Africans in the diaspora, and from large supermarkets. Inelastic demand; hence cyclic glut every three years Inconsistent quality due to poor/ outdated processing techniques
High Quality Cassava Flour (HQCF)	Baking (biscuits, confectionaries, noodles), Brewing, Pharmaceutical Other sources of demand for HQCF are as substitutes to imported starch in the packaging, and soap	Potential: 400,000 MT (Current production is 50,000 MT) Thirty bakeries, including the largest international supermarket chains, Shoprite and Park and Shop, now regularly sell cassava –wheat flour bread	1.15 million	Fall in demand for HQCF due to lack of enforcement of government policy on the 10% replacement of wheat flour with HQCF in bread. (Nigeria imports approximately 3 million ton/year of wheat; 2.2 million ton/year is used for bread making; 500,000t for biscuits/ snacks; and 300,000t for noodles. At a 10% replacement rate, this translates to 220,000 tons of HQCF for the bread making industry and

Starch	Household s, food manufactu rers – convenience & baby, pharmaceutical, textile and chemical industries. Also used in corrugate d cardboard, paper, furniture and plywood.	230,000 MT currently met by corn starch imports	1 million	The increasing demand for starch and starch –based products in Nigeria is reflected in the increase in quantity imported over the years (due to the inadequate local starch production). Starch is usually imported by the pharmaceutical firms who take undue ad vantage of the low tariff (5%) to import more than the amount they require for sale to other end users (the rate for general starch imports is 35%). Starch value suffers from similar raw material production constraints of high transaction costs due to poor road infrastructure, high prices of raw materials due to low productivity and uncertain availability of inputs (stems, fertilizer and other chemicals as at when due). At present, Matna and Nigeria Starch Mills sell cassava starch at 150,000 per mt (factory gate price) which is about the same price with imported cornstarch, thus many firms prefer to buy the imported starch due to their
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Chips/ Pellets	2 types- 1. Food grade - used in pharmaceutical companies for drugs. In high demand in countries like China, Japan, Israel and other Asian countries 2. Animal grade - used by animal feed millers - Ruminants, Poultry, Aquaculture The principal market for chips currently is the Dawanu Market in Kano, a major food stuff market serving the Sahelian West African region;	It has been estimated that, currently, the livestock feed industry uses 1.2 million tonnes of maize. Substituting 20% of the maize used by the livestock feed industry with cassava would require the setting up of about 400 cassava chips making factories processing about 10 tonnes of cassava roots per day.	3.36 million	The only way chips from Nigeria can be competitive is to produce at a price that is cost effective for the producer, processor and exporter and to identify a cheap means of transport of dried chips from the hinterland to the ports and an elimination of all import tariffs at the ports in China. The principal constraints of the dried cassava chip market are: • Low productivity of cassava leading to high prices of dried chips, • High transport costs • Lack of strong markets, as demonstrated by the wide swing in prices of dried chips due to oversupply by farmers at harvest • Lack of storage capacity.
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