Transforming the Agricultural Value Chain for Food Security in Nigeria: Any Role for Public-Private Partnership?

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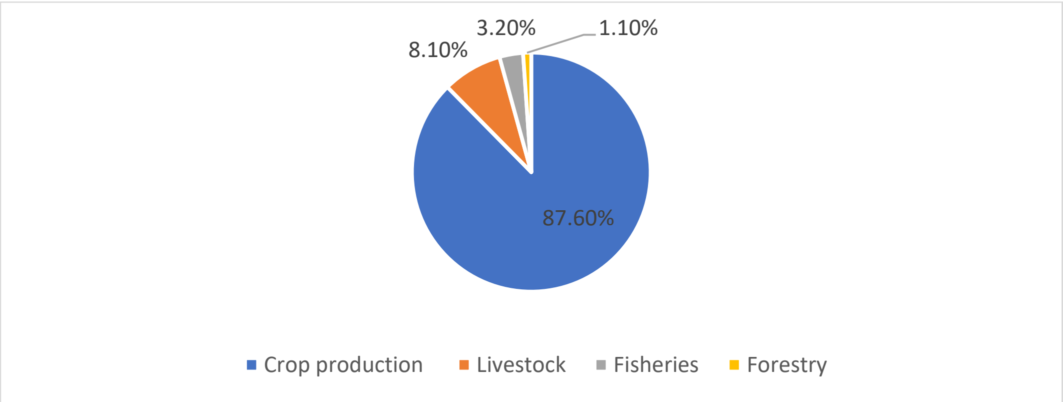
Abstract

In the food sector, public-private-partnership (PPP) has the potential, not only to reduce the risk that farmers face, but also to improve the agricultural business environment. As the agricultural and rural sectors are the habitat of the poor, the best value chain strategy should be one that embodies poverty reduction, which can be achieved by increasing the incomes of smallholder farmers and rural dwellers.

I. Introduction

Anthropologists and Sociologists have described Nigeria as a predominantly simple (primitive) society, meaning, one in which most people are engaged in a minimal number of livelihood activities, based on (differentiated by) age, gender or ability (Oludele, 2020). A complex society, in contrast, is one characterised by significant social and economic differentiation and a large population. Interestingly, whereas rural villages in Nigeria have small populations, Nigeria as a whole has a large population, making it a simple/complex Society. The dominant source of livelihood in Nigeria is agriculture. Between 2013 and 2019, it contributed, on average, 24.0 per cent to her GDP. In the sector, crop production is overwhelmingly dominant at 87.6 per cent, while livestock, fishery and forestry contributed 8.1 per cent; 3.2 per cent, and 1.1 per cent, respectively.

Figure 1: Size of Different Segments of the Agricultural Sector in 2019



Source: Author's computation.

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Agriculture employs 36.0 per cent of the labour force, but is characterised by very low productivity, arising from use of simple (primitive) tools, methods, and focused on subsistence. With a large and growing population, food importation is noticeable (at ₦3.35 trillion in the four years from 2016 to 2019 (Oyaniran, 2020).

Economists classify Nigeria's economy as dualistic (Abumere, 1978), in that there is a segment that is market-based and financial, and another that is non-market (subsistent) and non-financial (Anyanwu, Okere, & Adioha, 2020). The latter is the habitat of the agricultural (and hence, the food) sector in Nigeria. Economic dualism has also been characterised by the CBN and development economics scholars as formal and informal sectors, with the agricultural sector inhabiting the informal sector. Private sector and family-owned enterprises, typically, micro and small in size, are found in the informal sector and the agricultural sector. The challenges confronting these segments of the society are numerous and need to be addressed.

It is, therefore, germane that the agricultural sector in Nigeria is transformed, for increased productivity. Elementary economics teaches that one spur for an increase in productivity or efficiency at the firm level is the division of labour. At a macro level, the division of labour assumes the nature of value chain. A hungry population is a danger to political stability and a threat to general security. Whereas agriculture and food production are private sector concerns, food security is of importance for public welfare. When public welfare is implied, the public sector would be required to engage. There should therefore be no argument about exploring a value chain approach to increase agricultural sector productivity and boost food production in Nigeria, with public policy support. One can assume that increase in productivity in the agricultural sector and an increase in food output will translate to food security.

This paper will interrogate this proposition and confirm its validity or otherwise. In the next section, I shall share some general understandings regarding relevant key concepts and terms. In the subsequent sections, I discuss the state of food security in Nigeria, 1970 to 2020; the challenges of the agricultural and food sector in Nigeria; a taxonomy of value chain; public-private partnership schemes suitable for addressing the challenges; how to bring goal and tools together for food security; and finally, a conclusion is provided.

II. Key Concepts and Terms

i. The Agricultural Sector

There are some stylised facts about the Nigerian agricultural sector. The country has a landmass of 92.3768 million hectares, 70.11 million (75.90 per cent) hectares of which is agricultural land (World Development Indicators, 2021). Of the agricultural land, 37.33 million hectares are arable. The Food and Agricultural Organisation (FAO) of the United Nations Organisation (UNO), define arable land as including land: under temporary crops; temporary meadows for mowing or pasture; land under market and kitchen gardens; and land temporarily fallow (for less than five years).

In the FAO classification, land under permanent crops is land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest, such as oil palm, rubber, cocoa, and coffee. It includes land under flowering shrubs, fruit trees, nut trees, and vines, but excludes land under trees grown for wood or timber. Only 6.593 million hectares (7.1 per cent of the total land area) were under permanent crops, while 30,300 million hectares (32.8 per cent) were under temporary meadows for mowing or pasture in 2018.

However, rapid population growth has resulted in a sharp decline in arable land per capita in Nigeria, falling from 0.634 hectares in 1969 to 0.174 hectares in 2018 (Indexmundi, 2019). This implies a decline of 72.6 per cent in arable land supply. Currently, 88.4 per cent of farmers in Nigeria are small farmers, each holding an average of about 0.53 hectares (FAO, 2018). Majority of these farmers depend mostly on rainfall, as only about 1.0 per cent of farms in the country are irrigated (IFPRI, 2018). Also, mechanisation is available to only about 16.0 per cent of the smallholder farmers, who are able to sell only 20.0 per cent of their output, while consuming the remaining 80.0 per cent. Another prevalent feature of farming business in Nigeria is that the sale of farm produce and purchase of farm inputs are mostly informal.

Soil fertility in Nigeria is rated low to medium in general, but FAO agrees that the rating can be medium to good, if well managed (Metz, 1991). Fertiliser is the most used soil fertility improvement tool (used by 44.0 per cent of households), and its use by the average smallholder farmer is about 20 kg per hectare (Trading Economics, 2018). Generally, smallholder farmers depend on family members for labour supply, and they work only during the farming season.

In the livestock sub-sector, the 2011 National Agricultural Sample Survey, estimated that Nigeria had 19.5 million heads of cattle, 41.3 million sheep, 72.5 million goats, 7.1 million pigs, 974, 499 donkeys, 145 million chickens, 11.6 million ducks, and 1.2 million turkeys. As in the crop sub-sector, livestock farming is also dominated by smallholders who achieve only 7.3 Tropical Livestock Unit (TLU) on average. A Tropical Livestock Units (TLU) is defined as a mature animal weighing 250 kg (Houerou and Hoste, 1977; Stotz, 1983). Pastoralism is very common in the subsector, especially among cattle-herders, and productivity is low.

ii. Food Security

At the 1996 World Food Summit (FAO, 2008; Marion, 2011), food security was said to exist, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. The obverse of food security is food insecurity. Food insecurity may be chronic (long-term or persistent), seasonal (predictable, results from known causes and of short duration) or transitory (short-term and temporary). To avoid food insecurity, four conditions have to be satisfied, simultaneously. They are the availability of food; access to food; proper use of food; and stability in availability, access and proper use of food.

Food availability or supply can come from domestic production or imports. Family income and price may limit access to food, even when it is available; while improper storage, processing, preparation, and presentation could affect the proper use of food. Natural causes like flood, drought, pests, and disease can also challenge stability in food availability. Also, human causes such as insecurity, policy slippages, smuggling and trade restriction can limit access to food.

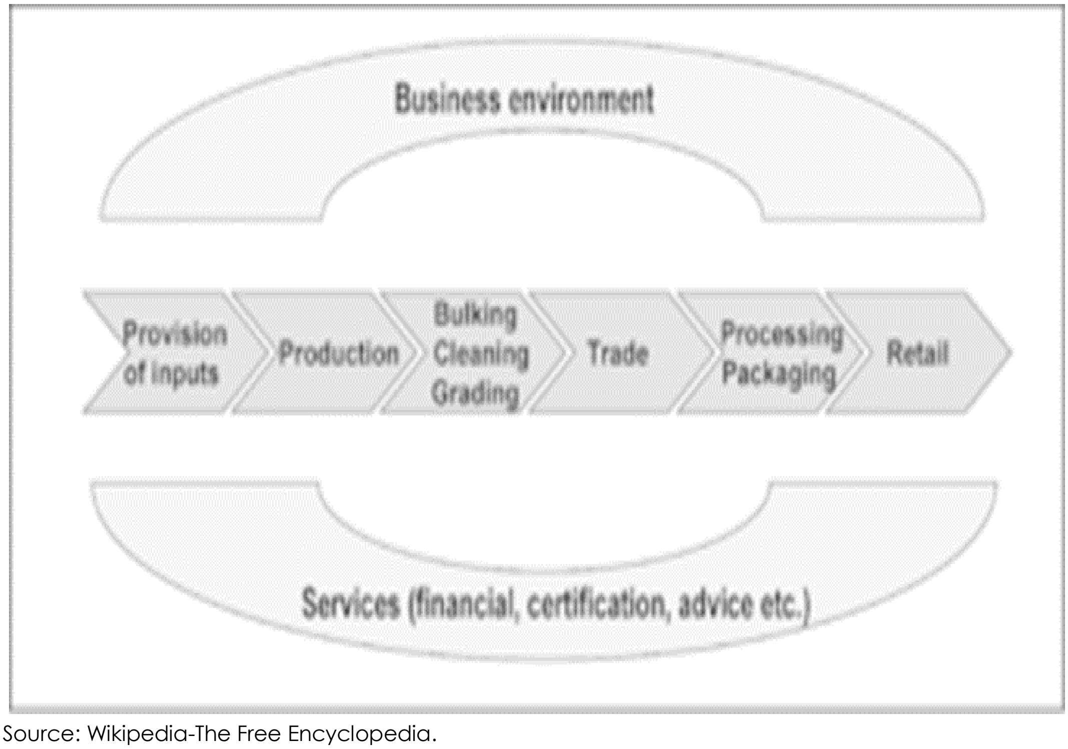
The nature of food production and trade in Nigeria, causes seasonal instability in the food supply. Policy interventions that provide income-support for food deficient households, end up limiting access to food through price-effect. Other methods exist for easing households' access to food. For instance, in the aftermath of the Nigerian Biafran War, the World Food Programme introduced a Food-for-Work programme in Nigeria, to support those engaged in the rehabilitation of agricultural infrastructure and rural roads.

iii. Value Chain

Value chain refers to the complete set of activities required to bring a product or service from initiation or conception, through all phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal (or recycling) after use. For a business unit or firm, a value chain is the set of activities it performs to deliver a product or service acceptable to consumers. In his book, "Business Management, Competitive Advantage: Creating and Sustaining Superior Performance", Michael Porter, in 1985, first introduced value chain concept. As a concept, it has been applied in various settings to industries, economic sectors, and globally (as in Global Value Chain, GVC) as a business strategy. The systems view of organisation has helped in the adoption of the value chain as a management strategy. Every system has subsystems, each of which requires inputs: finance, land, labour, management, and materials, with which it delivers output. Since 2019, countries around the world have suffered supply chain disruptions in the pharmaceutical, personal hygiene and medical consumables subsystems of their health system, because the GVCs became inaccessible or could not meet demand.

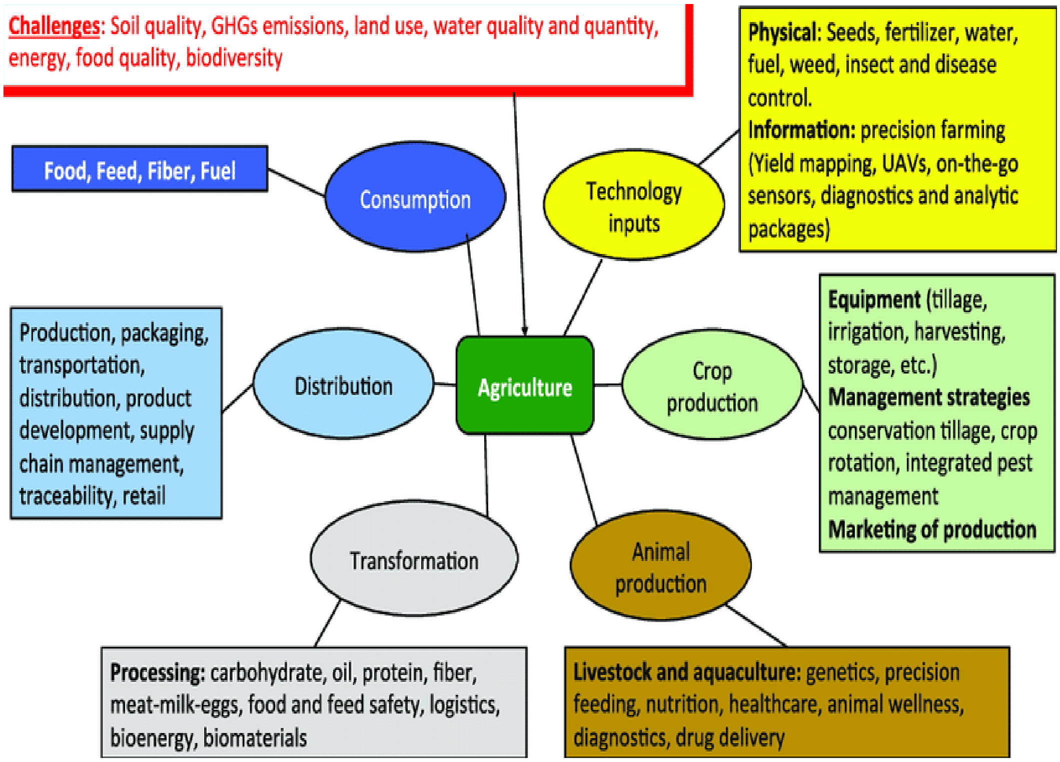
In an agricultural system, a value chain is the set of actors producing, transforming and delivering goods to consumers through a sequenced set of activities. This aligns with the concept of value-added in economics. Every actor along the chain, adds value to the final product or service. In Colonial times and before the introduction of the Structural Adjustment Programme in Nigeria, the United African Company (UAC), John Holt, Lever Brothers, and Regional Marketing Boards linked smallholder farmers to international markets; thereby playing value chain roles in the agricultural sector of the economy. The companies and Boards appointed Buying Agents, who in turn appointed sub-Agents. The Agents provided inputs, finance, extension services, and logistics to the farmers and, in some instances, purchased their products forward, as in Figure 2.

Figure 2: Value Chain Representation



Source: Wikipedia-The Free Encyclopedia.

Figure 3: Representation of Components of Agricultural Sector Value Chain



Source: adapted from Antle et al. (2017).

In a value chain, actors can be viewed as connected along a chain, but impacted upon by other actors from the general environment of the enterprise (the so-called enabling environment) and support enterprises.

iv. Agricultural Transformation

In all economies, the agricultural system is the source of food, savings for capital formation, labour employment, foreign exchange earnings, and demand for products and services produced by other sectors (Johnston & Mellor, 1961). As an economy develops (that it becomes less simple/primitive or more complex and diversified), the relative share of agriculture in output and employment declines. But in Nigeria, the experience is different as the contribution of the agricultural sector to employment in 1970 was 68.0 per cent; but still remained high at 45.0 per cent in 2014, 44 years later (Ajakaiye et al., 2016). With regard to contribution to output, in 1970, the sector's share in GDP was 60.0 per cent, while in 2014, it was 20.0 per cent, falling below industries and services.

The sector's performance in respect of supply of food, capital formation, foreign exchange earnings and purchasing power for the output of other sectors, suggests that its transformation is required.

According to Timmer (1988), agricultural transformation involves a change in the sector, over time, from being subsistence-oriented and farm-centred, to being more commercial, productive and off-farm centred. Transformation entails the establishment of agribusiness, which covers manufacturing activities that are closely related to agriculture (e.g. food and beverage, cotton ginning, tobacco processing, leather processing, wood-work, fertiliser manufacture, agro-chemical production, and agri-machinery production), as well as the food-related component of trade and transport/logistical services.

Nigeria has introduced a number of policy initiatives to transform the agri-food system, including the Agricultural Transformation Agenda of 2010. In 2003, the African Union (AU) also put in place, the Comprehensive Africa Agriculture Development Programme (CAADP), as a framework for agricultural transformation in member States. CAADP supports increasing investment and productivity as a means of promoting food security and economic development.

Transforming the agricultural sector would require a partnership between private sector operators of smallholder farms and firms in the agri-business system, on the one hand; and the public sector policy-makers, concerned with public welfare, generally, and food security, in particular.

v. Public-Private Partnership

Broadly, public-private partnership (PPP), refers to a partnership between the public sector, represented by government, and the private sector, as in firms, households and other non-governmental entities, in the delivery of goods and services. PPP is a framework for bringing together, the skills and resources of the public and private sectors, through sharing of risks and responsibilities. It enables the public sector to access and use the expertise of the private sector, by delegating day-to-day operations, while it concentrates on policy, planning and regulation. For the private sector, PPP removes uncertainty and enlarges markets.

The PPP Knowledge Lab (a coalition of leading global institutions, formed in 2015) defines PPP as "a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance" (Reference Guide, Version 3, 2017).

In the past, the government assisted agricultural sector transformation by providing free extension services, subsidised tractor rental services, interest-free loans, fertilizers, and farm inputs. However, the number of smallholder farmers are so large while government resources are quite limited to the extent that the efforts had limited impacts. An imperative of agricultural sector transformation would be the entry into the sector of medium-to-large private entities that can partner with the public sector and link-up with the smallholder farmers on a sustainable basis, in commercial relationships.

III. The State of Food Security in Nigeria

Legends about cassava, a food staple in the Southern and Central Regions of Nigeria suggest that food insecurity was common in the pre-colonial period (Iwuagwu, 2012; Jones, 1959). Reputed to have been introduced by Portuguese explorers from South America in the 17th Century, cassava's all-season availability relieved the famine that was common in communities that depended on yam, which is usually available from harvest to planting season only, in the two regions. Other food staples introduced into Nigeria include Maize, Sweet Potato, Groundnut, Guava, Pawpaw, Tomato, Okra and Green, a leafy vegetable (Alpern, 1992). The introduction of a money economy and creation of urban towns, under colonial rule stimulated rural-urban migration, which reduced labour supply in the agricultural sector, without a commensurate improvement in technology and factor productivity. This process has intensified since independence and is worsened by adverse income relativities between urban and rural livelihood activities.

Food security became a public issue from the 1970s in Nigeria and globally, following the Nigeria/Biafran War, the severe drought that occurred in Nigeria and the Sahel between 1972 and 1974, the famine in Ethiopia in 1973 and the intense famine in Bangladesh in 1974. As confirmed by Nigerian Institute of Social and Economic Research, NISER (2003), weighted aggregate agricultural activity contracted, in Nigeria, from 1970 to 1985; and crops, staples and livestock experienced negative nominal growth rates during the period.

The National Accelerated Food Production Programme (NAFPP), which was launched in 1972, was a public policy response to the state of food supply in Nigeria. The War had dislocated agricultural production in the old Eastern Region and deprived the rest of Nigeria of agricultural labour, by taking young men from farm work to military service.

Table 1: Average Growth Rate of Agricultural Output in Nigeria, 1970-99

		Types of Agricultural Activity					
Period	**Aggregate**	**Crops**	**Staples**	**Others**	**Livestock**	**Fish**	**Forestry**
1970-75	-2.9	-3.6	-4.4	2.1	-0.1	4.6	2.9
1976-80	-2.3	-3.7	-6.7	4.1	-0.3	3.9	3.9
1981-85	-2.6	2.5	3.9	-0.3	7.0	15.0	-1.0
1986-90	10.0	12.0	13.0	7.0	9.0	5.0	3.0
1991-98	4.5	5.9	6.5	2.9	1.7	4.2	1.6

Source: Nigerian Institute of Social and Economic Research, NISER (2003).

In 1974, the United Nations Organisation convened in Rome, Italy, a World Food Conference, which issued a declaration "that every man, woman, and child has the inalienable right to be free from hunger and malnutrition in order to develop their physical and mental faculties" (U.N. World Food Conference, 1974:3). The FAO estimated that if policy actions agreed at the Conference to improve food security were not taken seriously, there could be up to 680 million hungry people in the world by the year 2010, more than 250 million of whom would be in sub-Saharan Africa. Indeed, not much action was taken. So, in 1996, FAO convened the World Food Summit, to renew global commitment at the highest political level to eliminate hunger and malnutrition, and to achieve sustainable food security for all people (The Rome Declaration on World Food Security, 1996). As food insecurity is the obverse of food security, FAO (2008) and Marion (2011) outlined four conditions that signal food insecurity. They are non-availability of food; lack of access to food; improper utilisation of food; and instability in availability and access to food, over a certain period. Each of the four factors have determinants, as shown in Table 2.

Table 2: Factors of Food Security and their Determinants

Number	Factor	Determinants
1	Food availability	• Domestic production • Import capacity • Food stocks • Food aid
2	Stability of supply and access	• Weather variability • Price fluctuations • Political factors • Economic factors
3	Access to food	• Purchasing power • Income of population • Transport and market infrastructure
4	Food utilisation	• Food safety • Hygiene and manufacturing practices • Diet quality and diversity

Source: FAO (2008) and Marion (2011).

Following international awareness of the danger of food insecurity created by the World Food Summit 1996, the African Union (AU) Meeting in July 2003, expressed concern "that 30.0 per cent, of the population of Africa, is chronically and severely undernourished; that the Continent has become a net importer of food; and that it is currently the largest recipient of food aid in the world" (Attah, 2012). The AU Heads of State and Governments resolved to "implement, as a matter of urgency, the Comprehensive Africa Agriculture Development Programme (CAADP) and flagship projects and evolving Action Plans for agricultural development, at the national, regional and continental levels". "To this end, we agree to adopt sound policies for agricultural and rural development, and commit ourselves to allocating at least 10.0

per cent of national budgetary resources for their implementation within five years". At Addis Ababa, in January 2014, the AU launched the "**Year of Agriculture and Food Security**" to mark the 10th anniversary of CAADP. Later in June of the same year, AU Heads of State and Government adopted the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, committing to end hunger by halving the current levels of post-harvest losses by the year 2025.

Nigeria's response to the CAADP includes the formulation of a sectoral plan, and the development of the National Agricultural Investment Plan (NAIP). The first NAIP was for 2011-2015 and the main objective was to enhance total factor productivity in the agricultural sector through the application and diffusion of knowledge and improvement in the technology base. An important component of the Plan is productivity enhancement, which was aimed at boosting the output of food by intervening in the production, processing, storage and marketing of staple and cash crops, fishery and livestock products, in order to improve national food security. Among the specific objectives under this component was the enhancement of food security of consumers through improved availability of food and access to a variety of foods.

In 2017, Nigeria was ranked 37th (out of 45 countries in Africa) in its commitment to ending hunger and malnutrition among its people, in the Hunger and Nutrition Commitment Index – Africa (HANCI-Africa), produced by the Institute of Development Studies (UK) with the African Union's New Partnership for Africa's Development (NEPAD). At number 24, in the 2019 ranking, the country's position improved, but her classification among those with low commitment was unimpressive.

Below is the Hunger and Nutrition Commitment Index for Africa (HANCI-Africa), which ranks 45 African governments on their political commitment to tackling hunger and undernutrition.

- High commitment
- Moderate commitment
- Low commitment
- Very low commitment

Table 3: 2019 Country Rankings on Political Commitment to Tackling Hunger and Undernutrition

1 South Africa	13 Zimbabwe	25 Egypt	36 Cameroon
2 Burkina Faso	15 Côte d'Ivoire	26 Ethiopia	37 Lesotho
3 Malawi	16 Burundi	27 Congo, DR	38 Guinea-Bissau
4 Madagascar	17 Sierra Leone	28 Mauritania	39 Angola
4 Rwanda	18 Ghana	29 Algeria	39 Chad
6 Kenya	19 Zambia	30 Morocco	41 Sudan
7 Cape Verde	20 Gabon	31 Namibia	42 Comoros
9 Tunisia	20 The Gambia	32 Mozambique	43 Eswatini
10 Mali	22 Uganda	33 São Tomé and Príncipe	44 Togo
11 Botswana	23 Senegal	34 Liberia	
13 Niger	24 Nigeria	35 Guinea	

Source: Hunger and Nutrition Commitment Index Africa.

IV. The Challenges of the Agricultural and Food Sector in Nigeria

In this section, we highlight the challenges facing the agriculture in Nigeria. First, it is important to note that farming activities require a lot of efforts while the return on investment is low, compared with other sectors. This creates a perceived imbalance between effort and reward in the sector, a phenomenon that has exacerbated the problem of rural-urban migration and created shortage of agricultural labour force. Also, both crop and livestock farmers depend mostly on family labour for production, processing and marketing. However, due to changing lifestyles and availability of better job opportunities, family labour supply is declining and they are not being substituted by mechanisation and technology. Second, smallholder farmers and livestock breeders, in rural areas are the major players in the food sub-sector. However, the two groups are in conflict over land use, leading to insecurity and decreased farming activities. Third, most crop farmers depend mainly on rainfall for watering their farms, owing to limited irrigation facilities and use. Consequently, farming cycles follow the seasons - cultivation and planting just before and at the onset of the rainy season, and harvest and processing during the dry season.

Fourth, access to land is problematic, especially for commercial large-scale farming, because native law and customs prevail in most parts of the country. This is because the Land Use Act is unable to create a Statutory Right of Occupancy, without the cooperation of aboriginal owners of land. Acquisition of land under the Act is controlled by politicians who at times grant it only to their favourites. Thus, the average farm size in the country is small.

Fifth, the sector is characterised by low productivity, and this is due to a number of reasons. Among them are declining soil fertility; climate change (on account of expanding desertification, forest depletion, unusual temperature, and humidity); low quality inputs (including seedlings, fertilizer, pesticides, and tools); high risk to investment due drought, flood, pests, locust and diseases, with limited opportunities for underwriting the risks in the insurance market; lack of information about improvement pathways by farmers; inadequate support services and lack of long-term financial resources; fragmented market for agricultural inputs and output; and inadequate infrastructure and support services. Poor farming practices, including cattle roaming, have in a number of instances promoted soil erosion and denudation.

Sixth, post-harvest loses are high, even in the face of inadequate food supply and other agricultural outputs in the country. Agricultural produce in rural areas are difficult and costly to bring to markets in urban areas in good time and condition. Traders spend a lot of time and effort to reach remote and inaccessible farms and villages to gather and pool produce, without grading, which are on-sold to other traders who in turn sell to other layers before the products reach urban markets.

Seventh, inappropriate public policies such as over-valuation of the domestic currency, which promotes food imports, and government focus on cash crops discourage domestic food production. Importation of food has over time affected domestic taste, in favour of imported foods such as rice, poultry, sea foods and spices. Public policies are easily formulated and abandoned, and there are also cases of policy overlap. For instance, whilst the country has the River Basin Authorities (RBAs), there is also, another agency called National Agricultural Land Development Authority (NALDA). The World Bank supported the Agricultural Development Programme which offered extension and adaptation services to farmers. When the Bank's support ended, the different State Governments and the different Departments of the Federal Ministry of Agriculture – Federal Department of Agriculture, Federal Department of Livestock, Federal Department of Fisheries, failed to carry on with the programme. The public sector supports to farming households are mostly executed as social benefits, and not as support for improved productivity/viability of farming business.

V. A Taxonomy of Value Chain Designs Suitable for Addressing the Challenges

Nigeria's agricultural sector requires public policy support to improve its performance, especially with regards to the attainment of food security. So far, the approach adopted have been ungainly and unsustainable. As an important economic sector, the value chain in the sector needs to be developed and enabled to play its roles profitably.

There are a variety of value chain approaches in agriculture, but all of them involve linking farmers to markets (Donovan et al., 2015). An appropriate value chain for Nigeria's food sector at this time, must necessarily involve smallholder farmers, and take into account, the culture and usages of different communities, so as to achieve inclusiveness. Whereas, adequacy of food output (by growers) is easy to identify, diligence is necessary to ensure collaboration of all parties. In the Nigerian case, for example, it is easy to neglect, say, the World Trade Organisation (WTO) whose phytosanitary standards and market rules are mandatory. So a suitable value chain should be a workable collaboration among smallholder and large scale food growers, household and industrial food consumers, land owners, land developers, credit suppliers, merchants, retailers, brokers; processors, regulators, transporters, warehouse owners and managers, pest control agents, business membership organisations (BMOs), civil society and faith-based organisations, labour unions, and policymakers at all tiers of government (Hobbs et al., 2000).

The consideration of Value Chain Designs (VCDs) in Nigeria's food sector must start from where the food market (demand and supply) is, currently. Presently, the food sector is bedeviled by poverty – the smallholder farmers are poor, and a large proportion of the consumers of food are also poor. This implies that food availability may not simply translate to food consumption, if it is not affordable. As the agricultural and rural sectors are the habitat of poverty, the best VCD strategy should be one that embodies poverty reduction, which can be achieved by increasing smallholder farmers' and rural dwellers' incomes. A different way of stating this is to devise a VCD that will let the food market work for the poor. This can be achieved by transforming systems around the smallholder farmer and the rural poor (their livelihoods) towards income growth and increased access to markets.

There are a variety of VCD types in the agricultural sector:

I. In Nigeria's native communities, there is a limited value chain in agriculture. It takes one of two forms. On one hand is a person who does not have land or fertile land and seedlings or tree crops, but able and willing to farm. Such a person may contract with a person who has access, for a particular term. The donor gives what is requested in return for a share of the output or rent, which is paid in either output or cash (Udo, 1964). This sort of arrangements can be found in areas of Anambra, Enugu and Kogi States, which lie in the fertile valleys of Anambra, Adada, Mabolo and Ofu Rivers, with a high number of tenant farmers. The crop farmers obtain land from the land owners, which they farm and settle in and pay rent to the landowners out of their harvest. In recent times, livestock farmers, mainly from Kebbi and Zamfara States have settled in large numbers there, not as customary tenants, but as willful occupants, leading to violent conflict between crop farmers and the landlords. A second form of value chain exists where traders enter into forward market contracts with farmers by contracting to buy a specified amount of output at agreed price. The trader provides the farmer with advance payment to enable him or her cultivate the crops or, in the case of livestock, acquire the breeding stock. At maturity, the trader comes in to harvest the crops and sell;

II. The earliest form of corporate VCD in Nigeria was the one used by the European Trading Houses to organise local produce buying and selling for exports. The process started with the buying agents of European Trading Houses approaching Chiefs in Coastal communities to buy produce, such as palm oil. The Chiefs then organised local traders, who bought palm oil from the markets and supplied the same to the Chiefs. The products are then packed and stored until the Trading Houses take them to ships. Manufacturers in Europe received the produce from the Trading Houses as input, while the Trading Houses took processed goods to the coastal communities for sale to the palm oil producers, traders, and Chiefs. It is important to state that the demand for oil in Europe stimulated increased oil palm production in Nigeria;

III. The European Trading Houses were established and incorporated locally. Among other investments, the companies set up warehouses at sea and river ports, railway stations, and in different production regions around the country. They introduced scaling measures in terms of volume and weight, product standards, appointed buying agents and equipped them, granted credit to the buying agents who extended the same down the line, to primary producers and appointed distributors for manufacturers imported from Europe. At this stage, the products being traded had extended beyond palm oil, to include timber, rubber, groundnuts, cotton and cocoa. A number of these new commodities, such as groundnut, cocoa, cashew, and rubber, were introduced into the country, by the Europeans from elsewhere. The latter group were not regarded locally as food crops but as 'cash' crops, meaning that they were primarily grown for sale and not for food or subsistence. The Trading Houses provided information about how to grow the new products. In response to the return on investment on 'cash' crops production, growers hired labour, during growing, harvest and processing seasons. Portage became a major source of employment for able-bodied men, while the Trading Houses sponsored locally recruited persons as road transporters by enabling them to acquire trucks from associated European vehicle distribution companies. New jobs were thus created for truck drivers, drivers' assistants, mechanics, lorry-body builders (using wood), sign writers and artists who inscribed signs on Lorries to distinguish one from another. So, much internal migration came about through the growth of the agricultural value chain;

IV. With local political participation in governance, Regional Governments set up Marketing Boards that worked in collaboration with the European Trading Houses in 'cash' crops value chain. The governments introduced produce inspection services, set up produce standards and research stations, pest control services, and built infrastructure such as roads and training institutions to expand farmer participation. In time, the Regional government got involved in export of the produce, edging out the European Trading Houses, in order to appropriate the surpluses generated by the agricultural sector. Government participation introduced PPP into the value chain. In the 1970s, the Federal Government entered the scene by setting up crop-specific Boards – Cotton, Groundnut, Palm Oil and Cocoa Marketing Boards. The Federal Government's interest was backed-up by investment in training, research, and education. Faculties of Agriculture in universities introduced specialisations in Crop, Soil, and Livestock Sciences. Also, Universities of Agriculture, River Basin Development Authorities (RBDAs) and the Nigerian Agricultural Development Bank (now, Bank of Agriculture, BOA), were introduced. The RBDAs were expected to set up irrigation schemes, and develop agricultural land and practices for farmers. This intensified the scale of PPP system, even as the Central Bank of Nigeria (CBN) also introduced a Department of Agriculture, and the Agricultural Credit Guarantee Scheme. CBN's participation has metamorphosed into supporting Commercial Agriculture Development Programme (CADP), Anchor Borrowers' Programme (ABP), Nigerian Incentive-Based Risk Sharing for Agricultural Lending (NIRSAL), and Target Agricultural Commodities and Value Chains. The CBN's interventions have spread into supporting production of foods (such as rice, wheat, cassava, potato, yam, maize, soya beans, millet, guinea corn, sesame seed, tomatoes and vegetables); poultry (broilers and eggs production); livestock (meat, dairy and piggery); and aquaculture (fingerlings and Catfish);

V. A different variety of VCD was introduced in Kwara State when foreign commercial farmers were invited by the State Government to partner with Shonga Holdings and assist the company to invest in modern farming in the State. Olam International of Singapore, involved in agricultural production, processing, financing and commodity trading, has also entered into the Nigerian agricultural sector through, a subsidiary, Olam Nigeria Ltd. Olam Nigeria Ltd. is involved in rice, cocoa, cashew, sesame and poultry value chains, in partnership with Benue, Kaduna, Kwara, Nasarawa, and Niger States. Large-scale farmers have capacity for higher productivity through the introduction of high yield seed varieties and use of modern technology, but may change the composition of output from traditional to high-value crops, as is the case in South East Asia;

VI. Unilever, formerly, Lever Brothers; John Holt; and UAC at a time had large-scale farms, mostly in the Northern Region of Nigeria, on which smallholder farmers worked, to produce certain crops to specified standard, which the companies bought. The companies provided all the inputs, tools and services required by the farmers. Both the Colonial Government and their successor Regional Governments in the Eastern, Mid-West and Western Regions, set up Farm Settlements on which willing farmers were settled (Nwulu, 2019). The farmers received farm plots, training, equipment, and extension services that supported increased farm yield. In addition, infrastructure and social amenities were provided at the settlements, with the aim of transforming subsistence farmers into small-scale commercial farmers. The goods produced by the farmers belonged to them; and

VII. Global Value Chains (GVCs) in the agricultural and agribusiness sectors have become prominent participants across many countries. They combine value and supply chains through market power and operate in different jurisdictions as foreign direct investment, integrating and linking food production, processing, retail and distribution centres, across the world. GVCs operate at scale, and pay stringent attention to international standards of quality and safety. Smallholder farmers who join GVC would have to adopt their practices in order to increase productivity and cut down post-harvest losses.

VI. Public-Private Partnership Schemes Suitable for Addressing the challenges

In the food sector, public-private partnership (PPP) has the potential to reduce the risk that farmers face, while improving the agricultural business environment. FAO (2016) defined agricultural PPP as a “formalised partnership between public institutions and private partners designed to address sustainable agricultural development objectives, where the public benefits anticipated from the partnership are clearly defined, investment contributions and risks are shared, and active roles exist for all parties throughout the PPP lifecycle”.

Governments in Nigeria invest in agriculture, but such investments are not at scale and usually not sustained. The investments have been mainly in the provision of services to farmers, provision of agricultural infrastructure, and development of agricultural markets (Nwangwu, 2019). The formalisation of these investments in partnership with private sector interests in the agricultural and food sectors would unlock significant private sector investment in the sector. The challenges of food insecurity require partnerships between the public and the private sectors. The public sector provides services to farmers in the form of input supplies, training, loans and insurance under the Nigerian Agricultural Insurance Company (NAIC) and NIRSAL. Governments in Nigeria have also provided agricultural infrastructure in form of storage facilities (grain silos), irrigation schemes (RBDAs), tractor-hiring schemes and logistics. Marketing Boards and Strategic food reserve schemes have provided agricultural market development support to farmers. Commodity Exchange, run as a private sector platform makes trading in agricultural and food commodities transparent and predictable, thereby attracting private sector players as market makers. As evident in the PPP model of OLAM Nigeria Ltd.'s Rice Value Chain, a capable private sector investor, can create a market for a food commodity, both for smallholder farmers and consumers.

Table 4: Partners in OLAM Nigeria Ltd's Rice Value Chain PPP Model

Partner type	Partner name	Roles and responsibilities
International partners	USAID	Provide support (for example, technical assistance, training, and extension services)
	Bill & Melinda Gates Foundation	
	International Finance Corporation (IFC)	
Regional partners	Africa Enterprise Challenge Fund (AECF)	Provide grants
	West Africa Rice Development Agency (WARDA)	Provide quality rice seeds; work with Olam to conduct field tests and trials with a view to producing even higher yielding seeds for the partnership
Public partners	The Nigerian national government	Provide policy initiatives
	Benué, Kwara, Niger and Nassarawa state governments and their relevant agencies such as their ministries of agriculture and their agricultural extension organisations	Facilitate enabling environment, partnership management and implementation; availability of agricultural inputs
	Commodity Development Centre	Provide much needed infrastructure and other necessary support
Private partners	Olam Nigeria Ltd	Establish the commercial rice farm and rice processing factories at the nucleus, provide inputs and buy the farmers' products
	Smallholder farmers	Establish small-scale rice farms in their thousands in clusters around the nucleus
	First Bank of Nigeria	Provides loans

Source: Adapted from CABRI (2021).

Another large-scale firm, GBfoods has worked with smallholder farmers in Kebbi, Kaduna and Katsina States as out-growers of tomatoes; providing them with seedlings, fertilisers, training, and irrigation pumps, in order to increase the income of participants. Convinced about the viability of tomato production in the region, GBfoods invested directly in a tomato processing venture, including a ₦20.00 billion processing plant and farm in Yauri area of Kebbi State. The investment was facilitated by financing provided by the CBN, while the Kebbi State Government leased the land to the company.

Dangote, which is more known for commodities trading, flour milling, cement manufacturing, oil retail, fertiliser blending and oil refining, has ventured into sugar and tomato farming and plans to go into palm oil, rice, millet maize and sorghum. BUA is also engaged in sugar back-ward integration. New and significant investment is surely required in the agricultural sector, but it should come from focused and passionate investors. To achieve success, it is important that these firms back their venture capital funds in agriculture with experience in the farm sector.

As large private investors go into PPP arrangements, there is a choice of contractual arrangements for delivering infrastructure by the private sector, as in the Table 5.

Table 5: PPP Modality Types and Characteristics

PPP Modality Type	Main Features	Risk Transfers	Access to private finance	Ownership	Comment
1. Service Contract	• Certain services are out-sourced to a private company. • Private company provides agreed services to the government • Government retains general control and supervision	• Service contracts provide a relatively low-risk option for expanding the role of the private sector. • No equity risk borne by the private company	• Limited infusion of private capital i.e. working capital	Government	• This type of PPP has limited benefits. • Service contracts can be a competitive form of operational type PPPs, and require a well-developed service industry. • Not suitable for initial infrastructure development / investment
2. Operation and maintenance contract (O&M)	•Management and operation of a public infrastructure is out-sourced to a private company. • Similar to a service contract but the scope of services is wider with	•Similar to the service contract with additional risk of keeping the facility up to certain technical standards. • No equity risk borne	• Limited infusion of private capital i.e. working capital.	Government	•Suitable for projects with a significant operating content. • O&M could be applied to a BOT, BOOT, BOO, ROOT and ROO project. • A method to import private sector efficiencies and technical know-how.

	greater control passed to the private company	by the private company			• Not suitable for initial infrastructure development / investment.
3. Build Transfer/ or Annuity Type	• Private company finances the infrastructure. • Private company builds the infrastructure. • Upon completion of construction, the infrastructure is transferred to the government. • Government pays the private company on an agreed schedule, the total cost, plus a reasonable markup	• Private company only assumes constructio n risks. • No equity risk is borne by the private company.	• Much greater infusion of private capital i.e. for constructio n.	• Government	• Suited for infrastructure projects where the government can retain operating responsibility. • The government might end up paying more, as it is in effect borrowing from the private sector. • Can be suitable for infrastructure that are user-charged but that have limited benefits • Can be suitable for high risk and/or low financial return projects
4. Build Operate Transfer (BOT)	•Government finances the facility. • Private company builds the facility. • Private company operates the facility on a concession. • At the end of the O&M concession the facility is transferred to the government.	•Governm ent bears the equity risk. • Private company bears the risks associated with the constructio n.	•Limited access to private finance.	•Government	•Suited to projects that involve a significant investment and operating content. • Suitable for user-charged infrastructure. • Does not overcome shortage of State funding for infrastructure
5. Build Own	• Private company	•Private company assumes	•Significant infusion of capital for	•Private company until transfer	•Especially suitable if government has a

Operate Transfer (BOOT) • Known as DBFO in UK: Develop-Build-Finance-Operate.	finances the facility. • Private company builds the facility. • Private company operates the facility on a concession. • At the end of the concession the facility is transferred to the government.	equity and other commercial risks. • Private company assumes construction risk.	construction and working capital for operation and maintenance.		large infrastructure financing gap. • Suited to projects that involve a significant investment/operating content. • Good solution for most projects.
6. Rehabilitate Own Operate Transfer (ROOT)	•Same as a BOOT/BOT. • But for the rehabilitation of an existing facility rather than the construction of a new one.	As in BOOT	As in BOOT	•Private company until transfer	• Suitable for capacity expansion/ upgrading but essentially BOOT • Suited for projects that involve a significant investment/operating content. • Market risk is lower because there is a demand history.
7. Build own operate (BOO) and Rehabilitate Own Operate (ROO) (Effectively regulated Divestiture)	•Similar to a BOOT, except that the facility is not transferred to the government. • Operation and maintenance typically outsourced to another private company. • But for the rehabilitation of an existing facility rather than the	As in BOOT	As in BOOT	•Private company	•Suited for projects that involve a significant investment/operating content. • Market risk may be lower if there is a demand history. • The step before privatisation and can be a good solution for long-lived infrastructure.

	construction of a new one				
8. Privatisation	• Initial public offer (IPO), wholly or partly of a state-owned company (SOE). • Partial divestiture means government still owns a percentage of the SOE. • Total divestiture means the SOE has been completely privatised i.e. the company is now 100 per cent owned by the private sector.	•The private company is responsible for all aspects hence risks in infrastructure provision	• Private company funds future developments of the business.	•Private company	•Need to establish a strong regulatory body to prevent abuse of monopoly power. • Suitable if government wants to import private sector efficiencies into the SOE. • Privatisation can be politically controversial.

Source: The Public-Private Infrastructure Advisory Facility (PPIAF).

VII. How to bring Goals and Tools Together for Food Security

To achieve the goal of food security in Nigeria, the tools of VCD and PPP have to be applied in such a way as to reduce poverty. Smallholder farmers and rural dwellers (who are mostly farmers) are among the poorest segments of society. The process of transforming agriculture must include smallholder farmers in the crop and livestock segments, with a view to increasing their income through increased productivity, output, and linkage to markets. There is a danger when agricultural sector reform is top-down, instead of being inclusive, farmer need-based, and demand-led. This explains the reason why installed facilities or systems are at times left abandoned.

One of the objectives of the Farm Settlement Scheme of the past was to retain young school leavers in the agricultural sector, and stem the rural-urban population drift. Without attracting young, educated persons into the agricultural sector, the knowledge transfer and trainings required to transform practices and increase the skill set in the sector cannot be attained. It is in this sense that efforts at transforming agriculture should necessarily be part of broader rural transformation and development. Rural transformation and development can be sustained if rural employment is diversified, but linked to agriculture. This is important because in the short-to medium-term, a large part of the additional employment opportunities has to be generated within agriculture, as the manufacturing and service sectors cannot easily absorb a large number of unskilled labour.

Care should be taken to avoid the neglect of low-value food crops (cocoyam, millet and bambara nuts, for example) and livestock (goat and duck, for example) in the process of agricultural transformation. Private investors attracted by PPPs in the food sector will typically concentrate on a limited number of food crops and livestock that have high-value in the domestic and global markets, to the neglect of low-value but resilient food crops and livestock. Similarly, government policy could endanger the low-value but resilient commodities by supporting import-substitution agriculture through domestic production of high-value imported foods, in order to save on foreign reserves. Nigeria has been on this trajectory by trying to promote wheat cultivation through government intervention and support. The combined effect of these two possibilities, would be shrinking of the food variety and exposure of the country to volatility in food output and prices. Therefore, food production for cash, only, should be avoided because 'cash' crops like cocoa and rubber have suffered from world price and use shocks, which are outside the control of the domestic economy.

A number of high-yield crop varieties and prolific animal stocks require purchase of seedlings every planting and breeding season. This is unlike in traditional farming in which farmers preserve seedlings and parent stock. Government policy should guard against experimentation with Nigerian agriculture by GVCs and donors, which could dislocate farmers and increase, rather than reduce their poverty.

Under the Nigerian Economic Sustainability Plan, the Federal government proposed to develop between 20,000 and 100,000 hectares of new farmland in every state of the Federation. That is laudable. It can best be realised by first concessioning land already developed by RBDAs to farmers within the states and privatising other assets of the agency such as irrigation schemes, storage silos and agricultural service stations. The concessionaires and those acquiring the privatised assets should be players in the agricultural value chain, who will bring in capacity required to increase output, productivity, employment, and income of smallholder farmers. State Governments can turn the land so developed into farm settlements. The merit of modern farm communities is that it corrects the problem of isolation and disconnect from social circles, which often drives young people away from the rural areas.

VIII. Conclusion

Nigeria is experiencing a population growth rate that exceeds her food productivity growth, even as the food import value continues to outweigh food exports. In four years (2016–2019), Nigeria's cumulative agricultural imports stood at ₦3.35 trillion, four times higher than the agricultural export of ₦803.00 billion within the same period. The domestic food deficit has to be covered through imports, which has become difficult to sustain, because of declining foreign reserve levels. In 2019, Nigerians spent about ₦22.80 trillion on food items, representing more than half (56.7 per cent) of the total household expenditure of ₦40.20 trillion (Nigerian Living Standards Survey, 2020). With low food output, it is also difficult to maintain food reserves. In the North East and increasingly, in the North West and the Central Regions of Nigeria, displaced persons are receiving food aid from international agencies, such as United States of Agency for International Development (USAID)'s Office of Food for Peace (FFP), the World Food Programme (WFP); Action against Hunger; and others.

It follows that hunger is a fact of life for a percentage of the country's population. With family safety nets weakened by poverty, the Federal Government has come up with a national register of poor and vulnerable households (National Social Investment Management System - NASIMS, National Social Register). Those enrolled receive ₦5, 000.00 (about US$10) monthly under the Household Uplifting Programme (HUP), otherwise known as the Conditional Cash Transfer. This amount is a token, given the rate of food price inflation and the general price level in the country. The 2020 Global Hunger Index ranked Nigeria 98th out of 107 countries, with a score of 29.2 per cent. As shown in Table 6, the share of hungry people in total population remained above 5.0 per cent during 2001 to 2019 (Concern Worldwide and Welthungerhilfe, 2020).

In 2020, 32.0 per cent of children under five in Nigeria were stunted while the country also had the second highest burden of stunted children in the world (UNICEF, 2021). The data further confirmed that there was hunger in the country and at a level that was considered serious by UNICEF. Food insecurity in all its dimensions of availability, access, stability of supply and access and utilisation was manifest.

Also, based on the World Food Summit Plan of Action (1996) criteria for food insecurity, Nigeria is experiencing food scarcity because:

- There are people who are experiencing large reduction in their sources of food and are unable to make up the difference through new strategies;
- There is prevalence of abnormally high malnutrition for most part of a year, which cannot be accounted for by either health or care factors;

- A large proportion of the population is using marginal or unsuitable strategies; and
- People are using coping strategies that are damaging to their livelihoods in the longer term or are incurring some other unacceptable cost, such as acting illegally or immorally.

Transforming agriculture, in particular, food farming, is therefore both urgent and imperative. The government has, since 1972, when the National Accelerated Food Production Project (NAFPP) was introduced, tried to bolster the agricultural sector. This has, however, yielded limited success in terms of addressing the problem of food insecurity in the country. Therefore, providing opportunity for high-net-worth private sector investors' participation in the sector is necessary. To avoid a Top-Top framework in which top government functionaries and well-heeled investors agree on how to solve a problem (hunger and food insecurity) that do not affect them, a PPP framework is called for. In a PPP framework, smallholder farmers, farming and rural communities, Local, State and Federal Governments and genuine private sector investors would agree on programmes, under public law and policy. Under an appropriate PPP regime, members of agriculture and food production, consumption, distribution, supply, retail and service value chains would collaborate, to address food security concerns. Every PPP regime and its associated VCD must pay attention to the socio-political environment, as well as the legal and business context, to succeed and avoid social and economic crisis. Thus, it is imperative that considerable attention is devoted to the understanding of the political, legal, and marketing context within which value-chain actors operate.

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