Nigeria
Transforming Agribusiness for Inclusive Recovery, Jobs Creation and Poverty Reduction:
Policy Reforms and Investment Priorities

Main Report

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Transforming Agribusiness for Inclusive Recovery, Jobs Creation and Poverty Reduction: Policy Reforms and Investment Priorities

Main Report

Elliot W. Mghenyi, Cora Dankers, James Thurlow, and Chidozie Anyiro
List of Annexes

Annex 1. Estimating the Size and Structure of the Agribusiness Sector ......................................................... 151

List of Boxes

Box 3. 1. RIAPA model ........................................................................................................................................ 42
Box 4. 1. Key Elements of an Effective Legal and Regulatory Framework for WRS ...................................... 64
Box 4. 2. The Babban Gona model .................................................................................................................. 72
Box 4. 3. The lack of coordinated value chain financing is eliminating soybean SMEs that carry out primary processing ......................................................................................................................... 73
Box 5. 1. Policy lessons for developing the cashew value chain from Vietnam ............................................. 92
Box 6. 1. Rice trade policy milestones in Nigeria .............................................................................................. 105
Box 6. 2. Policy and public investments lessons that have supported growth in Vietnam’s rice sector .. 109
Box 7. 1. Policy highlights for cassava in Nigeria and Vietnam .................................................................. 128
Box 8. 1. Technology of poultry production in Nigeria and Vietnam ............................................................. 139

List of Figures

Figure 1. 1. A decade of strong economic growth did not reduce the unemployment rate, but volatility and declining growth quickly led to rising unemployment ............................................................. 19
Figure 1. 2. The poverty headcount rate in 2019 was more than 61 percent in many Northern States ... 20
Figure 1. 3. Agriculture is the most resilient sector, protecting livelihoods and jobs during tough economic times ........................................................................................................................................ 22
Figure 1. 4. The ERGP targets on agriculture growth were missed by wide margins in 2017-2019............ 23
Figure 1. 5. Agricultural sub-sectors that drove post-recession recovery ..................................................... 24
Figure 1. 6. Agricultural sub-sectors that drove post-recession recovery ..................................................... 24

Figure 2. 1. Agribusiness includes primary agriculture and non-farm food and non-food agricultural businesses ........................................................................................................................................ 28
Figure 2. 2. At about $4000 per capital on average countries earn $1 of agribusiness GDP off the farm for every $1 that is earned on the farm ........................................................................................................... 29
Figure 2. 3. Agribusiness is a large part of the national economy and there is enormous scope for transformation to create more and better jobs ....................................................................................... 30
Figure 2. 4. Better jobs can be created in agribusiness input supply and processing ................................. 31
Figure 2. 5. More jobs can be created in agribusiness trade & transport and hotels & food services ..... 31
Figure 2. 6. Agribusiness segments grew faster and created more and better jobs than overall economy

Figure 2. 7. Nigeria ranked behind only China, India, and Indonesia in terms of economic losses originating from foodborne diseases in 2016

Figure 2. 8. Off-farm share of agribusiness GDP and employment in Nigeria is similar to middle-income structural peers and regional peers in SSA

Figure 2. 9. Aspirational comparators have larger shares of processing, input supply and food services segments in agribusiness GDP than Nigeria

Figure 2. 10. As the sector transforms there will be more jobs opportunities in processing, hotels & food services and input supply segments

Figure A2. 1. Components of the Agribusiness Sector

Figure A2. 2. Agribusiness share of national GDP

Figure A2. 3. Off-farm of agribusiness

Figure 3. 1. Productivity growth equal to 1 percent of GDP in agriculture reduces poverty more than same size of productivity growth in other sectors in low income and lower-middle countries

Figure 3. 2. The agribusiness sector would create 6 million jobs in mid-2027 under observed trends

Figure 3. 3. The whole of agribusiness needs to grow in tandem to create 6 million jobs faster

Figure 3. 4. The growth rate required for the agribusiness sector in Nigeria to create 6 million jobs has been achieved by many countries in SSA in recent years

Figure 3. 5. The contribution of on-farm and off-farm segments to the value chain GDP differs across value chain groups

Figure 3. 6. High yields have laid strong foundations for growth and exports in sesame seed

Figure 4. 1. Total Factor Productivity in Nigeria’s agriculture has barely improved in decades

Figure 4. 2. A regionally differentiated approach to raise TFP makes sense given the different levels of attained efficiency

Figure 4. 3. Public investments to support expansion of digital technologies in agriculture

Figure 4. 4. Nigeria agribusinesses score average in terms of firms offering formal training

Figure 4. 5. Relatively few of the Nigeria agribusinesses have international certification

Figure 4. 6. In Nigeria, less than 10 percent of investments are financed by banks

Figure 4. 7. Nigeria has the lowest proportion of agribusinesses accessing finance

Figure 4. 8. Less than 2 percent of working capital for agribusinesses in Nigeria is financed by banks

Figure 4. 9. Nigeria agribusinesses rely more on supplier/customer for working capital

Figure 4. 10. Many agribusinesses in Nigeria compete with the informal sector

Figure 4. 11. However, less than 15 percent find practices of the informal sector a major issue

Figure 4. 12. Relatively fewer agribusinesses in Nigeria use foreign licensed technology

Figure 4. 13. Nigeria’s agribusinesses spend relatively less on Research and Development

Figure 4. 14. Nigeria has highest share of agribusinesses having new product or service

Figure 4. 15. Nigeria has higher share of agribusinesses introducing process innovation

Figure 4. 16. Electrical outages is a common problem faced by agribusinesses

Figure 4. 17. Nigerian agribusinesses experience electrical outages nearly every weekday

Figure 4. 18. Each power outage lasts more than half a day in Nigeria

Figure 4. 19. Electrical outages cause significant loss of sales and spoilage of products in Nigeria

Figure 5. 1. Vietnam agricultural exports in selected commodities doubled in the past decade
Figure 5. 2. Cashew nut production in Nigeria’s decreased rapidly in the past two decades
Figure 5. 3. Area harvested contracted in Nigeria between 2010 and 2014, contributing to declining production
Figure 5. 4. Yields in Nigeria declined between 2010 and 2014, but rebounded quickly and are now higher than major producers in West Africa
Figure 5. 5. Vietnam has achieved tremendous export growth in the past two decades while export growth Nigeria has been fleeting
Figure 5. 6. The tremendous export growth in Vietnam is fueled by imports of RCN that are processed and exported
Figure 5. 7. Nigeria exports of RCN have increased significantly since 2012 and Vietnam has become a major destination
Figure 5. 8. Vietnam exports processed cashew nuts mainly to USA, China and Netherlands
Figure 5. 9. Processed kernels from Nigeria fetched a better price than competitors for a good part of 2019
Figure 5. 10. West African countries are a major source of imports of RCN processed in Vietnam
Figure 5. 11. Cost build-up for the cashew nuts value chain in Nigeria
Figure 5. 12. Cost build-up for the cashew nuts value chain in Vietnam

Figure 6. 1. Rice production in Nigeria and Vietnam was growing at similar rates until early 1980s
Figure 6. 2. Rice yields in Vietnam increased rapidly since 1980s while in Nigeria the yield declined in most of the 1990s
Figure 6. 3. In the last 10 years, Viet Nam's has been exporting more than 4 million tons per year with the value of rice exports fluctuating around 3 billion USD
Figure 6. 4. The price of Viet Nam rice exports generally follows Thai export price trends
Figure 6. 5. Rice imports to neighboring countries (especially Benin) have increased as a large share of those imports were destined to Nigeria
Figure 6. 6. Before 2015, rice import tariffs did not have an impact on domestic prices mainly because of rice smuggled through the borders
Figure 6. 7. At least 60 percent of the rice milling capacity in Nigeria is in the North West region
Figure 6. 8. The State of Kebbi accounts for 20 percent of milled rice
Figure 6. 9. Build-up of costs, prices and margins for rice value chains in Nigeria
Figure 6. 10. Build-up of costs, prices and margins for rice value chains in Vietnam
Figure 6. 11. Percentage of total profit margin by value chain actor in Nigeria
Figure 6. 12. Percentage of total profit margin by value chain actor in Vietnam
Figure 6. 13. More than 80 percent of official rice imports in Nigeria originated from Thailand and India
Figure 6. 14. Export rice prices in Vietnam track Thailand prices and have been lower in some periods, most recently in 2019
Figure 6. 15. Without tariffs, rice imports from Vietnam are competitive in Nigeria domestic market

Figure 7. 1. Cassava production growth soared in Nigeria after 1985 but not in Vietnam
Figure 7. 2. Growth in Nigeria after 1985 was fueled by rapid increase in population
Figure 7. 3. Cassava yields in Vietnam leapfrogged Nigeria in 2000
Figure 7. 4. Cassava yields have stagnated in Nigeria for decades, but acreage increased
Figure 7. 5. Since 2000 both yields and acreage have grown tremendously
Figure 7. 6. Vietnam earned US$1.3 billion from cassava exports in 2017 while Nigeria played a very minor role in cassava trade
Figure 7. 7. Vietnam’s exports have rapidly transitioned from low-value dried cassava to high starch since 2008 ......................................................................................................................... 125
Figure 7. 8. Israel and China are the main export markets for cassava starch processed in Nigeria ... 127
Figure 7. 9. Chad is the main export markets for dried cassava processed in Nigeria ................. 127
Figure 7. 10. Cassava yields have nearly tripled in Vietnam since 2000, while in Nigeria yields became more volatile and declining ................................................................. 130
Figure 7. 11. Cassava prices doubled in Vietnam in the last 10 years while prices in Nigeria remained flat ................................................................................................................................. 130
Figure 7. 12. Cost build-up of starch value chain in Vietnam .................................................... 131
Figure 7. 13. Cost build-up of starch value chain in Nigeria .................................................... 131
Figure 7. 14. Cost build-up of starch value chain in Nigeria .................................................... 131
Figure 7. 15. Farmers in gari value chain earn a relatively smaller share of value chain margins .... 131

Figure 8. 1. Chicken population has dropped in Nigeria since 2010 but continues to increase in Vietnam ........................................................................................................................................ 137
Figure 8. 2. Chicken production value in Nigeria dropped rapidly since 2008 while it increased steadily in Vietnam......................................................................................................................... 137
Figure 8. 3. Broiler production growth accelerated in Vietnam in the past two decades after leapfrogging Nigeria in 1996 ..................................................................................................................................... 138
Figure 8. 4. Chicken meat productivity in Nigeria is about 57 percent lower than Vietnam .......... 138
Figure 8. 5. Imports of chicken meat in Nigeria closely tracks exports from Benin ....................... 141
Figure 8. 6. Chicken meat imports are low in Nigeria because of imports restrictions ............. 141
Figure 8. 7. The consumption of chicken meat in Nigeria has hardly increased over time and is a fraction of demand in comparable middle-income countries ......................................................... 142
Figure 8. 8. The consumption of chicken meat in Nigeria has hardly increased over time and is a fraction of demand in comparable middle-income countries ......................................................... 142
Figure 8. 9. Most of the raw materials for poultry feeds in Nigeria (maize and soya beans) are met through domestic production ............................................................................................................ 144
Figure 8. 10. Vietnam has adopted a two-pronged policy to increase imports of raw materials for poultry feeds while increasing productivity ......................................................................................... 144
Figure 8. 11. Cost build-up of broiler value chain in Nigeria .................................................... 145
Figure 8. 12. Cost build-up of broiler value chain in Vietnam ................................................... 145
Figure 8. 13. Vietnam imports heavily the major poultry feed ingredients ................................. 146
Figure 8. 14. Slaughterhouses capture the highest share of profit margins in Nigeria ............... 146
Figure 8. 15. Producers capture the highest share of profit margins in Vietnam ....................... 146

List of Table

Table 3. 1. Root crops and horticulture generate more than half of agribusiness GDP .................. 40
Table 3. 2. Baseline scenario for 2018-2025 (percent annual change) ........................................ 42
Table 3. 3. Traditional cash crops, rice, cassava, edible oilseeds and pulses have potential to create most jobs ........................................................................................................................................... 46
Table 3. 4. The value chain groups with most potential to reduce poverty are pulses, goats & sheep, poultry & eggs, fish & aquaculture, cattle & dairy, and traditional cash crops ......................... 49
Table 3. 5. Food groups with highest potential to improve nutrition outcomes are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables ......................... 50
Table 4. 1. The average farmer is a smallholder that relies on rainfed agriculture with little irrigation.... 56
Table 4. 2. Few farmers combine improved seeds and inorganic fertilizers and majority of farmers using inorganic fertilizers are doing so inefficiently................................................................. 58

Table 5. 1. Selected economic indicators for Nigeria and Vietnam.......................................................... 83
Table 5. 2. Importance of cashew nut in Nigeria and Vietnam .................................................................. 84
Table 5. 3. Relationship between quality of RCN and quality and prices of processed kernels by country of origin ............................................................................................................................... 88
Table 5. 4. Cost of production per kg of RCN based on average farm size and yields on mature trees..... 94
Table 5. 5. Cost-benefit analysis of cashew investments in Nigeria and Vietnam ........................................ 95
Table 5. 6. Cashew nut processing costs in Nigeria and Vietnam ............................................................. 95

Table 6. 1. Contribution of rice to the economies of Nigeria and Vietnam.................................................. 100
Table 6. 2. Summary of the characteristics of rice production in Nigeria and Vietnam.......................... 103
Table 6. 3. Small scale millers handle more than three quarters of rice produced in Nigeria .............. 108
Table 6. 4. Farmers in Nigeria have higher per-kg margins, but their counterparts in Vietnam earn higher annual margins because of higher yields and an additional crop ................................................................. 111

Table 7. 1. Contributions of cassava to GDP and agricultural production in Nigeria and Vietnam .......... 120
Table 7. 2. Nigeria is transitioning from exporting low-value dried cassava to high-value starch and cassava flour .................................................................................................................................. 126

Table 8. 1. The cost of production of chicken meat is lower in Nigeria than Vietnam......................... 145
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE</td>
<td>Agribusiness enabling environment</td>
</tr>
<tr>
<td>AMIS</td>
<td>Agricultural Markets Information System</td>
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<td>APPEALS</td>
<td>Agro-Processing, Agricultural Productivity Enhancement and Livelihood Improvement Support Project</td>
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<td>BEE</td>
<td>Business enabling environment</td>
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<td>CACS</td>
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<td>CMD</td>
<td>Cassava Mosaic Disease</td>
</tr>
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<td>CRIN</td>
<td>Cocoa Research Institute of Nigeria</td>
</tr>
<tr>
<td>DATs</td>
<td>Disruptive Agricultural Technologies</td>
</tr>
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<td>DDGE</td>
<td>Dietary Diversity Growth Elasticity</td>
</tr>
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<td>DFID</td>
<td>Department for International Development</td>
</tr>
<tr>
<td>DOCs</td>
<td>Day Old Chicks</td>
</tr>
<tr>
<td>DUS</td>
<td>Distinctiveness, uniformity and stability</td>
</tr>
<tr>
<td>EBA</td>
<td>Enabling Business of Agriculture</td>
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<tr>
<td>ERGP</td>
<td>Economic Growth and Recovery Plan</td>
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<td>ESP</td>
<td>Economic Sustainability Plan</td>
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<td>FAO</td>
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<td>FCs</td>
<td>Financial Cooperatives</td>
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<td>FI</td>
<td>Financial institutions</td>
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<td>FMARD</td>
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<tr>
<td>FOB</td>
<td>Free on Board</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GSO</td>
<td>General Statistical Office</td>
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<td>HPAI</td>
<td>High Pathogenic Avian Influenza</td>
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<td>HQCF</td>
<td>High Quality Cassava Flour</td>
</tr>
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<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
</tr>
<tr>
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<td>International Institute of Tropical Agriculture</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labor Organization</td>
</tr>
<tr>
<td>IOT</td>
<td>Input-Output Tables</td>
</tr>
<tr>
<td>IRR</td>
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</tr>
<tr>
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</tr>
<tr>
<td>KOR</td>
<td>Kernel Outturn Rate</td>
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<td>LBAs</td>
<td>Licensed buying agents</td>
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<td>MARD</td>
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<td>MFI</td>
<td>Micro-finance Institutions</td>
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<td>MSMEs</td>
<td>Micro, Small, and Medium Enterprises</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MTNDP</td>
<td>Medium-Term National Development Plans</td>
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<td>NASC</td>
<td>National Agricultural Seeds Council</td>
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<td>NBS</td>
<td>National Bureau of Statistics</td>
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<td>National Cashew Association of Nigeria</td>
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<td>NEMI</td>
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</tr>
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</tr>
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<td>Nigeria Export Supervision Scheme</td>
</tr>
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<td>New generation cooperatives</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
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<td>NIRSAL</td>
<td>Nigeria Incentive-based Risk-sharing System for Agricultural Lending</td>
</tr>
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<td>NLSS</td>
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<td>Net Present Value</td>
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<tr>
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</tr>
<tr>
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</tr>
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</tr>
<tr>
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<td>Poverty growth elasticity</td>
</tr>
<tr>
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</tr>
<tr>
<td>RCN</td>
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</tr>
<tr>
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<td>Rural Investment and Policy Analysis</td>
</tr>
<tr>
<td>RPPMPP</td>
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</tr>
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</tr>
<tr>
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<tr>
<td>SMEs</td>
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</tr>
<tr>
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<td>Sub Saharan Africa</td>
</tr>
<tr>
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</tr>
<tr>
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<td>Tree Crops Development Units</td>
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<tr>
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<td>Total Factor Productivity</td>
</tr>
<tr>
<td>USDA-ERS</td>
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</tr>
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<td>VINACAS</td>
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</tr>
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<td>Vietnam Cassava Programme</td>
</tr>
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<td>WARDA</td>
<td>West Africa Rice Development Association</td>
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<td>WHO</td>
<td>WHO World Health Organization</td>
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Executive Summary

Modern economic policy making in Nigeria has placed enormous emphasis on diversification of the economy to non-oil productive sectors. For example, long before the 2015-16 recession, the National Economic Empowerment and Development Strategy (2004) outlined a strategy for private sector development focusing on diversification to non-oil sources of growth, among other objectives. Agriculture has always been considered an important sector for diversification, most recently as outlined in the Economic Growth and Recovery Plan (ERGP) 2017-2020 and Economic Sustainability Plan 2020. With the aim to restore economic growth following the 2015-16 recession and lay the foundations for long-term structural change, the ERGP recognized the need to diversify the economy to non-oil productive sectors such as agriculture and agro-allied industries, in order to build an economy that can generate inclusive growth and create jobs. More recently, the government launched the Economic Sustainability Plan (ESP) in July 2020 to mitigate the adverse impacts of the COVID-19 crisis and lay the ground for a robust recovery. Among the major interventions proposed in the ESP is “A Mass Agriculture Programme” “to create millions of job opportunities, directly or indirectly, over a 12-month period”. Similar programs were proposed in roads, renewables, and housing.

Why has diversification pre-occupied modern economic policy making in Nigeria? It’s mainly because growth has largely been non-inclusive and without jobs. Furthermore, the dependence on oil has severely limited the ability of the economy to absorb external shocks, such that falling global oil prices have led to two recessions in the last five years. A key feature of Nigeria’s economy is that high oil prices lead to strong economic growth, and vice versa. Nigeria experienced strong and stable economic growth during 2000-2010, with annual GDP growth rate more than 6 percent, well above population growth rate. Oil prices were rising during this period. However, the strong years of growth did not appreciably reduce the unemployment rate, which remained nearly flat at about 4 percent (figure 1). The dependence on oil can be traced to the 1960s when exports of crude oil and gas increased sharply to provide a stream of enormous revenues to the government. The oil boom diverted attention away from non-oil sectors such as agriculture and manufacturing – and these sectors have become less competitive over time. The agriculture and manufacturing sectors feature prominently in policy dialogue around diversification. However, this does not mean that there is enough clarity or consensus on the parts of agriculture (or manufacturing or services) to diversify into and the expected outcomes on jobs, poverty reduction, etc. Without clarity on investment priorities and expected outcomes, the declarations that agriculture should drive diversification have often failed to persuade budget holders to allocate the resources. It has also deprived policy makers and practitioners of the information, inspiration, and conviction to develop and execute sector plans that could operationalize diversification.

This report aims to improve understanding of the potential of the agribusiness sector (primary agriculture plus off-farm agribusiness) to accelerate inclusive recovery from the 2020 recession, create jobs, and reduce poverty. A key early finding of the report is that the agribusiness sector is critical to accelerating inclusive recovery and creating jobs. The report builds on this evidence to identify the specific value chain groups that have most potential to create jobs, reduce poverty and improve nutrition outcomes. Next, the report offers to highlight the complex set of factors that mediate the performance of agricultural value chains, distinguishing between issues that pertain to upstream primary agriculture, those that affect downstream off-farm agribusiness and cross-cutting challenges. The agribusiness enabling environment takes center stage in this part of the report, focusing on policy reforms around seed regulations, fertilizers quality control, warehouse receipts, and agricultural trade. Finally, the report takes deep dives to identify
reforms to increase competitiveness in the value chains that were found to have the most potential to create jobs, reduce poverty and improve nutrition outcomes. The detailed value chain studies include cashew nuts – representing traditional cash crops, rice, cassava, and poultry – representing livestock value chains. The approach taken in this part of the study is to benchmark performance of these commodities with Vietnam, a country that has within the past two decades emerged as a global leader in agribusiness and a top exporter in several commodities and products that are important in Nigeria’s agribusiness sector. The strong performance of the agribusiness sector in Vietnam has ushered a model of structural transformation that could serve Nigeria very well.

What can Agribusiness do for Inclusive Recovery and Jobs?

The Agribusiness sector includes all farms and firms involved in producing, harvesting, packing, processing, preserving, distributing, marketing, and disposing of food and non-food agricultural products. These activities could be classified into the following categories – agriculture, processing, trade and transport, food services, hotels, and inputs. The agriculture segment of agribusiness includes all of the classical agriculture sector GDP – the primary production of all crops, livestock, forestry, and fishing. The processing segment includes the part of the manufacturing sector GDP that involves processing, value addition and preservation of food and non-food agricultural products. Examples include food processing, beverages, tobacco, cotton yarn, and timber. The trade and transport segment includes the part of the services sector GDP that entails transportation, storage, logistics and trading for agricultural commodities and products between farms, firms, and final consumers. The food services segment is the part of the classical services sector GDP that involves the preparation and sale of food outside the home (e.g. restaurants and street vendors). The hotels segment includes the part of the hotels and accommodation GDP that is associated with food. The inputs segment includes all GDP generated during domestic production of the inputs used by farmers and processors, excluding the inputs produced by the above five segments.

Agribusiness is a large part of Nigeria’s economy, directly providing more than 50 percent of jobs and contributing more than 35 percent to the national GDP. And there is enormous potential for transformation because primary agriculture is much larger than off-farm agribusiness. Primary agriculture accounts for 21 percent of the national GDP while off-farm agribusiness contributes 14 percent. The 1.5 ratio of primary agriculture to off-farm agribusiness GDP indicates that transformation is still at early stages. Therefore, there are enormous opportunities to design policies and investments to accelerate transformation and create more and better jobs. With the current low level of transformation, primary agriculture provides more jobs (about 21 million) than off-farm agribusiness (about 8 million jobs). However, off-farm agribusiness provides better jobs than primary agriculture, with GDP per worker at least 1.6 times higher than primary agriculture and comparable to economy-wide average. Within agribusiness segments, labor productivity is highest in input supply and processing, and lowest in hotels & food services and primary agriculture. However, labor productivity in primary agriculture tends to be underestimated when measured as GDP per worker. This is because workers in primary agriculture are engaged seasonally and not throughout the year. The GDP attributable to these workers is generated only during the cropping season and therefore the average annual labor productivity measure is biased downwards, unless corrected for seasonality. Furthermore, primary agriculture also tends to be a residual employer that absorbs low-skilled rural individuals who cannot find jobs elsewhere.
An early conclusion of the report is that the agribusiness sector provides perhaps the best opportunities to accelerate inclusive recovery from the 2020 recession while generating more and better jobs. This is based on analysis of the growth, jobs, and labor productivity outcomes in the past decade (2009-2018). The experience of this decade is quite instructive as this period was marked by pre-recession volatility, recession, and post-recession recovery – similar to the current economic situation and the near-term challenges going forward. During this period, the off-farm agribusiness sector outperformed the overall economy in GDP growth, jobs creation and labor productivity growth. In particular, GDP in the off-farm agribusiness segments grew on average by 5.3 percent annually compared to 3.7 percent economy-wide, jobs in off-farm agribusiness grew on average by 3.5 percent annually compared to 2.5 percent economy-wide and labor productivity (GDP per worker) in off-farm agribusiness grew on average by 1.8 percent annually compared to 1.2 percent economy-wide wide. Similarly, primary agriculture outperformed the overall economy in terms of GDP growth (4.3 percent versus 3.7 percent) and the creation of better jobs as labor productivity grew by 2.8 percent compared to 1.2 percent economy wide average. Within off-farm agribusiness, GDP growth and jobs creation was fastest in hotel & food services followed by trade & transport. The processing segment and primary agriculture led all agribusiness segments in the creation of better jobs.

Successful transformation will depend on productivity growth on the farm and stronger linkages between on-farm and off-farm agribusiness. And future opportunities for growth and jobs will increasingly be in the off-farm segments, in particular processing, hotels & food services and input supply segments. However, these growth and jobs opportunities cannot materialize without better coordination of agriculture/agribusiness value chains to reduce fragmentation and establish stronger linkages between upstream primary production and downstream value-addition segments. In addition, a growth and transformation strategy for agribusiness should aim for: (i) raising productivity in the on-farm segment (primary agriculture) to reduce the costs in downstream off-farm segments; (ii) effective coordination of agricultural value chains, including moving away from fragmented spot markets to strong forms of vertical arrangements; (iii) expanding processing of higher-value farm products such as cash crops, livestock products, and livestock and fisheries feeds – through value chain development approaches that establish strong linkages with primary agriculture; (iv) diversifying farm production and moving away from roots crops that have low value added and processing potential and low nutritional value (the 59% of root crops that don’t include cassava and potatoes); and (v) increasing domestic production of the inputs used in farming and processing, including seeds, agrochemicals, vaccines, and fertilizers.

How Much Growth is Needed for Agribusiness to Create 6 Million Jobs?

Assessment of the growth required to meet specific jobs targets and identification of value chains with most potential for jobs, poverty reduction and nutrition is conducted using the Rural Investment and Policy Analysis (RIAPA) Model\(^1\). The RIAPA is general equilibrium (CGE) model and its core database is a social accounting matrix (SAM) that captures all income and expenditure flows between all economic actors in the country, including producers, consumers, government, and the rest of the world. The model estimates how the speed and structure of growth in different sub-sectors affect consumption and income and their knock-on effects on various outcomes of interest such as jobs and poverty. These estimates reflect the differences in consumption patterns for different households and their factor endowments and demand for resources. For example, poor households tend to depend on incomes from low-skilled

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1 RIAPA was developed by the International Food Policy Research Institute
workers and therefore growth in sectors that have high intensity of low-skilled labor is likely to have a relatively larger impact on their incomes. On the same vein, poor households tend to spend a relatively higher share of their food budget on staples and therefore productivity growth in staple sector would lower prices, raise food consumption among the poor, and potentially transition some of them out of poverty. The outcome indicators in the RIAPA model include economic growth, employment, poverty, dietary diversity score, poverty-growth elasticity, dietary diversity growth elasticity, and economy/sectoral growth employment elasticity. The model is updated with 2018 data – the base year.

The whole agribusiness sector needs to growth by 5.4 percent annually to create 6 million jobs through 2024. The growth burden to meet this jobs target is higher if either on-farm or off-farm stagnates. For example, when left alone to achieve the jobs target, the on-farm segment will have to grow by 8.4 percent annually through 2024 to create 6 million jobs. On the other hand, the off-farm segment will have to grow even faster – by 13 percent annually – to create the 6 million jobs by 2024. The same target of 6 million jobs can be achieved with lower growth rates if the target year for achieving the result is pushed further into the future, for example only 3.9 percent growth is required to meet the jobs targets in 2026. The agribusiness sector in Nigeria was growing 3.4 percent in 2018 and will need to surpass these levels by about 2 percentage points to meet the 6 million jobs target by 2024. The COVID-19 pandemic has slowed growth considerably and it is estimated that primary agriculture grew by 1.7 percent in the first 3 quarters of 2020 compared to 2.4 percent during the same period in 2019. While the growth burden to meet the jobs targets has increased, the analysis of agribusiness growth rates in developing countries suggests that it’s possible for the sector to grow at rates higher than 5 percent. For example, the agribusiness sectors in Ethiopia, Mali, and Niger in SSA grew at 8, 9 and 10.2 percent respectively between 2013 and 2018.

Which Value Chains Have Most Potential to Create Jobs?

The traditional cash crops has the highest potential to create jobs, followed by cassava, rice, oilseeds and pulses. The jobs attributed to these value chain groups comes not only from the direct effects of productivity growth in the value chain but also the indirect effects through incentives created outside the value chains. For example, increasing cassava productivity may allow farmers to reallocate resources to other crops, thereby diversifying production and creating more jobs in other agricultural enterprises. Similarly, increasing incomes of workers in a value chain also allows households to purchase products from other sectors or value-chains, thereby generating economy-wide spillovers. The results for rice and cassava highlight policy tradeoffs on the location of new jobs. Cassava is significantly stronger than rice in creating jobs within the agribusiness sectors – higher agribusiness growth employment elasticity relative to rice. On the other hand, rice creates relatively more jobs in the broader economy than cassava but actually contributes negatively to jobs within the agribusiness segment. The larger economywide linkages in rice are through the milling industry as well as hotels and food services segments. Within the edible oils group, sesame is emerging as an important commodity for growth and exports. Nigeria has the highest sesame yields globally and this has laid strong foundations for competitiveness in global exports markets. Sesame seed was the most exported agricultural commodity in Q1 2019, accounting for 40.4 percent of agricultural exports with about 70 percent of exports going to the major consuming countries such as China, Japan, and Turkey.

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2 This target was set by the government policy document for the second term of the Buhari presidency “Delivering on the Government’s Priorities 2019-2023”
Which Value Chains Have Most Potential to Reduce Poverty?

The **value chain groups with highest potential to reduce the national poverty headcount rate** are pulses, goats & sheep, poultry & eggs, fish & aquaculture, cattle & dairy, and traditional cash crops. These pro-poor value chain groups have semi-poverty growth elasticity (PGE) of more than -1, which means that a one percentage change in agricultural GDP arising from productivity growth in any of these value chains will reduce the national poverty headcount ratio by more than one percentage points. However, not all of these value chains are as effective in reducing poverty in rural areas. Specifically, productivity growth in fish & aquaculture and cattle & dairy reduce more national poverty than rural poverty, indicating that the benefits of their growth accrue more to the urban poor relative to rural poor. The linkages with urban poverty are primarily through off-farm post-production management of the products and lower consumer prices. These livestock products tend to have high income and price elasticity of demand. With productivity growth, the prices for these products fall and demand for these commodities increase, especially among the urban poor. The extent to which the rural poor benefit partly depends on the tradeoff of growth and prices. Clearly, the instantaneous effect of productivity growth is to increase the incomes of producers, but this effect appears be dampened by falling farm-gate and consumer prices. In addition to the direct income and consumption effects, the increased production and demand create employment opportunities for the poor and low-skilled workers to move these commodities from the farm to the market.

Which Value Chains Have Most Potential to Improve Nutrition?

**Food groups with highest potential to improve nutrition** are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables. The assessment of potential of value chain groups to improve nutrition relies on estimates of the dietary diversity growth elasticity (DDGE), which measures the percentage change in the dietary diversity score of poor households divided by the per capita GDP growth rate. The dietary diversity score is calculated for household groups using food expenditure shares. Diversity is estimated using a generalized entropy measure across six food categories – cereals & roots, vegetables, fruits, meat, fish & eggs, milk & dairy, and pulses and oilseeds. A more diverse diet is associated with better nutrition outcomes. Food groups that dominate production and consumption (main staples) perform poorly in the dietary diversity score, primarily because such foods are already occupying a large share of the consumption basket and productivity growth makes them more available and cheaper, which further reduces the diversity of diets and leads to poor nutrition outcomes. Sorghum & millet have the worst dietary diversity growth elasticity, followed by yams, cassava, maize, bananas, rice, and edible oils. Food groups with highest scores are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables.

Major Challenges in Primary Agriculture and Off-farm Agribusiness

**Working with smallholder farmers presents several challenges to agribusinesses.** Perhaps the foremost, at least from the perspective of downstream agribusinesses include: (i) variable quality of production and low productivity due to weak access to improved technology of production and quality inputs; (ii) weak access to credit and risk-sharing services, especially by smallholder farmers, has led to investments in assets with poor returns; (iii) high ex-post transaction costs for contract enforcement; and (iv) ineffective farmer organizations that cannot effectively monitor disparate smallholders to adhere to their obligations under vertical coordination arrangements. Farmer organizations tend to be ineffective despite a long history of development projects organizing smallholder farmers into groups. This is mainly
because such groups are formed primarily to pursue livelihoods objectives. It takes significant investments to transition them into growth-oriented farmer organizations, such as cooperatives or producer companies, that can form long-term relationships with growth-oriented agribusinesses and incentivize member farmers to invest in appropriate technology of production to produce the quality desired by remunerative markets.

**Majority of the farmers use fertilizers inefficiently and without improved seeds, perhaps due to poor design of fertilizer subsidy programs and inadequate supply of improved seeds.** Farmers are unlikely to purchase fertilizers at full cost only to combine it with traditional seeds. But to the extent that farmers can access fertilizers through subsidy programs at less than full cost, and if such programs don’t provide the fertilizers as a package with improved seeds, it would lead to farmers using inorganic fertilizers together with traditional seeds. This is even more likely when the market supply of improved seeds is limited. Efficiency in the use of inorganic fertilizers can be improved by transitioning fertilizer supply programs to adapt the principles of smart subsidies. The two key principles of smart subsidies are: (i) targeting farmers that need to learn about proper use of fertilizers or those who could use it profitably but are not able to do so due to working capital constraints; and (ii) deliver the subsidy through the private sector by adopting voucher systems that mandate the farmers to purchase a package of fertilizers and improved seeds together. Smart subsidies will need to be accompanied with effective extension and service delivery to enable farmers learn about the nutrient deficiencies in their plots, nutrient requirements for different crops, crop water requirements and critical irrigation periods, etc.

**Total Factor Productivity (TFP) in primary agriculture has not improved for decades. The principal interventions to improve TFP are research to develop and disseminate improved technologies (crop varieties, livestock breeds, management practices, etc.) that are more productive and resilient to agroclimatic changes.** TFP captures differences in productivity that are not due to differences in use of inputs, but rather attributable to factors such as technological progress and efficiency in the conversion of inputs to outputs. The lack of progress on TFP is mainly explained by: (i) the significant underinvestment in agriculture research that is required to generate high-yielding and climate-resilient crop varieties and livestock breeds, and (ii) weak farmers extension and advisory services that are required to disseminate proper crop and livestock management practices that would enable farmers to use existing technologies efficiently. Nigeria’s investment in agricultural research as a share of agricultural GDP fell from an already low of 0.39 percent in 2008 to 0.22 percent in 2017. In comparison, Ghana’s share is 0.99 percent and South Africa’s is 2.79 percent. TFP can be increased through investments in research to develop and disseminate crop varieties and livestock breeds that are more productive and resilient to agroclimatic changes. In the face of changing climate, targeted agricultural research & development and effective advisory & extension services are critical to deliver the triple wins of improved productivity, enhanced resilience and adaptation, and reduction of greenhouse gas emissions.

**Smallholder farmers have weak access to credit, for various reasons.** The commercial lending sector tends to consider smallholder agriculture too risky, primarily because lenders face challenges in distinguishing between good and bad borrowers. Furthermore, lenders incur significant costs in processing a large number of relatively small loans to smallholder farmers. Smallholders have weak land rights and face difficulties using land as collateral for commercial credit. They are less likely to have their lands formally registered compared to medium and large-scale farmers, primarily because most

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3 Agricultural R&D Factsheet, ASTI, 2017
smallholders acquire land through inheritance and the land is often sub-divided among siblings without passage of full rights. In addition, smallholders tend to demand small and high-frequency loans that don’t match the financial products available. Agribusiness SMEs also struggle to access credit and invest in productive assets, capacities, and technologies that increase competitiveness and growth.

**Coordinated “value chain financing” arrangements can concurrently address the financing needs faced by farmers and off-farm agribusinesses.** The factors contributing to weak access to credit by agribusinesses are varied and include foundational and structural issues in the financial services sector, weak competitiveness of agribusinesses in domestic and export markets, high risk of failure and stunted growth, lack of financing instruments such as warehousing receipt systems, and the structure of primary agriculture, which is dominated by smallholders that are perceived as bad risks by the banks. These challenges require a multi-pronged approach that includes reforming the financial services sector, improving the agribusiness enabling environment and disruption of the financial services sector with fintech products that meet the needs of agribusiness SMEs and smallholders while generating information on creditworthiness of the farmers and riskiness of specific agricultural enterprises. In addition to these reforms, there is evidence that coordinated “value chain financing” arrangements can be very successful in Nigeria as they take a “whole-of-agribusiness” approach to concurrently address financing needs across multiple actors in the value chains. Without value chain financing, SMEs that face relatively more severe financial constraints cannot invest in innovative technologies and risk being eliminated from the value chains.

**Digital technologies have enormous potential to improve access to finance through fintech and mobile money and enable delivery of various other services.** Governments can support digital agriculture through various type of foundational public investments and policy and regulatory reforms. Access to finance is a major challenge for smallholder farmers and downstream agribusinesses. While the federal government has implemented various schemes to de-risk the sector\(^4\), there is still a lot of unfinished business. In particular, there is enormous scope for disruption in the financial sector through fintech, mobile money and innovations that deepen financial inclusion, generate information on creditworthiness of entrepreneurs, and return on investments in specific value chains. Recent advances in fintech and mobile money (e.g. MPESA in Kenya) have enabled smallholders and informal enterprises across sectors to access small and high-frequency loans with repayment terms that match their cashflow profiles. In addition, fintech and mobile money applications have proven effective in generating credit records for smallholders and this information can be harnessed by traditional banks to identify good risks among smallholder farmers. The main areas for public interventions include policies that lay the foundations for innovation and scaling out of digital technologies, expansion of rural broadband and supporting infrastructure, and collecting and digitizing plot-level data on farmers to lay strong foundations for platforms and innovations for service delivery.

**Nigeria has made significant improvements in the overall business enabling environment and agriculture sector policies.** It’s imperative that the recent policy reforms are fully operationalized to generate results and maintain the momentum to address the remaining

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\(^4\) Recent programs include Nigeria Incentive-based Risk-sharing System for Agricultural Lending (NIRSAL), Commercial Agriculture Credit Scheme (CACS) and Anchor Borrowers Program. However, the study could not obtain data on the performance of these programs.
The climate for doing business is improving and Nigeria ranks 131 out of 190 in the World Bank ease of doing business survey 2020, far behind the top countries in SSA – Rwanda and Kenya at 38 and 56 respectively. In addition, the agribusiness enabling environment has improved significantly with the passage of the National Agricultural Seed Council Act 2019 and the National Fertilizer Quality Control Act 2019, and significant progress on the Plant Variety Protection Bill and the legal and regulatory framework for warehouse receipts. However, these Acts have not been fully operationalized and there is important unfinished business to translate the legal and policy frameworks into action plans for implementation. The specific issues in the enabling environment are discussed below, focusing on seed development and quality control, fertilizer quality control, warehouse receipt system and agricultural exports.

The legal and regulatory framework for seed development has tremendously improved with the passage of the National Agricultural Seeds Council Act 2019. However, there is unfinished business to operationalize the policy. Among the major reforms embedded in the Act is that it empowers the Council to encourage the establishment of seed companies for the purpose of carrying out research, production, processing, and marketing of seed. Plant breeders’ rights are recognized in the Act but there are no specific measures to protect the rights beyond empowering the Council to approve and implement programs and measures to protect the rights. Private companies can access early generation seed if their registration allows handling of the seed. The Act does not automatically allow varieties already registered in another country to be automatically approved for commercialization. However, the Act empowers the Minister of Agriculture and Rural Development to, on the advice of the Seed Registration and Release Subcommittee, waive the testing requirements if an imported variety is already registered under a regional variety release system. For foreign varieties not registered under a regional release system, the Subcommittee is empowered to determine the required “limited multi-locational verification trial” according to its rules and procedures. The new Act does not require varieties for exports or varieties to produce commodities for exports to be subject to variety release or registration requirements unless required by the importing country. However, the related legislation on phytosanitary and bio-safety controls legislation apply.

Several aspects of the seed quality control system will be strengthened when the new Act is operationalized. The reforms would ultimately enable the removal of poor-quality seeds from the market and increase transparency in quality control processes. In particular, the new Seed Act clarifies the functions of seed inspectors and provides them sufficient powers to take samples of any seeds of any variety from any person or entity marketing or purchasing seed, carry out seed testing, search premises handling seed, carry out field inspection necessary to monitor seed production and certification. The Act not only encourages random market inspections but also stipulates clear penalties for sale of mislabeled seed bags. However, private seed companies or third parties, including private laboratories, still cannot certify seed in Nigeria, nor is a fee schedule for seed certification published, potentially constraining the provision of high-quality seed to producers throughout the country.

The National Fertilizer Quality (Control) Act 2019 sets the framework for effective quality control of fertilizers and its full operationalization is critical. Under the old policy regime, the permit to import and distribute fertilizer was valid for only one year and the process to obtain it took 3 months. The brief validity and long of obtaining the permit were major disincentives for private sector participation.

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5 In May 2018 the Senate passed the Companies and Allied Matters Act (CAMA) which included several major reforms including new business ownership forms such as sole proprietorships and limited liability companies, improved company registration procedures (including e-signatures for registration), improved insolvency process, enhanced protection of minority investors. However, it has yet to be passed by the House of Representatives and assented to by the Presidency.
in fertilizers importation and distribution. With the new Act, the number of days for processing the permits for fertilizer imports, trade and distribution is reduced from 3 months to 30 days. Furthermore, the duration of the permit has been increased from one year to 3 years – and the owner of a permit will not apply afresh after 3 years but instead pay a renewal fee. This provision creates stable expectations among the private sector and has potential to catalyze more investments in the fertilizers business. The Act also provides elaborate procedures and timelines for conflict resolution where a permit or certificate of registration is cancelled. In addition, the Act sets a framework for effective quality control of fertilizers. It provides a detailed account of prohibited activities, offenses and penalties in fertilizer handling and trade, including operating without registration, selling of fertilizers that contains destructive ingredients or properties that are harmful to plant group, repurposing of fertilizers to other uses, and obstruction of duly authorized officers from carrying out their enforcement and regulatory functions. The inspection and enforcement actions are specified in the new Law, including the power to enter and inspect, taking of official samples for analysis, and the power of the Minister to issue orders that stop sale or disposal of fertilizers whenever there is a reasonable cause. The labeling requirements are stipulated, including the maximum allowable quantity deviations between the label and the physical samples.

Completion of the legal and regulatory framework for warehouse receipt system is critical. Warehouse receipt systems (WRS) enable farmers and traders to access finance by liquidating part of the value of their non-perishable commodities while searching for better prices. The system is composed of the following parties: (a) depositors of commodities, mainly farmers, farmer organizations and traders; (b) warehousing facilities and collateral management services; (c) banks and financial institutions; (d) buyers of commodities and warehouse receipts, including traders, millers, exporters, etc. The laws and regulatory frameworks for WRS do not operate in isolation but rather work in parallel with broader laws defining negotiable instruments, passage of title for goods, use of assets as collateral, bankruptcy laws, contract laws, etc. This understanding was not sufficiently factored into the previous bill (2019), and for this reason it was contested by the SEC and did not obtain presidential assent. The lack of legal and regulatory framework means that any warehouse receipts issued are not negotiable instruments and cannot be used as collateral in the commercial banking sector.

A summary of critical actions to operationalize reforms and the expected impacts is presented in table 4 below.
<table>
<thead>
<tr>
<th>Seed Development and Quality Control</th>
<th>Critical Actions to Operationalize Reforms</th>
<th>What Could be the Impacts of the Reforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The National Agricultural Seed Council (NASC) to develop modalities for the private sector to access germplasm from public sources for the purpose of carrying out research, production, processing, and marketing of seed.</td>
<td>• Increased private sector participation in seed development, multiplication, and marketing to farmers</td>
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<tr>
<td>• NASC to develop regulations to recognize and protect plant breeder’s intellectual property rights – and implement measures to safeguard the rights</td>
<td>• Removal of low quality and fake seeds from the market</td>
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<tr>
<td>• The Minister of Agriculture and Rural Development, on the advice of the Seed Registration and Release Subcommittee, waive the seed testing requirements for imported variety that are already registered under the ECOWAS regional variety release system</td>
<td>• Increased availability of quality seeds, including imported seeds</td>
<td></td>
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<tr>
<td>• The Seed Registration and Release Subcommittee to determine the required “limited multi-locational verification trial” for foreign varieties not registered under a regional release system</td>
<td>• Increased crop productivity and production</td>
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<tr>
<td>• The Federal Ministry of Agriculture (FMARD) and NASC to develop Standard Operating Procedures for seed inspectors to carry out the duties and obligations specified in the National Agricultural Seeds Council Act 2019</td>
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<thead>
<tr>
<th>Fertilizer Quality Control</th>
<th>Critical Actions to Operationalize Reforms</th>
<th>What Could be the Impacts of the Reforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The FMARD should develop updated procedures for evaluating applications for permits to import and distribute fertilizers with the aim to reduce the processing time from 3 months to 30 days</td>
<td>• Increased private sector importation and marketing of fertilizers</td>
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<tr>
<td>• Establish a web-based platform to display all regulations and rules and update the public on measures being undertaken to operationalize the reforms</td>
<td>• Fertilizer availability is improved, especially to smallholder farmers</td>
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<tr>
<td>• Provide a website and carry out communications campaigns (with fertilizer importers, distributors, retailers and farmer organizations) to create awareness on effective quality control of fertilizers, including prohibited activities, offenses and penalties in fertilizer handling and trade, repurposing of fertilizers to other uses, and obstruction of duly authorized officers from carrying out their enforcement and regulatory functions</td>
<td>• Improved quality of fertilizers in the market</td>
<td></td>
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<tr>
<td>• The FMARD to develop Standard Operating Procedures for fertilizer inspectors to carry out the duties and obligations specified in the National Fertilizer Quality (Control) Act 2019, including inspections</td>
<td>• Increased crop productivity and production</td>
<td></td>
</tr>
</tbody>
</table>
of premises handling fertilizers and taking of official samples for analysis.
- The FMARD to develop criteria of reasonable cause that would trigger Ministerial intervention to stop sale or disposal of fertilizers and cancel a permit or certificate of registration for fertilizer importers and distributors

| Warehouse Receipt System | Cultivate the consensus of key stakeholders on the parts of the Warehouse Receipts (and Other Related Matters) Bill 2019 to be fast-tracked to become law, while addressing the issues that thwarted past efforts, including competition with existing laws. | Increased private sector investments in warehousing and improved standards of collateral management and quality of facilities
- In the meantime, clarify to stakeholders the extent to which warehouse receipts can be used to provide limited services to enable farmers to access finance and create liquidity, even when the instrument may not be transferrable. | Increased farmers access to finance through warehouse receipts
- Provide for certification of warehouses based on existing rules and regulations, in a manner that is credible and based on the independent assessment of reliable evaluators of assets, usually by private sector agencies. | Increased farmers access to large buyers and reduced transaction costs
- Admission of warehouse receipts in the existing collateral registry so that the financial instrument could be registered in a designated, reliable, easy-to-register, and easy-to-search registry. | Improved price discovery, especially for farmers as they tend to have less market information
- Capacity building of farmers organizations to understand how to use the warehouse receipt instruments, their rights and obligations, grades and standards for commodities, proper post-harvest handling before warehousing, etc. | Reduced post-harvest loss and waste

| Agricultural Exports | Establish electronic phytosanitary system to streamline export procedures and issue phytosanitary certificates on site. | Increased exports of agricultural commodities
- Reduce the time and cost of obtaining the mandatory, agriculture-specific, per-shipment export documents | Improved service delivery and confidence of actors in export value chains
- Rationalize fees on exports levied by the Nigeria Export Levy (NXP) and the Nigeria Export Supervision Scheme (NESS) to avoid “double taxation” and remove bureaucratic hurdles for obtaining support from the Nigerian Export Promotion Council (NEPC) |
The framework for land administration is ambiguous, non-uniform across states, and without enough protections for the large number of agricultural households that derive livelihoods directly from land. The requirements for land transfers are not standardized and property rights are uncertain, thus contributing to thin land markets and weakened incentives for long-term investments by landholders. The legal framework for land administration consists of the Land Use Act (LUA) of 1978 and the Urban and Regional Planning Act, Decree No. 88 of 1992. The state governments control land administration within their state boundaries through the Executive Governors who have legal authority to make any decisions on land administration in their states. In addition to the Acts and the authority vested with the Executive Governors, there are legitimate customary and religious practices and norms that often have the force of law. The ambiguous framework for land administration has encouraged informal land transfers that don’t afford enough protections to the parties and don’t create stable expectations that would enhance investments on land. It is estimated that nearly 70 percent of land transactions are informal\(^6\) and only 3 percent of the land is formally registered\(^7\). Even private sector companies face enormous challenges when allocated land by state governments because in many cases the land is encumbered with competing claims. For example, out of about 140,406 hectares of land allocated to the private sector by Ogun State government, the investors have been able to occupy only 30 percent\(^8\) and the remaining 70 percent is contested by the communities such that investors have not been able to move in.

The adoption and implementation of the Framework for Responsible and Inclusive Land-Intensive Agricultural Investments (FRILIA) is critical to addressing challenges in land administration for agricultural (and non-agricultural) purposes. Currently, only Ogun and Kaduna states have embarked on the process of adopting FRILIA\(^9\) through the support of World Bank-financed projects\(^10\). The scaling-out of FRILIA to more states will afford enormous economies of scale and provide communities, investors, and other stakeholders with a modern framework to guide responsible land-based agricultural investments. In particular, the adoption of FRILIA would enable state governments to enhance the regulatory, institutional and operational systems and provisions for land administration to attract private sector investments while protecting existing land-based agricultural livelihoods, addressing competing claims on land without leaving any claimants worse off, and mitigating social and environmental impacts related to land acquisition, resettlement of claimants and new investments. The FRILIA comprises of a total of 33 principles organized into: (i) overarching principles; (ii) principles on recognizing and protecting land rights; (iii) principles on state land acquisition and resettlement; and (iv) principles related to environmental and social sustainability. The principles are derived from two internationally negotiated agreements on responsible land-based investments: (i) the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security; and (ii) the United Nations Committee on World Food Security’s Principles for


\(^7\) World Bank, 2018. Doing Business in Nigeria

\(^8\) Data provided by Ogun State government during consultations on the World Bank financed Ogun State Economic Transformation Project. The project is supporting (among other investments) the adoption of the Framework for Responsible Investments in Land-Intensive Agriculture Investments (FRILIA).

\(^9\) The state of Jigawa has adopted the Land Acquisition and Resettlement Framework (LARF).

\(^10\) Kaduna State Economic Transformation Program for Results and Ogun State Economic Transformation Project
Responsible Investment in Agriculture and Food Systems (CFS-RAI). A summary of the FRILIA principles is provided below.

<table>
<thead>
<tr>
<th>Overarching FRILA principles</th>
<th>Principles on recognizing and protecting land rights</th>
<th>Principles on state land acquisition and resettlement</th>
<th>Principles related to environmental and social sustainability</th>
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<tbody>
<tr>
<td>• Investments should be consistent with and contribute to policy objectives, including poverty eradication, food security, sustainable land use, employment creation, and support to local communities</td>
<td>• Investments should safeguard against dispossession of legitimate tenure rights holders</td>
<td>• Compensation standards are to be disclosed and applied consistently</td>
<td>• Safeguard against environmental damage, unless adequately mitigated</td>
</tr>
<tr>
<td>• Investments should occur transparently</td>
<td>• Existing legitimate rights, including customary and informal, and rights to common property resources, should be systematically and impartially identified</td>
<td>• Economic and social impacts caused by land acquisition or loss of access to natural resources shall be identified and addressed, including people who may lack full legal rights to assets or resources they use or occupy</td>
<td>• Investments preceded by independent assessments of potential positive and negative impacts on tenure rights, food security, livelihoods, and environment</td>
</tr>
<tr>
<td>• Land acquisition and related adverse impacts will as much as possible be minimized or avoided</td>
<td>• Provide for of protection of rights through grievance redress mechanisms that provide accessible and affordable procedures for third-party settlement of disputes, including but not limited to disputes arising from displacement or resettlement. These mechanisms should consider the availability of judicial recourse and community and traditional dispute resolution mechanisms</td>
<td>• Adequate compensation will be provided to purchase replacement assets of equivalent value and to meet any necessary transitional expenses before taking of land or restricting access</td>
<td>• Consider potential adverse impacts on physical cultural property and, as warranted, provide adequate measures to avoid, minimize, or mitigate such efforts</td>
</tr>
<tr>
<td>• A range of investment and production models should be considered, including alternatives to large-scale transfer of land</td>
<td>• Supplemental livelihood improvement or restoration measures will be provided if taking of land causes loss of income-generating opportunities</td>
<td>• Public infrastructure and community services that may be adversely affected will be replaced/restored.</td>
<td>• Promote community, individual and worker safety</td>
</tr>
<tr>
<td>• Investments should be subject to consultation and participation, including the disadvantaged and vulnerable, informed of their rights and assisted to negotiate</td>
<td>• Displaced persons with land-based livelihoods should be offered an option for replacement land unless equivalent land is not available.</td>
<td>• Principles specific to compensation, resettlement, and livelihood restoration</td>
<td>• Promote fair treatment, nondiscrimination and equal opportunity of workers and prevent all forms of forced and child labor</td>
</tr>
<tr>
<td>• Communities have opportunity and responsibility to decide whether to make land available, based on informed choices</td>
<td>• Principles specific to compensation, resettlement, and livelihood restoration</td>
<td>• Promote use of recognized good practice related to hazardous materials generated</td>
<td>• Promote fair treatment, nondiscrimination and equal opportunity of workers and prevent all forms of forced and child labor</td>
</tr>
<tr>
<td>• Investments should be monitored</td>
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Competitiveness and Investment Priorities in Priority Value Chains

Why compare Nigeria with Vietnam? With the aim to identify sources of competitiveness and policy priorities in selected value chains in Nigeria, the analysis benchmarks yields, costs, prices and other aspects of competitiveness with similar value chains in Vietnam. The choice of Vietnam as a comparator is because the Southeast Asian nation has within the past two decades emerged as a global leader in agribusiness and a top exporter in several commodities and products that are important in Nigeria’s agribusiness sector. In 2019, Vietnam generated export earnings of at least US$ 3 billion from each of the following commodities – cashew nuts, rice, cassava, fish, coffee, tea, black pepper, and rubber – resulting in total agricultural export revenue of US$ 40 billion (figure 8)\textsuperscript{12}. These eight value chains have experienced strong export growth, founded on productivity growth in on-farm and off-farm segments and improved coordination of investments across the value chains. Access to remunerative export markets has generated broad-based gains in the incomes of farmers and higher returns for agribusinesses, thus increasing foreign exchange earnings and public revenues.

The strong performance of the agribusiness sector in Vietnam has ushered a model of structural transformation that could serve Nigeria very well. The growth of agricultural value chains in Vietnam is driven by increased productivity in primary production and improved coordination with downstream value addition. Agricultural wage rates and farmer incomes increased rapidly between 2010 and 2018, contributing to about 75 percent of the poverty reduction in rural areas\textsuperscript{13}. The strong performance of agricultural value chains has spurred the rural economy as farm incomes have been invested in rural sectors and created job opportunities outside farming. Perhaps the most interesting feature of Vietnam’s model of structural transformation is that labor released from farming has been productively absorbed in the rural non-farm sector, which differs from the usual pattern where labor migrates to urban sectors leaving rural sectors without skills and demand for services and goods necessary to catalyze rural development. While about 80 percent of rural households in Vietnam continue to engage in agriculture, many of these households are increasingly involved in the rural non-farm sector, and the diversification of income sources have not only raised rural incomes but also increased their resilience to economic shocks.

The investment priorities for cashew nuts, rice, cassava, and poultry value chains are provided below.

<table>
<thead>
<tr>
<th>Value Chain</th>
<th>Recommended Policy Priorities</th>
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</table>
| Cashew nuts     | • Continuous replacement of old orchards with improved, higher-yielding and early maturing varieties. Nigeria lost its leading position in global cashew nuts production primarily because of not replacing old orchards.  
• A strategy for developing the cashew nuts sub-sector in Nigeria should consider providing incentives for importation of RCN from neighboring West African countries to be processed in Nigeria for export markets  
• Reduce the import tariff regime for RCN to create incentives for the domestic processing industry. Nigeria levies a flat 20 percent import duties for both RCN and processed kernels imports. In contrast, in Vietnam the import duty for RCN is 5 percent and for processed kernels it is 25 percent (MFN). |

\textsuperscript{12} World Bank. 2020. Vietnam: Improving agricultural interventions under the new National Target Programs

• Investors in cashew nut processing could aim to “move up the value chain” and develop niche, branded, and differentiated cashew nut products for direct selling to supermarkets in western countries, including organic and fair-trade labelled products.
• Nigeria will need to embark on strategic improvements in the institutional and enabling environment for the cashew nuts sub-sector. Part of this will require strengthening and improving coordination between the federal Cocoa Research Institute of Nigeria (CRIN) – responsible for research and development and State’s Tree Crops Development Units (TCDUs) – responsible for seed distribution to farmers.
• Develop a specific policy and strategy for cashew production and export promotion
• Establish electronic phytosanitary system to streamline export procedures and issue phytosanitary certificates on site, and reduce the time and cost of obtaining the mandatory, agriculture-specific, per-shipment export documents
• Rationalize fees on exports levied by the Nigeria Export Levy (NXP) and the Nigeria Export Supervision Scheme (NESS) to avoid “double taxation” and remove bureaucratic hurdles for obtaining support from the Nigerian Export Promotion Council (NEPC)

Rice
• Develop a strategy to increase competitiveness of domestic rice. The supply response from import ban has waned out and it’s becoming clear that the trade policy alone will not improve competitiveness in the domestic market.
• Invest in research and development to develop high-yielding varieties and improve quality attributes of local rice (taste, aroma, texture, etc.) under local growing conditions, coupled with broad-based dissemination to farmers.
• Coordinated investments between farmers and millers to expand the milling capacity while improving the varieties with desired attributes can increase competitiveness of domestic rice.
• Institutional transformation of old cooperatives into new generation cooperatives (NGCs) modelled as producer companies that can take a long-term investment approach to asset building and service provision in critical areas such as input supply, irrigation management, extension management and marketing.
• Improve the technology of post-harvest drying by farmers to increase rice quality and reduce post-harvest losses.

Cassava
• Nigeria should pursue a dual strategy for transformation of the cassava sector, focusing on (i) increasing the competitiveness of the industrial starch value chain and (ii) modernizing the food products value chains to improve quality of gari and high-quality cassava flour
• Transforming the industrial starch value chain would require coordinated investments between researchers, farmers, and the processing sector – so that farmers can access varieties that yield high starch content and produce for the specific needs of starch processors under vertical coordination schemes
• The research and development work will need to be complemented with effective system to transfer clean planting materials to the farmers, while removing old plants contaminated with Cassava Mosaic Disease (CMD) and treating soils, and effective extension to ensure farmers apply the correct agronomic practices and proper fertilization
• Modernizing the value chains for cassava food products should aim to deliver healthy gari and HQCF to meet increased demand for healthy diets and meet the needs of the milling and baking industries.
• Coordinated investments between the cassava flour milling sector and the upstream segments (farmers and researchers) can help to expand the market for high-quality differentiated gari products, including by supplying farmers with varieties that are low in starch and with better taste

Poultry
• The government may revisit the policy of banning chicken imports because it has slowed down growth of the poultry consumption market. Annual per-capita consumption of chicken meat in Nigeria considerably lags countries with comparable per-capita incomes.
• Vertical coordination between poultry production in the South and the feed segment in the North provides significant opportunities for regional collaboration and growth.

• Priority reforms for the poultry feed segment include: (i) specification and enforcement of standards to ensure the quality of feeds, including standards for maximum allowable levels of mycotoxins, heavy metals and microorganisms in feed ingredients and compound feeds; and (ii) regular inspection, sampling and testing of feeds by the Ministry of Agriculture and Rural Development and market inspection agencies.

• Collaboration between private investors and public veterinary health authorities would expand investments in breeding for high-yielding birds and production of vaccines and drugs.

• Access to energy is a major constraint faced by the poultry industry in Nigeria. There are enormous investment opportunities in efficient poultry waste management to generate biogas energy and soil fertilizers.
1. Introduction. Agriculture in the (Elusive) Diversification Agenda

Nigeria has for a long time placed enormous emphasis on diversification of the economy to non-oil productive sectors. Agriculture has always been considered an important part of the non-oil sectors to drive diversification, most recently as outlined in the Economic Growth and Recovery Plan (ERGP) 2017-2020 and Economic Sustainability Plan 2020. The ERGP aimed to restore economic growth following the 2015-16 recession and lay the foundations for long-term structural change. It recognized the need to diversify the economy to non-oil productive sectors such as agriculture and agro-allied industries in order to create an economy that can generate inclusive growth and jobs. In particular, the ERGP identified the following “key execution priorities”: (i) stabilizing the macroeconomic environment; (ii) achieving agriculture and food security; (iii) ensuring energy efficiency (power and petroleum products); (iv) improving transportation infrastructure; and (v) driving industrialization focusing on Small and Medium Scale Enterprises. The Economic Sustainability Plan (ESP) was launched in July 2020 to mitigate the adverse impacts of the COVID-19 crisis and lay the ground for a robust recovery. The ESP lays out a package of policy measures and short-term programs over 12 to 18 months, including “A Mass Agricultural Programme” to bring between 20,000 and 100,000 hectares of new farmland under cultivation in every state of the federation “with the aim to create millions of job opportunities, directly or indirectly, over a 12-month period”. Similar programs are envisioned in roads, renewables, and housing.

Why has the diversification agenda remained elusive? The lack of progress could be blamed on weak implementation and misalignment of public spending. But this is often a reflection of more profound underlying issues. One perspective worth considering is that there is a real lack of clarity or consensus on which non-oil sectors are worth diversifying into, the specific segments to target and the expected outcomes on jobs, poverty reduction, etc.? For example, simply proclaiming that agriculture should be central to the diversification agenda without providing sound assessment of expected outcomes does not do anything to advise policy makers and budget holders. It also fails to provide development practitioners with the information, inspiration, and conviction to develop and execute reforms and programs that could help operationalize the diversification agenda.

This report offers to advance understanding of the potential of the agribusiness sector (primary agriculture plus off-farm agribusinesses) to contribute to economic diversification in Nigeria. The report comes at a time when the country is facing its worst recession in four decades. The evidence presented here can inform policy reforms and help set investment priorities to accelerate inclusive recovery, create jobs and reduce poverty. First, drawing on unique data on national accounts and supply-use tables, chapter 2 recalibrates national accounts to identify and estimate the size of various segments of the agribusiness sector – primary agriculture, input supply, agricultural processing, agricultural trading & transportation services, food services and hotels. The enriched data enables the assessment of the performance of these agribusiness segments – individually and collectively – in generating growth, jobs and labor productivity over the past decade (2009-2018). This period was marked by pre-recession volatility, recession, and post-recession recovery – which is similar in many ways to the current economic

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14 For example, long before the 2015-16 recession, the National Economic Empowerment and Development Strategy (2004) outlined a strategy for private sector development focusing on diversification to non-oil sources of growth, among other objectives

situation and the near-term challenges going forward. Performance in this period is quite instructive and provides useful evidence on the economic segments that can drive inclusive recovery from the 2020 recession. The main finding is that the agribusiness sector provides perhaps the best prospects to accelerate inclusive recovery and growth while generating more and better jobs.

Secondly, building on the evidence that the agribusiness sector is critical to accelerating inclusive recovery and jobs, the report proceeds to identify the specific agricultural value chain groups that have most potential to create jobs within the agribusiness sector and in the broader economy. The analysis is presented in Chapter 3. In addition to jobs, the agribusiness sector plays other important roles in development, including supporting the livelihoods to poor and vulnerable households and providing nutritious foods to support human capital development. The poverty headcount ratio is nearly three times higher in rural areas compared to urban areas, and a large majority of the rural poor derive their livelihoods from agriculture. A plausible approach to reduce poverty could consider catalyzing productivity in the activities that the poor are engaged in and in the areas where they live. The analysis in Chapter 3 will also identify the value chains with most potential to reduce poverty and to improve nutrition outcomes – by enabling diversification of diets among the poor and the overall population. A key finding in Chapter 3 is that the specific value chains with most potential to create jobs are not necessarily the most effective in reducing poverty or improving nutrition, clearly calling for selectivity of value chains depending on the policy objectives. Another important finding is that the growth burden to meet specific jobs targets is lower when both on-farm and off-farm segments of agribusiness grow in tandem and higher if either segment stagnates. Clearly, a whole-of-agribusiness approach is needed to accelerate inclusive recovery and jobs creation.

Thirdly, this work offers to highlight the complex set of factors that mediate the performance of agricultural value chains, distinguishing between issues that pertain to primary agriculture and those that primarily affect off-farm agribusiness. The analysis of agribusiness enabling environment takes center stage in Chapter 4, drawing from ongoing consultations on policy reforms with government and stakeholders around seed development and quality control, fertilizer quality control, warehouse receipt systems, and responsible land administration for agricultural investments. In addition, Chapter 4 focuses on competitive factors that operate within the broader macroeconomic environment, trade policies, and sectoral policies and institutions to ultimately determine the performance of the primary agriculture and off-farm agribusiness segments in terms of productivity, growth, jobs creation, competitiveness, etc. The analysis of competitive factors draws from recent household surveys and multi-country Enterprise surveys. A major conclusion of the chapter is that although the agribusiness enabling environment has improved significantly, there is still a significant reforms agenda that needs to be operationalized.

Fourth, the report builds on the foregoing evidence to dive deeper into assessing opportunities for increasing the competitiveness of value chains with most potential to create jobs and reduce poverty. The specific commodities are cashew nuts – representing traditional cash crops, rice, cassava, and poultry – representing livestock value chains. The approach taken in this part of the study is to benchmark performance of these commodities with Vietnam – a country that has within the past two decades emerged as a global leader in agribusiness and a top exporter in several commodities and products that are important in Nigeria’s agribusiness sector. Furthermore, the strong performance of the agribusiness sector in Vietnam has ushered a model of structural transformation that could serve Nigeria very well.

The remainder of this introductory chapter will discuss the main reasons why diversification has pre-occupied economic policy making, including the history of non-inclusive growth without jobs and its limited impact on the twin goals of poverty reduction and shared prosperity. The centrality of agriculture
in the diversification agenda is founded on its inclusiveness and resilience, which is discussed briefly as a prelude to a more compelling analysis in the rest of the report. This introductory chapter ends by assessing progress on the agriculture targets in the most recent diversification policy – the ERGP 2017-2020.

Why Diversification Pre-Occupies Economic Policy Making?

Growth has been non-inclusive and without enough jobs. Nigeria’s growth patterns in the last two decades illustrate a weak association between growth and jobs. The last two decades could be grouped into the following four periods: (i) consistent growth (2000-2010); (ii) pre-recession volatility (2010-2014); (iii) recession and recovery (2015-2019); and (iv) COVID-pandemic (2020). During the growth period, the economy registered a decade of consistent growth by more than 6 percent annually. However, the unemployment rate hardly responded and instead remained nearly flat at about 4 percent throughout that period (figure 1.1). Next was the pre-recession period (2010-2014) – marked by annual growth declining for the first time in nearly a decade by more than 4 percentage points: from 8 percent in 2010 to 3.7 percent in 2012. Although growth recovered by about 3 percentage points by 2014, the recovery was short lived and lasted for only about two years before the economy went on recession. The volatile and declining growth trends in the pre-recession period is associated with an upward trend in the unemployment rate, starting around 2013. That the unemployment rate was relatively flat during the strong growth period but rising during the volatile and declining growth period demonstrates an asymmetrical response of unemployment to growth. The patterns suggest that with the current structure of the economy, sustained growth may not reduce the unemployment rate, but declining growth leads to rising unemployment. The economy worsened after 2014 leading to the recession of 2015-16. The unemployment rate continued to increase with negative growth, reaching about 8 percent in 2016 and remaining flat in the recovery period (2017 and 2018). The COVID-19 pandemic has plunged the economy to its worst recession in four decades16 and there will be many jobs lost in manufacturing and services.

Figure 1. 1. A decade of strong economic growth did not reduce the unemployment rate, but volatility and declining growth quickly led to rising unemployment

![Graph showing Crude oil price, average, GDP growth rate, and Unemployment rate from 2000 to 2019]

Source: World Development Indicators

Growth has been volatile in the last 5 years as the dependence on oil severely limits the ability of the economy to absorb shocks. A key feature of Nigeria’s economy is the dependence on oil, a commodity that has faced rapidly fluctuating prices in the last five years alone. Oil contributes about 90 percent of export earnings, 30 percent of banking sector credit and more than 50 percent of the revenue of federal and state governments in 2011-2015, although its share in GDP is about 10 percent. High oil prices lead to strong economy growth, and vice versa. The COVID-19 pandemic reduced global demand for oil leading to a rapid fall in prices. Government revenues are projected to drop by US$12 billion (3 percent of GDP) or more due to the falling oil prices and the contraction of economic activities will further reduce internally generated revenues. The loss of revenues severely constraints the ability of the government to respond with fiscal measures to protect economic activities and accelerate recovery. The dependence on oil can be traced back to the 1960s when exports of crude oil and gas increased sharply to provide a stream of enormous revenues to the government. The oil boom diverted attention away from non-oil sectors such as agriculture and manufacturing – and these sectors have become less competitive over time. For example, in 2019 agriculture contributed merely 2 percent to exports and manufacturing contributed less than 7 percent, a clear lack of competitiveness in the global market.

Figure 1.2. The poverty headcount rate in 2019 was more than 61 percent in many Northern States

Growth without inclusion and jobs has not only had limited impact on poverty reduction and inequality, but also created conditions for social unrest. Global experience shows that economies that record significant growth with limited job creation – as it often happens in resource-rich countries – tend to have limited poverty reduction and increasing inequality, primarily because the benefits of growth are narrowly shared and hardly benefit the poor. Poverty is a major problem in Nigeria and previous years of robust economic growth have had little impact on poverty (figure 1.2). The national poverty headcount

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ratio was 40 percent in 2019 based on national poverty line\textsuperscript{18}. This is relatively high by middle-income country standards, yet it masks even higher rates of poverty in rural areas and northern parts of the country. For example, the poverty headcount ratio in rural areas is 52 percent compared to 18 percent in urban areas. Poverty is relatively more persistent in the North, with the poverty headcount ratio more than 61 percent in majority of the northern states compared to less than 20 percent in most of the southern states. Going forward, the national poverty rate is expected to increase from 40 percent in 2019 to 42.5 percent in 2020 as the economy contracts due to the COVID-19 pandemic. Experience around the world shows that persistent poverty and joblessness, especially among the youth, can lead to social unrest and civil strife. The last quarter of 2020 witnessed social disturbances that betray a sense of hopelessness and despair among youth that lack opportunities to pursue their aspirations.

Why Agriculture Features Strongly in the Diversification Agenda?

Agriculture is the most resilient sector, and this helps to protect the livelihoods of millions during tough economic times. However, the resilience of the sector is partly due to weak linkages with the rest of the economy. Agriculture was the only sector without negative growth during the recession in 2015-2016 and was the most stable sector in the turbulent years preceding the recession (figure 1.3). The relative stability of agriculture compared to other sectors (manufacturing, services, and industry) helps to protect the more than 70 percent of the population that are either directly employed in the sector or depend on the sector for livelihoods. The experience from previous economic downturns shows that a lot of jobs are lost in the more volatile sectors – manufacturing, industry, and services – during hard economic times. Many people losing their jobs in these sectors retreat to productive employment in agriculture – making the sector a productive safety net for vulnerable workers across the country. Agriculture is the most pro-poor sector and has unrealized potential to deliver broad-based, inclusive economic growth and poverty reduction. A competitive agriculture sector can contribute to foreign exchange savings and earnings through import substitution and exports. Non-oil exports are dominated by agricultural products, representing up to 70 percent of the value of non-oil exports\textsuperscript{19}. In addition, agriculture contributes significantly to national food security by accounting for a large proportion of total food consumption requirements, and to livelihood resilience in conflict and post-conflict environments.

The resiliency of the sector was harshly tested by the COVID-19 pandemic. Social distancing and restrictions on movement led to contraction in supply of labor for agriculture production. The effects were more pronounced in labor-intensive farming systems that depend on migrant and hired labor, and smallholder farms that rely on “labor-go-round” arrangements where villagers descend on one farm at a time to carry out land preparation and planting activities. Restrictions on interstate movement disrupted supply networks for seeds, fertilizers, agrochemicals, and technical advice. These inputs became less available and more costly, reducing farmer’s demand for the inputs and leading to reduced area under cultivation. The functioning of food supply chains was disrupted as movement restrictions left farmers without buyers, while on the other hand consumers experienced food shortages in the markets. Farm-level food loss and waste increased as farmers could not find markets, especially for perishable commodities such as fruits and vegetables, tomatoes, dairy and meat products, and fish. A household survey conducted in May-April 2020 showed that 80 percent of both

\textsuperscript{19} WBG staff calculation based on online data from the Nigeria’s National Bureau of Statistics (NBS)
rural and urban households faced an increase in price of major food items consumed, 55 percent of the respondents in rural areas faced increase in the price of farming/business inputs and nearly 30 percent of rural households were faced with a fall in price of the farming/business output\(^{20}\). A follow-on survey conducted in the middle of the planting season shows that about 38 percent of households that engaged in agriculture made significant changes due to the pandemic. Of these affected households, about 52 percent reduced area planted, 30 percent cultivated crops that take less time to mature, and 25 percent did not plant on time\(^{21}\). It is estimated that primary agriculture grew by 1.7 percent in the first 3 quarters of 2020 compared to 2.4 percent during the same period in 2019.

**Figure 1. 3. Agriculture is the most resilient sector, protecting livelihoods and jobs during tough economic times**

![Sectoral growth patterns](chart.png)

Source: World Development Indicators, World Bank

**Performance on ERGP Agriculture Targets**

**Performance on the ERGP agriculture targets has been weak.** The ERGP set specific targets for the agriculture and food security priority to “deliver on agriculture transformation”. However, most of the targets were not achieved. The targets relate to growth in agriculture GDP and transitioning from importer to exporter in selected commodities and food self-sufficiency. The specific targets for agriculture GDP growth were 5.03 percent in 2017, 7.04 percent in 2018, 7.23 percent in 2019, and 8.37 percent in 2020. This would mean increasing agricultural GDP from Naira 16.0 trillion in 2015 to Naira 21.0 trillion in 2020 at an average annual growth rate of 6.92 percent. However, most of the ERGP targets have been missed to date. Agricultural GDP growth in 2017 to 2019 missed the targets by wide margins (figure 1.4). Furthermore, agricultural GDP growth in 2020 is expected to contract due to the COVID-19 pandemic, missing the higher 2020 target by an even wider margin. In addition to growth, the ERGP aimed for: (i) self-sufficiency in rice (2018), tomato paste (2017), and wheat (2019/2020); and (ii) improved terms of trade that would turn the country into net exporter for fish, poultry meat, palm oil, groundnuts, cashew nuts, and other edible oil. The goal of becoming self-sufficient in rice was achieved in 2019 on the back of supply response to import restrictions, but it’s been missed for tomato paste and wheat. The goal to

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become net exporter for various commodities has been missed for tomatoes, vegetable oil, groundnuts, cassava, poultry, fish, and livestock.

Figure 1.4. The ERGP targets on agriculture growth were missed by wide margins in 2017-2019

Agricultural growth in the post-recession recovery period (2017-2018) was driven by a broad range of subsectors, including cereals, cash crops, and vegetables drove agricultural growth in the post-recession period. The fastest average annual production growth occurred in millet, a cereal food staple that is grown mainly in the northern parts of the country (figure 1.5). Growth was from a relatively low base as the crop had recorded negative growth in the years prior to the recession (2010-2014). A turn-around occurred during the recession and production soared to more than 20 percent average annual growth in the post-recession period (2017-2019). Other agricultural sub-sectors that performed well in the post-recession period include sesame seed, which has emerged as a major export crop in recent years, and soya beans. The latter is grown mostly in the middle-belt and is becoming an increasingly important source of animal feeds for the poultry and fish sectors in the southern states. Both sesame seeds and soya bean were performing well before the recession, but growth dipped during the recession and then recovered by more than 10 percent in 2017-2018. Tomato and wheat recorded significant growth of 8 percent and 5 percent respectively in the post-recession period, a remarkable expansion considering that these sub-sectors contracted by -8 percent and -17 percent respectively during the recession.

Expansion of area under cultivation was the dominant source of production growth, except for tomatoes and sesame where growth was driven by higher yields. The yields for tomatoes increased by 27.4 percent while area under cultivation contracted by about -14 percent. In sesame, there was a balanced increase between yields (6.96 percent) and expansion in area under cultivation (5.99 percent), indicating that both sources of growth are important in a commodity that is increasingly becoming significant for exports. In contrast, there was a major drop in yields for wheat (-11.1 percent) while area under cultivation rapidly expanded by 17.6 percent. Yields for the rest of the commodities did not appreciably change – cocoa beans (-1.58 percent), millet (1.41 percent), and soya bean (0.78 percent).
Rice contracted after the recession, which is notable because the sub-sector grew rapidly before and during the recession, driven by expansion of area under cultivation. Average annual production growth in the post-recession period contracted to about -5 percent after growing steadily by more than 12 percent between 2010 and 2016 (figure 1.6). The earlier growth was fueled by import restrictions that not only resulted to steep decline in official imports to near zero by 2019, but also increased domestic production. However, the production growth was driven by expansion in area under cultivation, which increased from 6.74 percent in 2010-2014 to 10.63 percent during the recession (2015-2016). Clearly, the expansion in area under cultivation could not be sustained and there was negative growth of -5.23 percent in cultivated area in 2017-2018. It’s important to note that rice yields have remained persistently low relative to major producers in the world. In addition to rice, several major food and industrial commodities posted growth before and during the recession, but then contracted after the
recession. These commodities include maize, sorghum, groundnuts, sugarcane, and yams. Production growth in chicken meat has been quite uneven, recording negative growth of about -6.1 percent in 2010-2014, followed by mild recovery during the recession and back to negative growth post the recession.
References


2. Agribusiness for Inclusive Recovery and Jobs

Basic knowledge on the relative size and structure of the agribusiness sector (primary agriculture and off-farm segments) in Nigeria remains sketchy. But this is not uncommon because few countries systematically track the size of agribusiness segment in their national accounts. And since policy dialogue on the missed opportunities in Nigeria’s agriculture often suggest the potential for Nigeria to become the Brazil of Africa, it is worth noting that Brazil actively tracks the dynamics of growth in its agribusiness segments and has used the information to develop growth strategies that have propelled the country to become a major player in the global food and non-food agricultural systems. The lack of basic knowledge about the relative size, structure, and dynamics of the agribusiness segments in Nigeria has created uncertainty about the potential of these segments to providing inclusive growth (recovery) and jobs – the key outcomes of the diversification agenda.

What is the potential of the agribusiness sector to accelerate inclusive recovery and create jobs in the economy? This is the overarching question addressed in this chapter. To facilitate the discussion the analysis begins with an assessment of the size and structure of the sector. By providing this basic yet unavailable information, the report enables a better assessment of the extent to which current policies, institutions, and investments have affected transformation. The analysis also compares the structure and size of the sector in Nigeria with middle-income structural peers, regional peers in Sub-Saharan Africa (SSA) and high-income aspirational comparator countries that have already achieved transformation. The findings lay a strong foundation to help identify the policy and investment priorities to “build back better” and re-tool the sector to accelerate recovery from the pandemic and serve the needs of an advanced modern economy. The data and methodology used for the analysis is described in Annex 1.

The main conclusions emerging from this analysis is that the growth, jobs, and labor productivity outcomes in the last decade (2009-2018) indicate that the agribusiness sector provides perhaps the best opportunities to accelerate inclusive recovery from the 2020 recession while generating more and better jobs. The last decade is instructive because it was marked by pre-recession volatility, recession, and post-recession recovery – similar to the current economic situation and the near-term challenges going forward. During this period, the off-farm agribusiness sector outperformed the overall economy in GDP growth, generating jobs and labor productivity growth. Similarly, primary agriculture outperformed the overall economy in terms of GDP growth and creation of better jobs as labor productivity growth in primary agriculture grew twice as fast as the economy wide average. Future opportunities for growth and jobs will increasingly be in the off-farm segments – in particular processing, hotels & food services, and input supply segments. However, these growth and jobs opportunities cannot materialize without better coordination of agriculture/agribusiness value chains to reduce fragmentation and establish stronger linkages between upstream primary production and downstream value-addition segments. In conclusion, the low level of transformation means that there are enormous opportunities to design policy reforms and investments to accelerate growth and create more and better jobs.

Dynamics of Agribusiness During Economic Transition

The Agribusiness sector includes all farms and firms involved in producing, harvesting, packing, processing, preserving, distributing, marketing, and disposing of food and non-food agricultural products. These activities could be classified into the following categories – Agriculture, Processing, Trade and Transport, Food Services, Hotels, and Inputs. The Agriculture segment of Agribusiness includes all of the classical Agriculture sector GDP – the primary production of all crops, livestock, forestry, and fishing. The
Processing segment includes the part of the Manufacturing sector GDP that involves processing, value addition and preservation of food and non-food agricultural products. Examples include food processing, beverages, tobacco, cotton yarn, and timber. The Trade and Transport segment includes the part of the Services sector GDP that entails transportation, storage, logistics and trading for agricultural commodities and products between farms, firms, and final consumers. The Food Services segment is also a part of the classical Services sector GDP – and this involves the preparation and sale of food outside the home (e.g. restaurants and street vendors). The Hotels segment includes the part of the hotels and accommodation GDP that is associated with sale of food. The Inputs segment includes all GDP generated during domestic production of the inputs used by farmers and processors, excluding the inputs produced by the above five segments.

**Figure 2.1.** Agribusiness includes primary agriculture and non-farm food and non-food agricultural businesses

The off-farm agribusiness segment provides opportunities for more and better jobs during economic transition. As countries transition from lower to higher income, the off-farm agribusiness segment grows much faster than primary agriculture and creates more and better jobs (figure 2.2). These patterns are driven mainly by growing per-capita incomes and urbanization. As per-capita incomes rise, consumers demand less of the traditional staples and more of the high value foods such as fruits and vegetables and animal proteins, creating demand and growth in post-harvest management services such as sorting, grading, cold storage, packaging etc. Food expenditures increase even as the share of food in total expenditure declines (Bennet’s Law). On the other hand, increased urbanization concentrates consumer demand in urban areas that are often far from the rural areas where most of food production occurs, creating demand for food transportation, trading, logistics and value preservation. Workers in urban areas increasingly demand processed foods that are ready to eat or easy to prepare because the
value of their time is higher at work than in cooking. The shift in consumer demand and increased urbanization leads to expansion of the agribusiness sector, including cold chains, aggregation and food storage, food processing and nutrition enrichment, logistics and transport, modern retailing, restaurants, and food services, etc. The overall business of providing safe and nutritious food grows rapidly, much faster than primary agriculture, and becomes an engine for transformation, jobs, income growth and poverty reduction. It is estimated that a successful transformation converges on-farm and off-farm agribusiness GDP at about $4000 per capital such that countries at this point on average earn $1 of agribusiness GDP off the farm for every $1 that is earned on the farm (figure 2.2).

*Figure 2.2. At about $4000 per capital on average countries earn $1 of agribusiness GDP off the farm for every $1 that is earned on the farm*

![Graph showing off-farm share of agribusiness GDP and EMP](image)

Source: RIAPA Model and SAM

**Successful transformation depends on productivity growth on the farm and stronger linkages between on-farm and off-farm agribusiness segments.** Agriculture productivity growth creates the conditions necessary for transformation, consistent with the development experience of all countries that started off with a large agricultural sector. Higher labor productivity in primary agriculture releases agricultural labor from the farm to off-farm agribusiness segments and the broader economy. It stimulates higher wages and creates demand for high value and more nutritious foods – as well as other goods and services. Productivity growth reduces cost of food, thus increasing real incomes of consumers. The income opportunities for producers increase as they are able to produce more with less resources and at a lower cost. Similarly, agribusinesses in the food processing industry experience lower costs of raw materials, allowing for greater margins and more investments in capital goods that can increase competitiveness in domestic and export markets. In addition to productivity growth, transformation is dependent on stronger linkages between upstream primary agriculture and the off-farm agribusiness segments. Agribusinesses increasingly move away from spot markets and establish backward linkages, for example contract farming where farmers produce to meet specific quantity and quality in exchange for better technology of production and services.

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22 Christiansen, Demery, Kuhl 2011; Johnston and Mellor 1961; Mellor 1995; Timmer 1988; Gollin, Parente, and Rogerson 2002; McMillan and Heady, 2014
Agribusiness is Critical for Inclusive Recovery and Jobs

Agribusiness is a large part of Nigeria’s economy, directly providing more than 50 percent of jobs and contributing more than 35 percent to the national GDP. Primary agriculture is larger than off-farm agribusiness, indicating enormous potential for transformation. Primary agriculture accounts for 21 percent of the national GDP while off-farm agribusiness contributes 14 percent (figure 2.3). The 1.5 ratio of primary agriculture to off-farm agribusiness GDP indicates that transformation is still at early stages. Therefore, there are enormous opportunities to design policies and investments to accelerate transformation and create more and better jobs. Currently, a large majority of the agribusiness jobs are in primary agriculture (about 21 million) while off-farm agribusiness generates about 8 million jobs. The largest off-farm agribusiness segment, both in terms of GDP and jobs is Trade and Transport, which accounts for 57 percent of the off-farm agribusiness GDP and 62 percent of jobs. The importance of this segment is partly driven by the North-South divide between major production areas and consumption markets – and the segment will likely continue to growing with increased commercialization and urbanization. The processing segment is a relatively small share of off-farm agribusiness, accounting for 31 percent of the off-farm agribusiness GDP and 20 percent of jobs. The input supply segment is about twice the size of the services segments (hotels and food services) in terms of share of off-farm agribusiness GDP. However, the services segments provide three times more jobs than the input supply segment.

Figure 2.3. Agribusiness is a large part of the national economy and there is enormous scope for transformation to create more and better jobs

Labor productivity in agribusiness processing and input supply segments is respectively 1.5 times and twice higher than an average job in the economy. There are significant differences in labor productivity (GDP per worker) within the off-farm agribusiness segments (figure 2.4). Labor productivity is highest in the input supply segment (more than twice the economy-wide average) which indicates that this segment has the highest potential to create better jobs. Agribusiness processing is another segment with enormous potential for better jobs as jobs in this segment are at least 1.5 times more productive than economy-wide average. The hotels and food services segments create more jobs per GDP than all off-farm agribusiness segments, however; labor productivity is lowest in this segment. The trade and transport segments have relatively lower labor productivity than input supply and processing segments; however, more jobs per GDP are created in trade and transport segments. For
example, figure 2.5 shows that agribusiness trade & transport accounts for about 40 percent of GDP and nearly 40 percent of jobs in the overall trade & transport segment – while agribusiness processing comprises nearly half of manufacturing GDP but accounts for about 36 percent of jobs in manufacturing.

**With the current low level of transformation, primary agriculture provides more jobs than off-farm agribusiness but going forward more and better jobs will be created in off-farm agribusiness segments.** Primary agriculture currently accounts for about 70 percent of all agribusiness jobs while off-farm segments contribute 30 percent. However, the off-farm generates better jobs as labor productivity off-farm is nearly 1.75 times higher than in primary agriculture, even though the calculations of labor productivity for primary agriculture tend to be underestimated when measured as GDP per worker. This is because workers in primary agriculture are engaged seasonally and not throughout the year. The GDP attributable to these workers is generated only during the cropping season and therefore the average annual labor productivity measure is biased downwards unless corrected for seasonality. Furthermore, primary agriculture also tends to be a residual employer that absorbs low-skilled rural individuals who cannot find jobs elsewhere.

**Figure 2.4. Better jobs can be created in agribusiness input supply and processing**

**Figure 2.5. More jobs can be created in agribusiness trade & transport and hotels & food services**

![Graph showing average GDP per worker by sector](image1)

![Graph showing agribusiness share by sector](image2)

Source: RIAPA Model and SAM

**The growth, jobs, and labor productivity outcomes in the past decade (2009-2018) suggest that the agribusiness sector provides perhaps the best opportunities to accelerate inclusive recovery and jobs creation.** The experience of the last decade (2009-2018) is quite instructive and provides useful lessons on what sectors can drive recovery now that the economy is in a recession. This period was marked by pre-recession volatility, recession, and post-recession recovery – similar to the current economic situation and the near-term challenges going forward. During this period, the off-farm agribusiness sector outperformed the overall economy in GDP growth, jobs creation and labor productivity growth. In particular, GDP in the off-farm agribusiness segments grew on average by 5.3 percent annually compared to 3.7 percent economy-wide, jobs in off-farm agribusiness grew on average
by 3.5 percent annually compared to 2.5 percent economy-wide and labor productivity (GDP per worker) in off-farm agribusiness grew on average by 1.8 percent annually compared to 1.2 percent economy-wide wide. Similarly, primary agriculture outperformed the overall economy in terms of GDP growth (4.3 percent versus 3.7 percent) and creation of better jobs as labor productivity grew by 2.8 percent compared to 1.2 percent economy wide average (figure 2.6). Within off-farm agribusiness, GDP growth and jobs creations was fastest in hotel & food services followed by trade & transport. The processing segment and primary agriculture led all agribusiness segments in the creation of better jobs. A major conclusion from these results is that the whole-of-agribusiness (on-farm and off-farm) provides the best prospects to accelerate recovery and create more and better jobs.

**Figure 2.6. Agribusiness segments grew faster and created more and better jobs than overall economy**

Many agribusinesses operate in the informal sector and lack the incentives to invest in appropriate technologies for food handling, leading to high food loss & waste and food-borne diseases that pose huge economic costs. The most recent survey shows that the number of micro-enterprises in Nigeria is more than 500 times the number of Small and Medium-sized enterprises (SMEs) combined\(^{23}\). The agribusiness microenterprises (and many of the small enterprises) tend to operate in the informal sector, serving low-income consumers that are not able to sufficiently reward food quality and safety. For this reason, agribusinesses in the informal food sector tend to not invest in appropriate technology of food handling and processing, and skilled workers, leading to significant food safety risks and food-borne diseases. The economic cost of food-borne diseases is enormous and disproportionately affects low-income consumers. It is estimated that foodborne diseases cost Nigeria more than US$ 6 billion in 2016, ranking behind China, India, and Indonesia in terms of economic losses originating from

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\(^{23}\) The classification of Micro, Small, and Medium-Sized Enterprises (MSMEs) in Nigeria is based on the number of persons employed and value of assets – excluding land and buildings. Enterprises that employ 10-49 persons and have assets valued at 5-50 million Naira are considered Small. Enterprises employing 50-199 persons and with assets valued at 50-500 million Naira are considered Medium. The upper end of this classification are Large firms with a workforce greater than 199 and assets more than 500 million Naira. And on the lower end are the Micro-enterprises – firms employing between 1-9 persons and assets valued at less than 5 million Naira. In 2013, the number of micro-enterprises was about 500 times higher than SMEs. The total number of micro-enterprises were about 37 million (of which more than 3 million were in agriculture) while Small and Medium enterprises were 68,168 are and 4,670 respectively.
foodborne diseases\textsuperscript{24} (figure 2.7). Food safety is an important public good that can be generated by supporting the large informal segment to invest in appropriate technology of food handling and processing, skilling workers, and integrating into formal value chains. Support to the informal sector would also promote gender goals as female entrepreneurs are twice as likely to be in micro-enterprises than in SMEs. In 2013, female entrepreneurs accounted for 43.32 percent in the ownership structure of micro-enterprises compared to 22.75 percent in SMEs.

Figure 2. 7. Nigeria ranked behind only China, India, and Indonesia in terms of economic losses originating from foodborne diseases in 2016

Comparing Agribusiness in Nigeria with Comparator Countries

The degree of transformation in Nigeria’s agribusiness sector is comparable to middle-income structural peers and regional peers in Sub-Saharan Africa. A comparison of the structure and performance of the agribusiness segment in Nigeria with other countries enables a better understanding of the opportunities available for growth of the agribusiness segment. Nigeria is a middle-income country with per-capita income of US$ 2,030 (2019). The degree of transformation could be compared to middle-income structural peers, high-income aspirational comparators and Sub-Saharan African (SSA) regional peers (figure 2.8). Middle-income peers are countries that resemble Nigeria in key elements of the economic structure and overall performance in recent years. The cohort includes lower-middle income countries with nominal income per capita of at least 50 percent that of Nigeria and upper-middle income countries with nominal income per capita less than double that of Nigeria. Middle-income structural peers include Pakistan, Indonesia, and Vietnam. The aspirational comparators are advanced countries and higher middle-income countries that have achieved rapid transformation in the last few decades. The aspirational comparators have successfully transformed such that their off-farm agribusiness GDP is larger than on-farm agribusiness GDP by a factor of more than 1. Countries that fit this description include South Africa, Brazil, Chile, and Thailand. Nigeria could also be compared to regional peers comprising of

countries in Sub-Saharan African (SSA) that have already achieved middle income status or those with high populations and growing fast. Ghana, Kenya, and Ethiopia can be considered regional peers for Nigeria.

**Figure 2.8. Off-farm share of agribusiness GDP and employment in Nigeria is comparable to middle-income structural peers and regional peers in SSA**

Growth opportunities in off-farm agribusiness will increasingly be in processing, input supply and food services segments. The analysis of the structure of agribusiness during economic transition shows that the processing, input supply and food services segments are larger in countries that are further along in the transformation process – the aspirational comparators (figure 2.9). Currently, trading and transportation is the largest off-farm agribusiness segment in Nigeria and this segment can continue to grow with increased urbanization and commercialization of agriculture. However, the largest gains as the sector transforms will increasingly be in the processing, input supply and food services segments. However, the overall growth in off-farm agribusiness will depend on establishing stronger intra-sectoral linkages with the on-farm segment (primary agriculture).

**Figure 2.9. Aspirational comparators have larger shares of processing, input supply and food services segments in agribusiness GDP than Nigeria**

Source: RIAPA Model and SAM
As the sector transforms, there will be more jobs opportunities in the off-farm agribusiness segments, especially processing, food services and input supply segments. Figure 2.10 illustrates the dynamics of sources of agribusiness jobs as countries transform their agribusiness sectors. At the lower end of the spectrum are low-income countries such as Ethiopia where Agriculture contributes about 34 percent to national GDP and directly employs about 66 percent of the labor force\(^\text{25}\). Primary agriculture is the single most important source of jobs in Ethiopia with off-farm agribusiness contributing about 11 percent of agribusiness jobs. The share of primary agriculture jobs in agribusiness declines steadily as countries move along the transformation path – to about 76 percent in lower-middle income countries, 61 percent in upper-middle income countries and 41 percent in high income countries. On the other hand, the shares of most off-farm segments grows steadily during transformation, with processing growing from 3 percent in low-income countries to 13 percent and 21 percent respectively in upper-middle income and high income countries, hotels & food services growing from 5 percent in low-income countries to 11 percent and 15 percent respectively in upper-middle income and high income countries, and input supply growing from 1 percent in low-income countries to 6 percent and 10 percent respectively in upper-middle income and high income countries.

Better coordination between primary agriculture and off-farm agribusinesses would help unlock the growth and growth and jobs opportunities in processing, food services and input supply segments. Key elements of a growth and transformation strategy for agribusiness could aim for:

- Raising productivity in the on-farm segment (primary agriculture) to reduce the costs in downstream off-farm segments
- Effective coordination of agricultural value chains, including moving away from fragmented spot markets to strong forms of vertical arrangements
- Expanding processing of higher-value farm products such as cash crops, livestock products, and livestock and fisheries feeds – through value chain development approaches that establish strong linkages with primary agriculture
- Diversifying farm production and moving away from roots crops that have low value added and processing potential and low nutritional value (the 59% of root crops that don’t include cassava and potatoes)
- Increasing domestic production of the inputs used in farming and processing, including seeds, agrochemicals, vaccines, and fertilizers.

\(^{25}\) World Development Indicators
This chapter has examined the potential of the agribusiness sector to accelerate inclusive recovery and create jobs in the economy. Agribusiness is a large part of Nigeria’s economy, directly providing more than 50 percent of jobs and contributing more than 35 percent to the national GDP. The sector is still at low levels of transformation as primary agriculture is about 1.5 times larger than off-farm agribusiness. The largest off-farm agribusiness segment both in terms of GDP and jobs is trade & transport, which accounts for 57 percent of the off-farm agribusiness GDP and 62 percent of jobs. The processing segment is a relatively small share of off-farm agribusiness, accounting for 31 percent of the off-farm agribusiness GDP and 20 percent of jobs. The input supply segment contributes 8 percent to off-farm agribusiness GDP and is about twice the size of the hotels & food services.

The main conclusion is that the growth, jobs, and labor productivity outcomes in the past decade (2009-2018) suggest that the agribusiness sector provides enormous scope to accelerate inclusive recovery from the current recession and generate more and better jobs. The experience of the last decade is quite instructive as this period was marked by pre-recession volatility, recession, and post-recession recovery – similar to the current economic situation and the near-term challenges going forward. During this period, the off-farm agribusiness sector outperformed the overall economy in GDP growth, generating jobs and labor productivity growth. In particular, GDP in the off-farm agribusiness segments grew on average by 5.3 percent annually compared to 3.7 percent economy-wide, jobs in off-farm agribusiness grew on average by 3.5 percent annually compared to 2.5 percent economy-wide and labor productivity (GDP per worker) in off-farm agribusiness grew on average by 1.8 percent.

Figure 2.10. As the sector transforms there will be more jobs opportunities in processing, hotels & food services, and input supply segments

<table>
<thead>
<tr>
<th>Shares of Jobs in Agribusiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Income: Ethiopia</td>
</tr>
<tr>
<td>Upper Middle Income: Brazil, South Africa, Thailand</td>
</tr>
<tr>
<td>Lower Middle Income: Ghana, Kenya, Nigeria, Pakistan, Vietnam</td>
</tr>
<tr>
<td>High Income: Chile, France, United States</td>
</tr>
</tbody>
</table>

Source: RIAPA Model and SAM

Conclusions

The experience of the last decade is quite instructive as this period was marked by pre-recession volatility, recession, and post-recession recovery – similar to the current economic situation and the near-term challenges going forward. During this period, the off-farm agribusiness sector outperformed the overall economy in GDP growth, generating jobs and labor productivity growth. In particular, GDP in the off-farm agribusiness segments grew on average by 5.3 percent annually compared to 3.7 percent economy-wide, jobs in off-farm agribusiness grew on average by 3.5 percent annually compared to 2.5 percent economy-wide and labor productivity (GDP per worker) in off-farm agribusiness grew on average by 1.8 percent.
annually compared to 1.2 percent economy-wide. Similarly, primary agriculture outperformed the overall economy in terms of GDP growth (4.3 percent versus 3.7 percent) and creation of better jobs as labor productivity grew by 2.8 percent compared to 1.2 percent economy wide average. Within off-farm agribusiness, GDP growth and jobs creations was fastest in hotel & food services followed by trade & transport. The processing segment and primary agriculture led all agribusiness segments in the creation of better jobs.

While labor productivity in off-farm agribusiness is comparable to economy-wide average, the agribusiness processing and input supply segments have significantly higher labor productivity which is respectively 1.5 times and twice higher than an average job in the economy. Labor productivity in primary agriculture is lower than economy-wide average and average for off-farm agribusiness, but higher than hotels and food services. However, calculations of labor productivity for primary agriculture tend to be underestimated when measured as GDP per worker. This is because workers in primary agriculture are engaged seasonally and not throughout the year. The GDP attributable to these workers is generated only during the cropping season and therefore the average annual labor productivity measure is biased downwards unless corrected for seasonality. Furthermore, primary agriculture also tends to be a residual employer that absorbs low-skilled rural individuals who cannot find jobs elsewhere.

Future opportunities for growth and jobs will increasingly be in the agribusiness off-farm segments, in particular processing, hotels & food services and input supply segments. However, these growth and jobs opportunities cannot materialize without better coordination of agriculture/agribusiness value chains to reduce fragmentation and establish stronger linkages between upstream primary production and downstream value-addition segments. Key elements of a growth and transformation strategy for agribusiness should with stronger intra-sectoral linkages would involve: (i) raising productivity in the on-farm segment (primary agriculture) to reduce the costs in downstream off-farm segments; (ii) effective coordination of agricultural value chains, including moving away from fragmented spot markets to strong forms of vertical arrangements; (iii) expanding processing of higher-value farm products such as cash crops, livestock products, and livestock and fisheries feeds – through value chain development approaches that establish strong linkages with primary agriculture; (iv) diversifying farm production and moving away from roots crops that have low value added and processing potential and low nutritional value; and (v) increasing domestic production of the inputs used in farming and processing, including seeds, agrochemicals, vaccines, and fertilizers.

The next chapter will advance the analysis presented here by looking at the potential of specific value chains groups to generate jobs, reduce poverty and improve nutrition outcomes. This is important because the agribusiness sector in Nigeria is comprised of a wide range of commodities and value chains and the potential of different value chain groups to achieve development outcomes could vary greatly. It’s critical from a policy and investment perspective to understand which value chain groups are most effective in achieving the critical development outcomes.
References


3. Selecting Value Chains to Create Jobs, Reduce Poverty, and Improve Nutrition

The preceding chapter concluded that the agribusiness sector provides enormous scope to accelerate inclusive recovery from the recession and generate more and better jobs. Policy makers in Nigeria are also concerned about the high rates of poverty, and the government has declared an ambition to lift 100 million people out of poverty by 2030. The prevalence of poverty – measured by the poverty headcount ratio – is more than twice higher in rural areas (52 percent) compared to urban areas (18 percent). Majority of the poor are directly employed in agriculture and depend on farming for their livelihoods. Therefore, efforts to reduce poverty are likely to more successful if they aim to catalyze broad-based growth where majority of the poor work (agriculture) and live (rural areas). The extent to which productivity growth in agriculture is poverty reducing is higher in countries that are at early stages of economic transformation (figure 3.1) and dissipates as countries grow richer. Nevertheless, the evidence is quite strong that productivity growth equal to 1 percent increase in GDP reduces more poverty when the source of that growth is in agriculture compared to industry and services.

How fast does the agribusiness sector need to grow to meet the sectoral jobs targets set in government policy? Which value chains provide most potential to create jobs, reduce poverty and improve nutrition outcomes to support human capital development? Seeking answers to these questions will help policy makers in developing priorities, setting reasonable targets and ultimately enable more efficient allocation of scarce development resources. At a more operational level, the analysis can help inform the technical design of programs and identify partnerships with the private sector.

The main conclusion from this chapter is that the value chains with most potential to create jobs are not necessarily the most effective in reducing poverty or improving nutrition, clearly calling for a deliberate selection of value chains depending on the policy objective. Another important finding is that the growth burden to meet specific jobs targets is lower when both on-farm and off-farm segments grow in tandem, and higher if either of the other segment stagnates. Clearly, a whole-of-agribusiness approach is needed to accelerate inclusive recovery and jobs creation.

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*Figure 3.1. Productivity growth equal to 1 percent of GDP in agriculture reduces poverty more than same size of productivity growth in other sectors in low income and lower-middle countries*

Source: Ivanic and Martin 2018:

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26 Ligon and Sadoulet 2018; Ivanic and Martin 2018
Size of Value Chain Groups

Table 3.1 below describes the composition of value chain groups to on-farm and off-farm agribusiness GDP and the share of specific commodities within each value chain group. Overall, root crops and horticulture account for the largest shares of agribusiness GDP with each contributing 28 percent. The main difference between these two value chain groups is that horticulture contributes a relatively higher share to off-farm agribusiness GDP (21 percent) than root crops (15 percent), clearly indicating that horticulture provides more opportunities in downstream value addition. The next largest value chain group is cereals, contributing 14 percent to overall agribusiness GDP with balanced shares between the on-farm and off-farm segments – 13 percent and 14 percent respectively. The traditional cash crops value chain group is the largest in terms of contributions to off-farm GDP with a share of about 24 percent, primarily because the commodities in this group are industrial crops that are hardly consumed on the farm and instead require a high degree of value addition outside the farm into food and non-food products. The livestock value chain group contribute about 10 percent to agribusiness GDP (including fishing) with most of the value generated in cattle meat, small ruminants, poultry meat, and raw milk – in that order. Pulses and oil seeds are a small sub-sector contributing about 4 percent to agribusiness GDP which equals the total contribution of fish and forestry (2 percent each).

Table 3.1. Root crops and horticulture generate more than half of agribusiness GDP

<table>
<thead>
<tr>
<th>Value chain group</th>
<th>Share in Agribusiness GDP (%)</th>
<th>Shares of commodities and products in Agribusiness GDP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>On-farm</td>
</tr>
<tr>
<td>Cereals</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Pulses and oilseeds</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Root crops</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Horticulture</td>
<td>28</td>
<td>33</td>
</tr>
<tr>
<td>Livestock</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Fish</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Traditional cash crops</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Forestry</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Unattributable</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: RIAPA Model and SAM.

27 Some GDP from certain highly-processed products (e.g., beverages & baby foods) cannot be traced back to a single agric. product chain without risking double-counting
28 Excludes cashew nuts and sugarcane
Methodology

The analysis to identify value chains with most potential to create jobs, reduce poverty and improve nutrition is conducted using the Rural Investment and Policy Analysis (RIAPA) Model. The RIAPA is a general equilibrium (CGE) model and its core database is a social accounting matrix (SAM) that captures all income and expenditure flows between all economic actors in the country, including producers, consumers, government, and the rest of the world (see Box 3.1). The model estimates how the speed and structure of growth in different sub-sectors affect consumption and income and their knock-on effects on various outcomes of interest such as jobs and poverty. These estimates reflect the differences in consumption patterns for different households and their factor endowments and demand for resources. For example, poor households tend to depend on incomes from low-skilled workers and therefore growth in sectors that have high intensity of low-skilled labor is likely to have a relatively larger impact on their incomes. On the same vein, poor households tend to spend a relatively higher share of their food budget on staples and therefore productivity growth in staple sector would lower prices, raise food consumption among the poor, and potentially transition some of them out of poverty. The outcome indicators in the RIAPA model include economic growth, employment, poverty, dietary diversity score, poverty-growth elasticity, dietary diversity growth elasticity, and economy/sectoral growth employment elasticity.

- **Economic growth** is measured by real GDP at factor cost either for all sectors (total GDP) or specific sectors, for example the agribusiness sector.
- **Employment** includes both paid and unpaid work such as home enterprises. Workers may have multiple jobs, but only their primary job is considered, and no adjustment is made for hours worked.
- **Poverty** is measured by the poverty headcount or poverty gap. The former is the share of the population with consumption below the poverty line, and the latter is the cumulative distance between poor people’s consumption levels and the poverty line (also described as depth of poverty).
- **Dietary diversity score** is calculated for household groups using food expenditure shares. Diversity is estimated using a generalized entropy measure across six food categories (cereals and roots; vegetables; fruits; meat, fish, and eggs; milk and dairy; and pulses and oilseeds). A more diverse diet is associated with better nutrition outcomes.
- **Poverty-growth elasticity (PGE)** is the percentage change in the poverty rate divided by the per capita GDP growth rate. **Semi-PGEs** use percentage point changes in the poverty rate.
- **Dietary-diversity-growth elasticity (DDGE)** is the percentage change in the dietary diversity score of poor households divided by the per capita GDP growth rate.
- **Growth employment elasticity** is the percentage change in employment divided by percentage change in GDP. The elasticity can be calculated for a specific segment of the economy, for example to capture the agribusiness GDP growth employment elasticity.
Box 3. 1. RIAPA model

RIAPA is a computable general equilibrium (CGE) model that simulates the functioning of a market economy, including markets for products and factors (i.e., land, labor, and capital). RIAPA measures how impacts are mediated through prices and resource reallocations, and ensures that resource and macroeconomic constraints are respected, such as when inputs or foreign exchange are limited. RIAPA provides a consistent “simulation laboratory” for quantitatively examining value-chain interactions and spillovers at national, sub-national and household levels.

RIAPA divides the economy into sectors and household groups that act as individual economic agents. Producers maximize profits and supply output to national markets, where it may be exported and/or combined with imports depending on relative prices, with foreign prices affected by exchange rate movements. Producers combine factors and intermediate inputs using sector-specific technologies. Maize farmers, for example, use a unique combination of land, labor, machinery, fertilizer, and purchased seeds. Workers are divided by education levels, and agricultural capital is separated into crop and livestock categories. Labor and capital are in fixed supply, but less-educated workers are treated as underemployed. Producers and households pay taxes to the government, who uses these and other revenues to finance public services and social transfers. Remaining revenues are added to private savings and foreign capital inflows to finance investment, i.e., investment is driven by levels of savings. RIAPA is dynamic, with past investment determining current capital availability.

RIAPA tracks changes in incomes and expenditures for different household groups, including changes in food and nonfood consumption patterns. Poverty impacts are measured using survey-based microsimulation analysis. Individual survey households map to the model’s household groups. Estimated consumption changes in the model are applied proportionally to survey households, and post-simulation consumption values are recalculated and compared to a poverty line to determine households’ poverty status.

Source: IFPRI

The assessment of the job creation and poverty reduction potential of alternative value chain groups begins with establishing a baseline scenario for 2018-2025 using recent trends. The “business-as-usual” scenario is summarized in Table 3.2. The initial values are for 2018 – the base year for analysis from which simulations are run. The population is expected to grow at 2.45 percent annually, which is higher than employment growth (2.42 percent) and expansion of crop area. The national GDP grows nearly the same rate as the population – 2.96 percent versus 2.45 percent respectively – meaning that GDP per-capita barely improves. Agricultural GDP continues to grow nearly as fast as Industry but slower than Services GDP. However, the agribusiness part of industry (agro-processing) grows faster than agriculture, industry and services. These growth patterns not only reflect outcomes in the base year (2018) but also are consistent with relative performance of the sectors in the past decade (2009-2018). Poverty is projected to decline marginally in the baseline scenario, with PGE of -0.13. Productivity growth is adjusted to replicate trends in sectoral GDP.

Table 3.2. Baseline scenario for 2018-2025 (percent annual change)

<table>
<thead>
<tr>
<th>Population</th>
<th>GDP growth rate</th>
<th>Employment</th>
<th>Consumption per capita</th>
<th>Poverty headcount rate</th>
<th>Poverty-growth elasticity (PGE)</th>
<th>Semi-PGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Agriculture</td>
<td>Industry</td>
<td>Agro-processing</td>
<td>Services</td>
<td>2.42</td>
</tr>
<tr>
<td>2.45</td>
<td>2.96</td>
<td>2.89</td>
<td>2.73</td>
<td>3.37</td>
<td>3.07</td>
<td></td>
</tr>
</tbody>
</table>

Source: RIAPA Model

The simulations to estimate the jobs and poverty reduction effects of value chains proceeds by accelerating total factor productivity growth beyond baseline growth rates, one value chain group at a
time, such that total agricultural GDP is one percent higher in 2025 than it is in the baseline scenario.\(^{29}\) The simulated expansion of agricultural production increases supply to downstream processing activities and generates demand for agricultural trade and transport services and inputs. Because agricultural subsectors differ in size, the same absolute increase in total agricultural value-added is achieved across value chains if smaller value-chains expand more rapidly than larger ones. The initial GDP shares of value chains are listed in table 3.1 above. The smallest value chains are fish followed by pulses and oilseeds. Productivity gains in these value chains will need to be relatively large to generate the one percent increase in agricultural GDP compared to what would be required from larger value chains such as cassava and rice. The burden for productivity growth placed on smaller value chains may be difficult to achieve in practice, however, simulating the same absolute increase in agricultural GDP enables a consistent approach to compare impacts across value chains.

**How much growth is needed in agribusiness to create 6 million jobs?**

Jobs creation remains a key priority of the government and features prominently in recent government policy documents. The most recent policy documents emphasizing jobs creation are the ERGP (2017-2020), Delivering on the Government’s Priorities 2019-2023, and the Economic Sustainability Plan (2020). In particular, the government set a specific target to create 6 million jobs in the agribusiness sector between 2019 and 2023 in the policy document “Delivering on the Government Priorities 2019-2023”. These many jobs would be created through medium-term interventions to catalyze agro-based business clusters for processing, value addition and technology support — and with accompanying investments to improve access to finance and markets, increase yields, remove barriers to exports and better utilization of arable land. Although the COVID-19 pandemic shifted the focus to short-term measures, the jobs agenda remained a priority as the economic downturn is expected to increase the unemployment rate by about 10 percentage points compared to 2018 levels (from 23.1 percent in 2018 to 33.6 percent by end of 2020)\(^{30}\). However, the Economic Sustainability Plan 2020 adopted a short-term agenda to create “millions of jobs” over a 12-month period through “A Mass Agricultural Programme”. Going forward, jobs are expected to remain a priority in the policy documents that are currently under preparation - Nigeria’s Medium-Term National Development Plans (MTNDP), 2021–2025, 2026–2030 and the Nigeria Agenda 2050.

Based on projections with economic data before the onset of COVID-19, the agribusiness sector was on track to create 6 million jobs in the middle of 2027. These results are based on a linear time trend of agribusiness GDP and employment outcomes using data observed before the pandemic – 2019 as the base year. The regressions are based on growth rates rather than levels and do not factor the COVID-19 dip because economic outcomes for 2020 have not been fully observed. Under observed trends, the agribusiness sector would create additional 6 million jobs by mid-2027 (figure 3.2), again without accounting for the effects of the pandemic. Clearly, there is interest to create the 6 million jobs earlier than 2027 as previous targets had aimed to create the same number of jobs by 2023 – a difference of 4 years that is equivalent to one-full term of a government. The on-farm sector would contribute most of the jobs – about 3.4 million and the balance of 2.2 million (about 37 percent) would be contributed by the

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\(^{29}\) The choice to target one percent increase in agricultural GDP is somewhat arbitrary, since results are largely unaffected by the magnitude of the target growth acceleration

\(^{30}\) Nigeria Economic Sustainability Plan 2020
off-farm segments, which is consistent with the current structure of the agribusiness sector where on-farm is dominant.

Figure 3.2. Projections from base year 2018 indicate that the agribusiness sector was on track to create 6 million jobs by mid-2027

The growth burden to create 6 million jobs is lower when both on-farm and off-farm segments grow in tandem, and higher growth rates would be required from either segment if the other part stagnates. In particular, the study finds that the agribusiness sector needs to grow by 5.4 percent annually to create 6 million jobs by 2024. The same jobs target can be met in future years with a lower growth rate – for example only 3.9 percent growth is required to meet the jobs targets in 2026. Furthermore, a higher growth would be required from either segment if the other part stagnates (figure 3.3). For example, when left alone to achieve the jobs target, the on-farm segment will have to grow by 8.4 percent annually through 2024 to create 6 million jobs. On the other hand, the off-farm segment will have to grow even faster – by 13 percent annually – to create the 6 million jobs by 2024. The same target of 6 million jobs can be achieved with lower growth rates if the target year for achieving the result is pushed further into the future. These estimates were calculated using the Growth employment elasticity, which estimates the percentage change in employment given one percentage change in agribusiness GDP. The calculated elasticity for the overall agribusiness sector is 0.57. Consistent with the findings in the previous chapter, the off-farm segments create jobs relatively faster for each one percentage change in its GDP than the on-farm segments and the respective elasticities are 0.75 and 0.49. However, the on-farm segment is larger and currently employs more people. The higher baseline translates to more jobs in absolute numbers in the on-farm segment. More importantly, these results reinforce the need for coordinated investments between on-farm and off-farm segments of agribusiness so that both segments grow in tandem.
Although the growth rates needed for agribusiness to create 6 million are quite ambitious for Nigeria at this juncture, there are several countries in Africa with agribusiness sectors that have grown even faster in recent years. The agribusiness sector in Nigeria was growing 3.4 percent in 2018 and will need to surpass these levels by about 2 percentage points to meet the 6 million jobs target by 2024. The COVID-19 pandemic has slowed growth considerably and it is estimated that primary agriculture grew by 1.7 percent in the first 3 quarters of 2020 compared to 2.4 percent during the same period in 2019. While the growth burden to meet the jobs targets has increased, the analysis of agribusiness growth rates in developing countries suggests that it’s possible for the sector to grow at rates higher than 5 percent. For example, the agribusiness sectors in Ethiopia, Mali, and Niger in SSA grew at 8, 9 and 10.2 percent respectively between 2013 and 2018 (figure 3.4).

Figure 3. 3. The whole of agribusiness needs to grow in tandem to create 6 million jobs faster

Figure 3. 4. The growth rate required for the agribusiness sector in Nigeria to create 6 million jobs has been achieved by many countries in SSA in recent years

Source: RIAPA Model
Value Chains with Most Potential for Jobs Creation

The traditional cash crops emerge as the value chains with highest potential to create jobs, whether the employment elasticity is evaluated economywide or within the agribusiness sector. The jobs attributed to traditional cash crops comes not only from the direct effects of productivity growth in that value chain but also the indirect effects through incentives created outside the value chain. This is true for other value chains as well. For example, increasing cassava productivity may allow farmers to reallocate resources to other crops, thereby diversifying production and creating more jobs in other agricultural enterprises. Similarly, increasing incomes of workers in a value chain also allows households to purchase products from other sectors or value-chains, thereby generating economy-wide spillovers. Table 3.3 reports growth employment elasticities in the economy as well as within agribusiness. The traditional cash crops value chain group ranks first on both accounts. A key characteristic of this value chain is that it has a relatively larger share of downstream processing and trade and transport activities, with nearly 80 percent of GDP generated off the farm, which leads to higher employment multipliers\(^ {31} \) (figure 3.5). Traditional cash crops employment elasticity of 0.11 implies that a one percent increase in agricultural GDP driven by productivity growth in traditional cash crops increases jobs in the national economy by 0.11 percent and in the agribusiness sector by 0.15 percent. Additional value chains with high potential to create jobs are cassava, rice, oilseeds, and pulses.

Table 3.3. Traditional cash crops, rice, cassava, edible oilseeds and pulses have potential to create most jobs

<table>
<thead>
<tr>
<th>Targeted sector within agriculture</th>
<th>Economywide (rank in parentheses)</th>
<th>Agribusiness (rank in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>0.02 (9)</td>
<td>0.01 (5)</td>
</tr>
<tr>
<td>Sorghum &amp; millet</td>
<td>-0.01 (13)</td>
<td>-0.03 (7)</td>
</tr>
<tr>
<td>Rice</td>
<td>0.08 (2)</td>
<td>-0.04 (8)</td>
</tr>
<tr>
<td>Pulses</td>
<td>0.04 (4)</td>
<td>0.08 (4)</td>
</tr>
<tr>
<td>Edible oilseeds</td>
<td>0.07 (3)</td>
<td>0.15 (3)</td>
</tr>
<tr>
<td>Cassava</td>
<td>0.03 (7)</td>
<td>0.15 (2)</td>
</tr>
<tr>
<td>Yams</td>
<td>-0.01 (12)</td>
<td>-0.06 (10)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-0.02 (15)</td>
<td>-0.33 (14)</td>
</tr>
<tr>
<td>Bananas</td>
<td>0.01 (10)</td>
<td>-0.06 (11)</td>
</tr>
<tr>
<td>Fruits</td>
<td>0.01 (11)</td>
<td>-0.02 (6)</td>
</tr>
<tr>
<td>Cash crops</td>
<td>0.11 (1)</td>
<td>0.15 (1)</td>
</tr>
<tr>
<td>Cattle &amp; dairy</td>
<td>0.03 (5)</td>
<td>-0.44 (15)</td>
</tr>
<tr>
<td>Poultry &amp; eggs</td>
<td>-0.01 (14)</td>
<td>-0.16 (12)</td>
</tr>
<tr>
<td>Goats &amp; sheep</td>
<td>0.02 (8)</td>
<td>-0.27 (13)</td>
</tr>
<tr>
<td>Fish &amp; aquaculture</td>
<td>0.03 (6)</td>
<td>-0.04 (9)</td>
</tr>
</tbody>
</table>

Source: RIAPA CGE Model and SAM.
Notes: GDP employment elasticity is the percentage increase in total or agriculture-food system employment given a one percent increase in agricultural GDP originating from the targeted value chain group.

\(^ {31} \) Benfica R and J Thurlow 2017: Identifying Priority Value Chains in Malawi
The results for rice and cassava highlight policy tradeoffs on the location of new jobs. Cassava is significantly stronger than rice in creating jobs within the agribusiness sectors – higher agribusiness growth employment elasticity relative to rice. On the other hand, rice creates relatively more jobs in the broader economy than cassava but actually contributes negatively to jobs within the agribusiness segment. The larger economywide linkages in rice are through the milling industry as well as hotels and food services segments. Unlike countries in East Asia where cassava is used for starch and other industrial products, cassava is not an industrial crop in Nigeria and its use is limited to staple food products. Cassava is hardly consumed in hotels and restaurants. Cassava processing is predominantly for producing *gari* and cassava flour in small-scale processing units. As with cassava, the root crops value chain group do not involve major processing activities and most of their downstream GDP comes from trading and transportation (figure 3.5). Nearly 80 percent of GDP in the root crop value chain group is generated on the farm. In summary, these findings demonstrate that the potential to create jobs differs across value chains and depends on the linkages between the primary production segment of the value chains with the downstream segments of agribusiness and the broader economy. The rice and cassava value chains are studied in more detail in chapters 6 and 7 respectively.

Edible oilseeds and pulses have strong potential for jobs – and within edible oilseeds, sesame is becoming a major exports commodity. Edible oilseeds and pulses are ranked third and fourth respectively when the potential is evaluated economywide and within agribusiness. Nearly half of the agribusiness GDP in these value chains is generated off the farm, with trade and transportation alone accounting for 36 percent of the agribusiness GDP. Within the edible oils group, sesame is emerging as an important commodity for growth and exports. Nigeria is the fifth largest producer of sesame in the world (and third in Africa) with about 550,000 metric tons in 2017, which is nearly 10 percent of the total global output. But in terms of yields Nigeria ranks first globally with more than 1 ton per hectare. The high yields have laid strong foundations for competitiveness in global exports markets. Sesame seed was the most exported agricultural commodity in Q1 2019, accounting for 40.4 per cent of agricultural exports with about 70 percent of exports going to the major consuming countries such as China, Japan, and Turkey.

Figure 3.5. The contribution of on-farm and off-farm segments to the value chain GDP differs across value chain groups

<table>
<thead>
<tr>
<th>Contribution of segments to value chain group GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
</tr>
<tr>
<td>Pulses &amp; oilseeds</td>
</tr>
<tr>
<td>Root crops</td>
</tr>
<tr>
<td>Horticulture</td>
</tr>
<tr>
<td>Livestock</td>
</tr>
<tr>
<td>Fish</td>
</tr>
<tr>
<td>Trad. cash crops</td>
</tr>
<tr>
<td>Sugarcane</td>
</tr>
<tr>
<td>Forestry</td>
</tr>
</tbody>
</table>

Source: RIAPA CGE Model and SAM.
**Value Chains with Most Potential for Poverty Reduction**

The value chain groups with highest potential to reduce the national poverty headcount rate are pulses, goats & sheep, poultry & eggs, fish & aquaculture, cattle & dairy, and traditional cash crops, in that order. These pro-poor value chain groups have semi-poverty growth elasticity (PGE) of more than -1, which means that a one percentage change in agricultural GDP arising from productivity growth in any of these value chains will reduce the national poverty headcount ratio by more than one percentage point (table 3.4). However, not all of these value chains are as effective in reducing poverty in rural areas. Specifically, productivity growth in fish & aquaculture and cattle & dairy reduce more national poverty than rural poverty, indicating that the benefits of their growth accrue more to the urban poor relative to rural poor. The linkages with urban poverty are primarily through off-farm post-production management of the products and lower consumer prices. These livestock products tend to have high income and price elasticity of demand. Productivity growth leads to fall in prices and increased demand, especially among the urban poor. The extent to which the rural poor benefit partly depends on the tradeoff of growth and prices. Clearly, the instantaneous effect of productivity growth is to increase the incomes of producers, but this effect could be dampened by falling farm-gate and consumer prices. In addition to the direct income and consumption effects, the increased production and demand create employment opportunities for the poor and low-skilled workers to move these commodities from the farm to the market.

*Source: FAOSTAT*
Table 3.4. The value chain groups with most potential to reduce poverty are pulses, goats & sheep, poultry & eggs, fish & aquaculture, cattle & dairy, and traditional cash crops

<table>
<thead>
<tr>
<th>Baseline or targeted sector within agriculture</th>
<th>National poverty headcount</th>
<th>Rural poverty headcount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>-0.09</td>
<td>-0.12</td>
</tr>
<tr>
<td>Maize</td>
<td>0.15 (14)</td>
<td>0.24 (14)</td>
</tr>
<tr>
<td>Sorghum &amp; millet</td>
<td>0.16 (15)</td>
<td>0.25 (15)</td>
</tr>
<tr>
<td>Rice</td>
<td>0.01 (13)</td>
<td>0.17 (13)</td>
</tr>
<tr>
<td>Pulses</td>
<td>-1.80 (1)</td>
<td>-2.62 (2)</td>
</tr>
<tr>
<td>Edible oilseeds</td>
<td>-0.06 (10)</td>
<td>0.00 (11)</td>
</tr>
<tr>
<td>Cassava</td>
<td>-0.04 (11)</td>
<td>-0.06 (10)</td>
</tr>
<tr>
<td>Yams</td>
<td>0.00 (12)</td>
<td>0.00 (11)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-0.19 (8)</td>
<td>-0.12 (8)</td>
</tr>
<tr>
<td>Bananas</td>
<td>-0.18 (9)</td>
<td>-0.09 (9)</td>
</tr>
<tr>
<td>Fruits</td>
<td>-0.35 (7)</td>
<td>-0.34 (7)</td>
</tr>
<tr>
<td>Cash crops</td>
<td>-0.94 (6)</td>
<td>-1.36 (4)</td>
</tr>
<tr>
<td>Cattle &amp; dairy</td>
<td>-1.03 (5)</td>
<td>-0.77 (6)</td>
</tr>
<tr>
<td>Poultry &amp; eggs</td>
<td>-1.64 (3)</td>
<td>-1.72 (3)</td>
</tr>
<tr>
<td>Goats &amp; sheep</td>
<td>-1.78 (2)</td>
<td>-2.65 (1)</td>
</tr>
<tr>
<td>Fish &amp; aquaculture</td>
<td>-1.52 (4)</td>
<td>-1.21 (5)</td>
</tr>
</tbody>
</table>

Source: RIAPA CGE Model and SAM.
Notes: Semi-PGE is the percentage point change in the poverty rate per one percent increase in GDP per capita driven by GDP growth originating from within the targeted value chain group.

Value Chains with Most Potential to Improve Nutrition

Poor people face challenges in accessing nutritious foods and therefore it’s important to examine which value chain groups have more potential to improve their nutrition outcomes. The assessment of potential of value chain groups to improve nutrition relies on estimates of the dietary diversity growth elasticity, which measures the percentage change in the dietary diversity score of poor households divided by the per capita GDP growth rate. The dietary diversity score is calculated for household groups using food expenditure shares. Diversity is estimated using a generalized entropy measure across six food categories – cereals & roots, vegetables, fruits, meat, fish & eggs, milk & dairy, and pulses and oilseeds. A more diverse diet is associated with better nutrition outcomes. Food groups that dominate production and consumption (main staples) perform poorly in the dietary diversity score, primarily because such foods are already occupying a large share of the consumption basket and productivity growth makes them more available and cheaper, which further reduces the diversity of diets and leads to poor nutrition outcomes. Sorghum & millet have the worst dietary diversity growth elasticity, followed by yams, cassava, maize, bananas, rice, and edible oils. Furthermore, the scores for maize, rice and sorghum & millet, maize are lower for rural households (relative to urban households) and worsen among poor rural households. Food groups with highest scores are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables – in that order. These findings lead to the conclusion that livestock food groups and fruits and vegetables are the most effective at improving nutrition outcomes among not only poor rural households but also other rural and urban households.
Table 3.5. Food groups with highest potential to improve nutrition outcomes are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables

<table>
<thead>
<tr>
<th>Targeted sub-sector within agriculture</th>
<th>Estimated DDGE (sectoral rank in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All households</td>
</tr>
<tr>
<td>Maize</td>
<td>-2.25 (12)</td>
</tr>
<tr>
<td>Sorghum &amp; millet</td>
<td>-2.58 (15)</td>
</tr>
<tr>
<td>Rice</td>
<td>-1.78 (10)</td>
</tr>
<tr>
<td>Pulses</td>
<td>0.20 (7)</td>
</tr>
<tr>
<td>Edible oilseeds</td>
<td>-0.70 (9)</td>
</tr>
<tr>
<td>Cassava</td>
<td>-2.38 (13)</td>
</tr>
<tr>
<td>Yams</td>
<td>-2.38 (14)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1.40 (6)</td>
</tr>
<tr>
<td>Bananas</td>
<td>-2.04 (11)</td>
</tr>
<tr>
<td>Fruits</td>
<td>5.15 (2)</td>
</tr>
<tr>
<td>Cash crops</td>
<td>0.19 (8)</td>
</tr>
<tr>
<td>Cattle &amp; dairy</td>
<td>6.88 (1)</td>
</tr>
<tr>
<td>Poultry &amp; eggs</td>
<td>4.90 (3)</td>
</tr>
<tr>
<td>Goats &amp; sheep</td>
<td>4.39 (4)</td>
</tr>
<tr>
<td>Fish &amp; aquaculture</td>
<td>4.07 (5)</td>
</tr>
</tbody>
</table>

Source: RIAPA CGE Model and SAM.

Notes: Dietary diversity score (DDS) measures the unevenness of the real value of consumption across major food groups (i.e., negative entropy distance from equality). DDGE is the percentage change in the DDS per one percent increase in GDP per capita driven by GDP growth originating within the targeted value chain group.

Conclusions

This chapter addressed two interrelated questions – first the amount of growth that is required for the agribusiness sector to meet the sectoral jobs targets set in government policy, and secondly the value chains with most potential to create jobs, reduce poverty and improve nutrition outcomes to support human capital development. The value chains are identified by estimating how the speed and structure of productivity growth in different sub-sectors affect consumption and income, and their knock-on effects on various outcomes of interest such as jobs, poverty, and dietary diversity. These estimates reflect the differences in consumption patterns for different households and their factor endowments and demand for resources. For example, poor households tend to depend on incomes from low-skilled workers and therefore growth in sectors that have high intensity of low-skilled labor is likely to have a relatively larger impact on their incomes. On the same vein, poor households tend to spend a relatively higher share of their food budget on staples and therefore productivity growth in staple sector would lower prices, raise food consumption among the poor, and potentially transition some of them out of poverty. The expansion of productivity growth increases supply to downstream processing activities and generates demand for agricultural trade and transport services and inputs.

**The whole agribusiness sector needs to growth by 5.4 percent annually to create 6 million jobs through 2024** – a jobs target set in the policy document “Delivering on the Government Priorities 2019-
2023”. The same jobs target can be met in future years with a lower growth rate – for example only 3.9 percent growth is required to meet the jobs targets in 2026. Furthermore, a higher growth would be required from either segment if the other part stagnates. For example, when left alone to achieve the jobs target, the on-farm segment will have to grow by 8.4 percent annually through 2024 to create 6 million jobs. On the other hand, the off-farm segment will have to grow even faster – by 13 percent annually – to create the 6 million jobs by 2024. These results reinforce the need for coordinated investments between on-farm and off-farm segments of agribusiness so that both segments grow in tandem. Clearly, a whole-of-agribusiness approach is needed to accelerate inclusive recovery and jobs creation. These results were generated using 2018 as base year and do not account for the deceleration of agribusiness growth due to the COVID-19 pandemic. Growth in agriculture alone fell from 2.4 percent in Q1-Q3 2019 to 1.7 percent during the same period in 2020.

The value chain groups with most potential to create jobs are traditional cash crops, rice, edible oilseeds, cassava, and pulses. The jobs attributed to these value chains not only from the direct effects of productivity growth in that value chain but also the indirect effects through incentives created outside the value chain. For example, increasing cassava productivity may allow farmers to reallocate resources to other crops, thereby diversifying production and creating more jobs in other agricultural enterprises. Similarly, increasing incomes of workers in a value chain also allows households to purchase products from other sectors or value-chains, thereby generating economy-wide spillovers. The rice and cassava value chains highlight policy tradeoffs on the location of new jobs. Cassava is significantly stronger than rice in creating jobs within the agribusiness sectors. On the other hand, rice creates relatively more jobs in the broader economy than cassava but actually contributes negatively to jobs within the agribusiness segment.

The value chain groups with most potential to reduce poverty are pulses, goats & sheep, poultry & eggs, fish & aquaculture, cattle & dairy, and traditional cash crops. Clearly, livestock enterprises dominate value chains that help to reduce poverty. However, not all of these value chains are as effective in reducing poverty in rural areas. Specifically, productivity growth in fish & aquaculture and cattle & dairy reduce more national poverty than rural poverty, indicating that the benefits of their growth accrue more to the urban poor relative to rural poor. The linkages with urban poverty are primarily through off-farm post-production management of the products and lower consumer prices. These livestock products tend to have high income and price elasticity of demand. With productivity growth, the prices for these products fall and demand for these commodities increase, especially among the urban poor. The extent to which the rural poor benefit partly depends on the tradeoff of growth and prices.

The value chains with most potential to improve nutrition are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables. Poor people face challenges in accessing nutritious foods and therefore it’s important to examine which value chain groups have more potential to improve their nutrition outcomes. The assessment of potential of value chain groups to improve relies on estimates of the dietary diversity growth elasticity, which measures the percentage change in the dietary diversity score of poor households divided by the per capita GDP growth rate. Food groups that dominate production and consumption (main staples) perform poorly in the dietary diversity score, primarily because such foods are already occupying a large share of the consumption basket and productivity growth makes them more available and cheaper, which further reduces the diversity of diets and leads to poor nutrition outcomes. Sorghum & millet have the worst dietary diversity growth elasticity, followed by yams, cassava, maize, bananas, rice, and edible oils. The value chains with highest scores are cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture, and vegetables. These findings
lead to the conclusion that livestock food groups and fruits and vegetables are the most effective at improving nutrition outcomes among not only poor rural households but also other rural and urban households.

The overarching conclusion from this chapter is that the value chains with most potential to create jobs are not necessarily the most effective in reducing poverty and improving nutrition, clearly calling for a deliberate selection of value chains depending on the policy objective. However, a number of value chains can address more than multiple objectives. Traditional cash crops and pulses concurrently address the jobs and poverty reduction goals. Similarly, the following livestock value chains help reduce poverty and improve nutritional outcomes – cattle & dairy, fruits, poultry & eggs, goats & sheep, fish & aquaculture.

Value chain investments should be co-located with connective and productivity-enhancing infrastructure, especially transport and energy. There are major gaps in roads and energy infrastructures across the country, especially in rural areas, and these gaps increase the cost of inputs such as seeds and fertilizers and lower farm-gate prices offered to farmers by downstream agribusinesses. It directly contributes to Nigeria being a costly producer for many agricultural commodities. Furthermore, the weak and transport and energy infrastructure contributes to the high levels of food waste and loss in the country. It is estimated that more than 50% of loss and waste in tomato value chains occurs during transport, handling, and storage\(^{32}\).
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Nigeria Food Smart Country Diagnostic, mimeo

World Bank, Nigeria Economic Update, June 2020
4. Major Challenges in Primary Agriculture and Off-farm Agribusiness

The preceding chapter identified agricultural value chains with most potential to create jobs, reduce poverty and improve nutrition outcomes. The extent to which the value chains could realize the potential is mediated through a complex set of foundational and competitiveness factors that ultimately determine productivity, competitiveness and other outcomes. Foundational factors relate to the macro-economic environment, trade policies, sector development policies and institutions. These policies determine the incentive structure for farmers and agribusinesses to invest and compete in the domestic and external markets. Furthermore, policies determine the approaches used by actors to organize investments and transactions. The various segments of agribusiness sector – inputs suppliers, farmers, processors, food services, etc. – rely on public institutions to deliver the necessary amounts of public goods and services to catalyze private investments. Competitiveness factors operate within the foundational factors to ultimately determine productivity and competitiveness. Competitive factors include access to improved technology of production, finance, skills of workers, markets, etc.

This chapter takes a deep-dive to assess both the factors constraining primary agriculture and off-farm agribusinesses from attaining their potential and the opportunities for mitigating the challenges. First, the analysis considers the problem of low productivity growth in primary agriculture, by taking advantage of recent country-level data from the United States Department of Agriculture’s Economic Research Service (USDA-ERS) to compare Total Factor Productivity (TFP) between Nigeria’s agriculture and comparator countries. A discussion of factors that contribute to low TFP helps to identify approaches that may help to increase broad-based productivity growth, including opportunities to operationalize key policy reforms on seed development, plant variety protection, fertilizer quality control – and investments in Research and Development and extension and advisory services. Next, the chapter explores major challenges faced by off-farm SME agribusinesses in the food sector. The analysis proceeds by comparing the performance of off-farm agribusiness segments in Nigeria with structural peers across the world and regional peers in SSA, building on earlier results in chapter 2 that showed that the structure of agribusiness sector in Nigeria is comparable to middle-income structural peers such as Pakistan and Vietnam and regional peers in Sub-Saharan African (SSA) such as Ghana, Kenya and Ethiopia. Data for the analysis comes primarily from responses to World Bank Enterprise surveys in most recent years. Agribusinesses identifiable in the data are firms in the “food sector”, including processing, marketing, and exporters. Agribusinesses in the non-food sector were lumped together with other sectors (e.g. transport, trading) and are not identifiable in the data. However, the report will use the terminology of agribusiness to discuss the findings even though the analysis captures only the food segment and excludes the non-food segment.

Fragmentation of Agricultural Value Chains

One of the foremost challenges constraining growth of agribusiness value chains in Nigeria is the fragmentation and lack of coordination between inputs supply, primary agriculture, and downstream off-farm agribusinesses. Survey data continue to confirm the limited usage of improved inputs by farmers, including improved seeds and fertilizers, and this primarily because these inputs are not readily available to farmers and the quality is often poor. That lack of coordination between inputs supply segment and primary production has persisted because of weak incentives for the private sector to invest in seed.

33 World Bank 2019. Nigeria Systematic Country Diagnostic: Transitioning to a Middle-Class Society
development and multiplication. However, the recent reforms on seeds and fertilizers\(^\text{34}\) policies have the potential to create an enabling framework for private sector investments in seed segments, support the recognition and protection of intellectual property rights in breeding, enforce seed quality standards and appropriate labeling, enable imports and commercialization of seeds certified outside the country, etc.

The downstream off-farm segments such as processors and exporters face significant difficulty in building and organizing supply chains, primarily because off-farm agribusinesses have to work with smallholder farmers. Working with smallholder farmers presents several challenges to agribusinesses. The main challenges, at least from the perspective of downstream agribusinesses include: (i) variable quality of production and low productivity due to weak access to improved technology of production and quality inputs; (ii) weak access to credit and risk-sharing services, especially by smallholder farmers, has led to investments in assets with poor returns; (iii) high ex-post transaction costs for contract enforcement; and (iv) ineffective farmer organizations that cannot effectively monitor disparate smallholders to adhere to their obligations under vertical coordination arrangements. Farmer organizations tend to be ineffective despite a long history of development projects organizing smallholder farmers into groups. This is mainly because such groups are formed primarily to pursue livelihoods objectives. It takes significant investments to transition them into growth-oriented farmer organizations, such as cooperatives or producer companies, that can form long-term relationships with growth-oriented agribusinesses and incentivize member farmers to invest in appropriate technology of production to produce the quality desired by remunerative markets.

**Major Challenges in Primary Agriculture**

**Primary agriculture is dominated by small-holder farmers that rely on rainfed production systems rather than irrigated agriculture.** Smallholders production systems dominate across all regions of the country, accounting for 88 percent of the farming population\(^\text{35}\). The national average area cultivated per household in 2018/19 was 1.12 hectares, with female headed households cultivating 0.45 hectares compared to 1.24 hectares cultivated by men. However, there are some differences across the regions. The area cultivated is lowest in the South-East and South-South regions where on average households cultivated 0.30 hectares and 0.43 hectares respectively. Farmers in the North East cultivated the highest acreage (2.03 hectares) followed by North Central (1.95 hectares). Cropping systems are primarily rain-fed and on average only about 2.2 percent of plots under irrigation\(^\text{36}\). Irrigation is lowest in the South West with 0.6 percent of plots under irrigation and highest in the North West with about 5.6 percent of plots under irrigation. The development of irrigation infrastructure coupled with extension services to improve water use efficiency will increase the production capacity of smallholder farmers.

**Total Factor Productivity in primary agriculture has not improved for decades. The principal interventions to improve Total Factor Productivity (TFP) are research to develop and disseminate improved technologies (crop varieties, livestock breeds, management practices, etc.) that are more productive and resilient to agroclimatic changes.** TFP captures differences in productivity that are not due to differences in use of inputs, but rather attributable to factors such as technological progress and efficiency in the conversion of inputs to outputs. A comparison of TFP in agriculture with clusters of countries in SSA indicates that TFP in Nigeria has hardly changed since 2005,

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\(^{34}\) National Agricultural Seeds Council Act 2019, National Fertilizer Quality (Control) Act 2019 and Plant Variety Protection Bill

\(^{35}\) FAO 2018

\(^{36}\) Given that climate change is estimated to reduce crop yields by 50 percent, access to water and irrigation will be an important determinant of the stability of yields and the adaptation to the effects of climate change.
while other countries are making progress (see figure 4.1). TFP is driven by technical change and technical efficiency change. Technical change is associated with release and application of new technology (farmers reaching new production frontier), while technical efficiency change is about how well existing technologies are utilized by farmers (progress towards an existing production frontier). The lack of progress on TFP is mainly explained by: (i) the significant underinvestment in agriculture research that is required to generate high-yielding and climate-resilient crop varieties and livestock breeds, and (ii) weak farmers extension and advisory services that is required to disseminate crop and livestock management practices to enable farmers to use existing technologies efficiently. Nigeria’s investment in agricultural research as a share of agricultural GDP fell from an already low of 0.39 percent in 2008 to 0.22 percent in 2017\textsuperscript{37}. In comparison, Ghana’s share is 0.99 percent and South Africa’s is 2.79 percent. In the face of changing climate and increasingly fragile natural resource base, targeted agricultural research & development and effective advisory & extension services are critical to deliver the triple wins of improved productivity, enhanced resilience and adaptation, and reduction of greenhouse gas emissions.

Table 4. 1. The average farmer is a smallholder that relies on rainfed agriculture with little irrigation

<table>
<thead>
<tr>
<th>Region</th>
<th># of Plots</th>
<th># of Cultivated Plots</th>
<th>Average plot Size (hectares)</th>
<th>% of Plots irrigated</th>
<th>Total land Holdings (hectares)</th>
<th>Total Cultivated Areas (hectares)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central</td>
<td>3.10</td>
<td>2.76</td>
<td>0.66</td>
<td>1.3</td>
<td>2.05</td>
<td>1.95</td>
</tr>
<tr>
<td>North East</td>
<td>2.81</td>
<td>2.08</td>
<td>0.83</td>
<td>1.1</td>
<td>2.31</td>
<td>2.03</td>
</tr>
<tr>
<td>North West</td>
<td>2.87</td>
<td>2.16</td>
<td>0.46</td>
<td>5.6</td>
<td>1.28</td>
<td>1.21</td>
</tr>
<tr>
<td>South East</td>
<td>3.04</td>
<td>2.08</td>
<td>0.17</td>
<td>1.1</td>
<td>0.52</td>
<td>0.30</td>
</tr>
<tr>
<td>South South</td>
<td>3.06</td>
<td>2.31</td>
<td>0.18</td>
<td>0.8</td>
<td>0.55</td>
<td>0.43</td>
</tr>
<tr>
<td>South West</td>
<td>1.96</td>
<td>1.41</td>
<td>0.63</td>
<td>0.6</td>
<td>1.24</td>
<td>0.99</td>
</tr>
<tr>
<td>NIGERIA</td>
<td>2.85</td>
<td>2.16</td>
<td>0.45</td>
<td>2.2</td>
<td>1.28</td>
<td>1.12</td>
</tr>
</tbody>
</table>

Source: Nigeria General Household Survey-Panel Wave 4 - 2018/2019

Figure 4. 1. Total Factor Productivity in Nigeria’s agriculture has barely improved in decades

Source: USDA-ERS 2018

\textsuperscript{37} Agricultural R&D Factsheet, ASTI, 2017
A regionally differentiated approach to raising TFP makes sense given that there are major differences in attained agricultural efficiency across the country. Nigeria is a country with vast differences in agricultural potential. Figure 4.2 shows the extent to which the potential has been exploited by the average farmer. In states/regions where agricultural efficiency is high or very high, agricultural TFP can be increased by shifting to a new production frontier through research to generate and disseminate new varieties, innovations and management practices that are more productive and resilient. On the other hand, in states/regions where efficiency is low and moderate, the priority is for farmers to move towards the existing production frontier. This calls for effective agricultural extension and education to ensure farmers are applying existing technologies, innovations, and management practices efficiently. A combination of measures to shift to a new production frontier and move towards existing frontier would be required in states/regions with medium efficiency. The regionally differentiated approach would need to be supported by measures to address the broader challenges faced by farmers, including insufficient availability of improved inputs and technologies to farmers, limited private investment in developing improved seeds and fertilizers, weak access to finance for agriculture, etc.  

Figure 4.2. A regionally differentiated approach to raise TFP makes sense given the different levels of attained efficiency

Only farmers in North Central appear to have balanced use of fertilizer and improved seeds. The imbalanced use of these inputs suggests technical inefficiency in most parts of the country and is perhaps due to limited availability of inputs and poor design of fertilizer subsidy programs. Significantly more farmers use inorganic fertilizers than improved seeds in the North West  

38 Nigeria Systematic Country Diagnostics (SCD) 2019
Efficiency in the use of inorganic fertilizers and improved seeds can be raised by incentivizing production and distribution of the inputs and adopting the principles of smart subsidies in public fertilizer supply programs. The key principles of smart subsidies are: (i) targeting farmers that need to learn about proper use of fertilizers or those who could use it profitably but are not able to do so due to working capital constraints; and (ii) delivering the subsidy through the private sector by adopting voucher systems that mandate the farmers to purchase a package of fertilizers and improved seeds together. Smart subsidies need to be accompanied with effective extension and service delivery to enable farmers learn about the nutrient deficiencies in their plots, nutrient requirements for different crops, crop water requirements and critical irrigation periods, etc. Access to extension is limited with less than 10 percent of farmers in Nigeria reported receiving advice on new seed, pest control, and fertilizers (Sheahan and Barrett, 2014).

Table 4.2 Imbalanced use of improved seeds and inorganic fertilizers suggest technical inefficiently among many farmers

<table>
<thead>
<tr>
<th>Region</th>
<th>% Used Inorganic Fertilizer</th>
<th>% Used Organic Fertilizer</th>
<th>% Used Pesticide</th>
<th>% Used Herbicides</th>
<th>% Used Improved Seed</th>
<th>% Used Animal Traction</th>
<th>% used HH Labour</th>
<th>% Used Hired Labour</th>
<th>% used Exchange Labour</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central</td>
<td>31.6</td>
<td>10.9</td>
<td>9.2</td>
<td>69.3</td>
<td>32</td>
<td>16.3</td>
<td>97.9</td>
<td>70.0</td>
<td>42.2</td>
</tr>
<tr>
<td>North East</td>
<td>45.2</td>
<td>23.3</td>
<td>24.3</td>
<td>57.1</td>
<td>72</td>
<td>41.5</td>
<td>99.3</td>
<td>70.4</td>
<td>47.1</td>
</tr>
<tr>
<td>North West</td>
<td>69.1</td>
<td>59.8</td>
<td>21.4</td>
<td>23.4</td>
<td>9.7</td>
<td>43.7</td>
<td>98.2</td>
<td>81.8</td>
<td>38.7</td>
</tr>
<tr>
<td>South East</td>
<td>29.5</td>
<td>14.7</td>
<td>4.7</td>
<td>12.4</td>
<td>9.7</td>
<td>0.0</td>
<td>99.0</td>
<td>78.8</td>
<td>21.3</td>
</tr>
<tr>
<td>South South</td>
<td>5.6</td>
<td>2.1</td>
<td>1.0</td>
<td>20.0</td>
<td>21.0</td>
<td>0.0</td>
<td>99.1</td>
<td>58.2</td>
<td>27.8</td>
</tr>
<tr>
<td>South West</td>
<td>1.8</td>
<td>0.4</td>
<td>23.9</td>
<td>29.7</td>
<td>8.3</td>
<td>0.0</td>
<td>98.5</td>
<td>76.6</td>
<td>20.1</td>
</tr>
<tr>
<td>NIGERIA</td>
<td>35.4</td>
<td>23.1</td>
<td>13.1</td>
<td>34.7</td>
<td>10.1</td>
<td>19.5</td>
<td>98.6</td>
<td>72.8</td>
<td>34.2</td>
</tr>
</tbody>
</table>

Source: Nigeria General Household Survey-Panel Wave 4 - 2018/2019

Smallholder farmers have weak access to credit, for various reasons. The commercial lending sector tends to consider smallholder agriculture too risky, primarily because lenders face challenges in distinguishing between good and bad borrowers. Furthermore, lenders incur significant costs in processing a large number of relatively small loans to smallholder farmers. Smallholders have weak land rights and face difficulties using land as collateral for commercial credit. They are less likely to have their lands formally registered compared to medium and large-scale farmers, primarily because most smallholders acquire land through inheritance and the land is often sub-divided among siblings without passage of full rights. In addition, smallholders tend to demand small and high-frequency loans that don’t
match the financial products available. Agribusiness SMEs also struggle to access credit and invest in productive assets, capacities, and technologies that increase competitiveness and growth.

The federal government has implemented various schemes to de-risk the sector, but there is still a lot of unfinished business. In particular, there is enormous scope for disruption in the financial sector through fintech and mobile money. The federal government has taken various measures to help reduce the risks to the financial sector when they lend to agricultural enterprises. A major government initiative was to establish the Nigeria Incentive-based Risk-sharing System for Agricultural Lending (NIRSAL)\(^3\) to facilitate lending to agriculture. Other approaches to increase access to financing include the Commercial Agriculture Credit Scheme (CACS) and the Anchor Borrowers Program. While these programs may have improved access to finance to farmers\(^4\), the sector has not been de-risked sufficiently from the perspective of the financial sector and access to credit is still a big concern among farmers and off-farm agribusinesses that work to establish supply chains. There is enormous scope for disruption in the financial sector through fintech, mobile money and innovations that deepen financial inclusion, generate information on creditworthiness of entrepreneurs, and return on investments in specific value chains. Recent advances in fintech and mobile money (e.g. MPESA in Kenya) have really enabled smallholders and informal enterprisers across sectors to access small and high-frequency loans with repayment terms that match their cashflow profiles. In addition, fintech and mobile money applications have proven effective in generating credit records for smallholders and this information can be harnessed by traditional banks to identify good risks among smallholder farmers.

Governments can support digital agriculture through various type of foundational public investments and policy and regulatory reforms. Technology firms are working around the clock to develop and introduce new digital technologies, platforms, and products in Africa. However, these innovations will benefit only those economies that embrace digitization, invest in the required infrastructure, and introduce commensurate regulatory technology. The main areas for public interventions include policies that lay the foundations for innovation and scaling out of digital technologies, expansion of supporting rural broadband and supporting infrastructure, and collecting and digitizing plot-level data on farmers lays strong foundations for delivery of services and innovations (figure 4.3). Nigeria is already among the leading adopter of digital technologies in agriculture (DATs), ranking third behind Kenya and South Africa in 2018 in terms of number of scalable disruptive agri-tech hubs\(^4\), and second behind South Africa in 2018 in terms of number of technology incubators and accelerators\(^4\).

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\(^3\) NIRSAL is a non-banking financial entity wholly-owned by the Central Bank of Nigeria (CBN). It was established in collaboration with the Federal Ministry of Agriculture and Rural Development (FMARD) and Nigerian Bankers’ Committee in 2013, to redefine, measure, re-price and share agribusiness related credit risk in Nigeria with the sum of US$500million. NIRSAL has a mandate is to augment the flow of affordable finance and investments into the agricultural sector by de-risking the agribusiness finance value chain, fixing agricultural value chains, building long-term capacity, and institutionalizing incentives for agricultural lending

\(^4\) The study could not obtain data on the performance of these programs

\(^4\) Kim et. al. 2020.

\(^4\) Bayen 2018
Digital technologies have great potential to catalyze productivity growth in primary agriculture and off-farm agribusiness. Digital tools for monitoring climate risks can help identify the onset of climatic shocks before they happen, thus facilitating responses for building resilience and supporting decision making at the farm level. They can also increase efficiency in the use of resources for agricultural production, for example by using automated irrigation systems, soil sensors and drones. Access to finance can be increased when service provision is organized using digital tools, including through platforms for credit, access to inputs and crowd funding capital—e.g. Farmcrowdy in Nigeria. Agricultural services can be delivered more effectively through digital tools. With regards to delivery of extension and advisory services, digital tools can be used to diagnose agronomic problems faced by farmers, relay extension advice in real time to address the challenges, enable high frequency soil testing using digital portable soil testers, and provide farmers with the necessary education and skills to adopt climate-smart management practices and innovations. Digitally enabled tractor-hiring services are improving access to mechanization, for example Hello Tractor. Agricultural value chains can be strengthened in a variety of ways through digital tools. For example, e-commerce platforms can integrate smaller farmers into value chains and enable the farmers to eliminate the transaction costs of locating demand and determining prices. Food utilization and food safety can be improved when digital tools are employed for traceability and monitoring of food hazards.

Agribusiness Enabling Environment

The business environment plays an important role in influencing private sector development in a country. An enabling business environment lays the ground for firms to innovate and invest, which in turn increases productivity, creates employment, and generates taxes and public revenues to support public investments.
such as infrastructure and security. On the other hand, a weak business environment creates obstacles to entrepreneurship and ingenuity of the private sector, leading to lack of innovation and productivity, weak private sector development and lack of competitiveness in national, regional, and global markets. Trade facilitation services are a key aspect of the enabling environment for accessing regional and global markets. The services include enforcement of global quality standards and improvements in customs procedures and facilities. Trade facilitation services can help reduce transaction costs and improve firm competitiveness, leading to increased access to external markets. The benefits of economic openness in generating high income and growth are well documented and there is increasing evidence that these outcomes tend to increase with better business enabling environment (BEE). In particular, regulatory quality, customs efficiency, quality of infrastructure, and access to finance are among the drivers of export performance.

Nigeria has made significant improvements in the overall business enabling environment and agriculture sector policies. It’s imperative that the recent policy reforms are fully operationalized to generate results and maintain the reforms momentum to address the remaining gaps. The overall climate for doing business is improving and Nigeria was ranked 131 out of 190 in the World Bank ease of doing business survey 2020, which is a major improvement from previous years but still behind the top performers in SSA – Rwanda and Kenya at 38 and 56 respectively. The most recent BEE reforms include the Companies and Allied Matters Act (CAMA) 2020. The Act provides for improved company registration procedures (including e-signatures for registration), improved insolvency processes, enhanced protection of minority investors, etc. In addition, the agribusiness enabling environment has improved significantly with the passage of the National Agricultural Seed Council Act 2019 and the National Fertilizer Quality Control Act 2019, and significant progress on the Plant Variety Protection Bill and the legal and regulatory framework for warehouse receipts. However, these Acts have not been fully operationalized and there is important unfinished business to translate the legal and policy frameworks into action plans for implementation. The specific issues in the enabling environment are discussed below, focusing on seed development and quality control, fertilizer quality control, and warehouse receipt system.

**Seed Development and Quality Control**

**Plant Breeding.** The development of new varieties is critical to ensure that farmers have a steady stream of new varieties that continue to raise yields while building resilience to effects of climate change, such as new diseases and pests, heat stress, etc. Plant breeding allows the development of new varieties to adapt to such challenges. Therefore, an effective legal and regulatory framework for plant breeding directly impacts agricultural productivity. A key aspect of the legal and regulatory environment is the extent to which it grants intellectual property rights over plant materials, which is vital to encourage private sector investments in the seed sector. The specific regulatory issues include granting and protecting breeder’s rights, the duration of the protections granted, non-discrimination between national and foreign breeders seeking protection, the availability of a list of protected varieties and the right to license protected varieties, etc. In addition, there is need for the private sector to access materials essential for innovative breeding, such as early generation seed (breeder seed) developed by the public

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46 Freund and Bolaky (2008) and Chang et al. (2009)
47 Seker (2011)
sector, germplasm stored in publicly managed gene banks, and genetic material imported for research purposes.

**Seed quality control.** The ultimate objective of the entire formal seed system is to assure that seeds coming to the market are of high quality, properly labelled and that low-quality seeds are not sold to farmers. For example, registered or certified seed is produced as per standards set by government regulations and through a process that allows traceability. On the other hand, quality declared seed does not meet the standards of registered or certified seed but is considered by relevant authorities to be of sufficiently high quality. Seed quality control systems include tests for specific quality parameters, recordkeeping to ensure traceability of breeding materials through labeling, and provisions for third-party accreditation or self-accreditation to allow the private sector to complement the government process.

**The legal and regulatory framework for seed development and quality control has improved tremendously with the passage of the National Agricultural Seeds Council Act 2019. However, there is unfinished business to operationalize the Act.** Among the major reforms embedded in the Act is that it empowers the Council to encourage the establishment of private seed companies for the purpose of carrying out research, production, processing, and marketing of seed. Plant breeders’ rights are recognized in the Act. And while there are no specific measures to protect the rights, the Act empowers the Council to approve and implement programs and measures to protect the rights. Private companies can now access early generation seed if their registration allows handling of the seed. The Act does not automatically allow varieties already registered in another country to be automatically approved for commercialization. However, the Act empowers the Minister of Agriculture and Rural Development to, on the advice of the Seed Registration and Release Subcommittee, waive the testing requirements if an imported variety is already registered under a regional variety release system. For foreign varieties not registered under a regional release system, the Subcommittee is empowered to determine the required “limited multi-locational verification trial” according to its rules and procedures. The new Act does not require varieties for exports or varieties to produce commodities for exports to be subject to variety release or registration requirements unless required by the importing country. However, the related legislation on phytosanitary and bio-safety controls legislation apply. Operationalization of the Act will help remove poor quality seeds from the market. The Act clarifies the functions of seed inspectors and provides them sufficient powers to take samples of any seeds of any variety from any person or entity marketing or purchasing seed, carry out seed testing, search premises handling seed, carry out field inspection necessary to monitor seed production and certification.

**Fertilizer Quality Control**

Fertilizer production is energy intensive, and the industry benefits from economies of scale as well as low costs of raw materials. It is no surprise, therefore, that the world’s production capacity is concentrated in a few countries. With just five countries producing half or more of the global supply of the most common types of fertilizer, simple and uncomplicated import procedures are essential to fertilizer access in the majority of countries around the world. In most countries, fertilizer cannot be imported, manufactured, distributed, sold, or used unless it has been registered with the designated authority in the country. Registration of fertilizer products ensures the safe entry of new products into the market as governments are able to provide market oversight through a registration scheme and test the fertilizer’s impact on soil, human health, and the environment. Moreover, product registration gives farmers confidence in the products that they are using. This is important because the damage caused by adulterated fertilizer is typically not apparent until months after application. It undermines trust in fertilizer quality and discourages farmers from using fertilizer. Quality control and inspection methods, as well as punishments
for breaking laws, vary significantly across the world. However, a minimum set of standards to increase fertilizer quality control can be applied in all countries and across regions and income groups.

**The National Fertilizer Quality (Control) Act 2019 sets the framework for effective quality control of fertilizers and its full operationalization is critical.** Under the old policy regime, the permit to import and distribute fertilizer was valid for only one year and the process to obtain it took 3 months. The brief validity and long of obtaining the permit were major disincentives for private sector participation in fertilizers importation and distribution. With the new Act, the number of days for processing the permits for fertilizer imports, trade and distribution is reduced from 3 months to 30 days. Furthermore, the duration of the permit has been increased from one year to 3 years – and the owner of a permit will not apply afresh after 3 years but instead pay a renewal fee. This provision creates stable expectations among the private sector and has potential to catalyze more investments in the fertilizers business. The Act also provides elaborate procedures and timelines for conflict resolution where a permit or certificate of registration is cancelled. In addition, the Act sets a framework for effective quality control of fertilizers. It provides a detailed account of prohibited activities, offenses and penalties in fertilizer handling and trade, including operating without registration, selling of fertilizers that contains destructive ingredients or properties that are harmful to plant group, repurposing of fertilizers to other uses, and obstruction of duly authorized officers from carrying out their enforcement and regulatory functions. The inspection and enforcement actions are specified in the new Law, including the power to enter and inspect, taking of official samples for analysis, and the power of the Minister to issue orders that stop sale or disposal of fertilizers whenever there is a reasonable cause. The labeling requirements are stipulated, including the maximum allowable quantity deviations between the label and the physical samples.

**Warehouse Receipt System**

Warehouse Receipt Systems (WRS) enable farmers and traders to access finance by liquidating part of the value of their non-perishable commodities while searching for better prices. The system is composed of the following parties: (a) depositors of commodities, mainly farmers, farmer organizations and traders; (b) warehousing facilities and collateral management services; (c) banks and financial institutions; (d) buyers of commodities and warehouse receipts, including traders, millers, exporters, etc. The basic system works as follows. First, the owner of commodity deposits the goods in a certified warehouse. The owner could be an individual farmer, an organization of farmers (e.g. cooperative) or a trader. The collateral management firm verifies quality on delivery at the warehouse and issues warehouse receipt to the depositor. The depositor takes the warehouse receipt to a participating bank and receives credit up to a certain value of the commodity deposited. The credit is normally below the full value, whichever way the full value is assessed. The transaction normally happens around harvest time when market prices are low. As market prices improve, the depositor looks for buyers, reaches agreement on purchase price, and informs the bank holding the warehouse receipt. The buyer pays the agreed purchase price to the bank in exchange for the warehouse receipt. The bank deducts the loan repayment amount, pays collateral manager and warehousing costs, and credits the balance to the depositor’s account. Finally, the buyer takes delivery of the commodity from the collateral manager.

**The completion of the legal and regulatory framework for WRS is imperative to enable operationalization of various warehouse receipts initiatives.** Various stakeholders have made enormous efforts in the past few years to develop WRS, including investments in warehouses and farmers training programs. On the legal and regulatory front, a warehouse receipt bill was duly passed by parliament and other organs of government and presented for presidential assent in 2019. However, the bill did not receive presidential assent, primarily because a major financial regulatory agency thought it
was consistent with broader laws defining negotiable instruments, passage of title for goods, use of assets as collateral, bankruptcy laws, contract laws, etc. The legal and regulatory vacuum means that any warehouse receipts issued are not negotiable instruments and cannot be used as collateral in the commercial banking sector.

Box 4. 1. Key Elements of an Effective Legal and Regulatory Framework for WRS

In summary, the key elements of an effective legal and regulatory framework for WRS provides for the following:

- Definition of the rights and obligations of all the parties
- Specific recognition of a warehouse receipt instrument as collateral that is different from general “goods in storage”
- Allow subsequent potential creditors of a warehouse receipt to determine whether there are any pre-existing claims or encumbrances on the warehouse receipts themselves, or assets that underlie the warehouse receipt
- In the case of a default by the debtor, the law must clarify that the party holding a warehouse receipt has first priority to recover the underlying assets or their proceeds
- Allow warehouse receipts to be transferred and to clearly define that the transfer of warehouse receipts is the equivalent of transferring the underlying assets
- Adequate insurance regulatory framework to cover the property in warehouses for damages
- Legally establish a body for certifying and supervising warehouses – either a government agency or allow for self-regulated by the industry
- Recognize the grading systems for verifying the quantity and quality of the commodities stored
- Dependable court system to settle commercial disputes. The courts should understand the WRS and its enabling legal and regulatory framework and apply the law appropriately in cases of default
- Institutionalized participatory processes for reviewing and updating the legal and regulatory framework to ensure parties are comfortable with the system.

In addition to the legal and regulatory frameworks, there are a variety of physical investments and institutions required to facilitate a functioning WRS. The required physical investments, institutions and services relate to warehousing infrastructure, collateral management, registration of warehouse receipts in the collateral registry, grading system for commodities in storage, banking and financial services, and capacity building services especially for farmers and their organizations.

Warehousing Infrastructure. Certification of warehouses is a critical part of the system because not all storage facilities can preserve the quality of commodities. The certification must be credible and independently executed by reliable evaluators of assets and systems without any interference. Certification is typically carried out by private agencies on behalf of the WRS regulator (government agency or self-regulation by industry). Furthermore, the capacity of the warehouses must be adequate and located close enough to the production zones, and adequately connected to transport and power infrastructure. In countries where the government owns warehouses that can be used for WRSSs, the normal practice is to offer concessions to the private sector to upgrade, use and maintain the facilities well before they are assessed by a certification agent. Concessions avoid conflicts of interest that can potentially erode trust in the system. The warehouses should be equipped with appropriate technology for verifying grades and quality when commodity is delivered, including properly calibrated weighting scales and facilities to test for moisture content in grains, size, and physical defects.

Collateral Management. The proper management of goods in storage requires implementation of Standard Operating Procedures for fumigation, packaging, labelling, and rotating commodities in storage.
Traceability is crucial for exportable commodities and therefore part of collateral management involves tracing the practices, methods and processes used in production. For example, food regulations in the EU and USA require that commodities are traced along the agricultural value chains and that data is available on specific health, safety, and agricultural practices. Part of collateral management will include installing electronic traceability system where bags are tagged with geo-referencing to area of production, aggregation points, washing and hulling stations, etc.

**Collateral Registry.** A Warehouse Receipt is a financial instrument that must be registered in a designated, reliable, easy-to-register, and easy-to-search registry that is designated by law. The registry should be searchable by all parties. Modern Warehouse Receipts are electronic and are backed by electronic collateral registry system, although paper-based instruments are still there.

**Grading System for Commodities.** Not all agricultural commodities can be accommodated in WRS. A core requirement is that a commodity is not perishable and can be stored for a substantial amount of time. Therefore, WRS tend to cater to grain commodities. However, there have been innovations for perishables that operate similar to WRS using cold storage facilities\(^{48}\). In addition to non-perishability, commodities that benefit from WRS tend to have the following characteristics: (i) high volumes of production and marketing; (ii) market is allowed to set prices, instead of government setting administrative prices; (iii) enough price movement to offset costs of storage and loans; and (iv) a formal and simple grading system that can be commonly understood by various parties, verifiable with simple technology, and founded on desirable attributes that are rewarded by the market. A formal grading system allows parties to engage based on the description of the commodity and without the need for physical inspection. WRS operate at national or regional levels and the grading systems used should be consistent with the reference market. However, in practical terms a WRS could begin with national standards and evolve towards regional standards as the market coverage expands.

**Banking and Financial services.** The main role of banking and financial services is to assure WRS parties that the warehouse receipts would be honored as valid negotiable instruments. As part of their due diligence, the banks might only be willing to trade the receipt if the goods in storage are insured, hence the need for an active insurance sector that can cover insurable risks for goods in storage to indemnify banks in case of losses.

**Capacity Building.** The main capacity building needs relate to enabling the farmers understand how to use the warehouse receipt instruments and their rights and obligations. The critical training needs often include grades and standards, proper post-harvest handling, technology of aggregation, and marketing. Where production is mostly small-scale, the farmers benefit more if organized into effective farmer organizations with capacity to aggregate commodities, ensure proper grading and engage with large buyers. Without functioning farmer organizations, the depositors will mainly be traders and the small-scale farmers would lose the opportunity to use WRS as a means for increasing access to finance.

**Responsible and Inclusive Land Administration**

Land administration across Nigeria operates under a framework that is ambiguous, non-uniform across states, and without enough protections for the large number of agricultural households that derive

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\(^{48}\) For example, in the India state of West Bengal farmers can receive warehouse receipts on potatoes stored under cold storage and use the receipts top obtain loans from the commercial banking sector. The receipts are guaranteed by the cold store owner operator that is also provides storage and collateral management services.
livelihoods directly from land. The requirements for land transfers are not standardized and property rights are uncertain, thus contributing to thin land markets and weakened incentives for long-term investments by landholders. The legal framework for land administration consists of the Land Use Act (LUA) of 1978 and the Urban and Regional Planning Act, Decree No. 88 of 1992. The state governments control land administration within their state boundaries through the Executive Governors who have legal authority to make any decisions on land administration in their states. In addition to the Acts and the authority vested with the Executive Governors, there are legitimate customary and religious practices and norms that often have the force of law. The ambiguous framework for land administration has encouraged informal land transfers that don’t afford enough protections to the parties and don’t create stable expectations that would enhance investments on land. It is estimated that nearly 70 percent of land transactions are informal and only 3 percent of the land is formally registered. Even private sector companies face enormous challenges when allocated land by state governments because in many cases the land is encumbered with competing claims. For example, out of about 140,406 hectares of land allocated to the private sector by Ogun State government, the investors have been able to occupy only 30 percent and the remaining 70 percent is contested by the communities such that investors have not been able to move in.

The adoption and implementation of the Framework for Responsible and Inclusive Land-Intensive Agricultural Investments (FRILIA) is critical to addressing challenges in land administration for agricultural (and non-agricultural) purposes. Currently, only Ogun and Kaduna states have embarked on the process of adopting FRILIA through the support of World Bank-financed projects. The scaling-out of FRILIA to more states will afford enormous economies of scale and provide communities, investors, and other stakeholders with a modern framework to guide responsible land-based agricultural investments. In particular, the adoption of FRILIA would enable state governments to enhance the regulatory, institutional and operational systems and provisions for land administration to attract private sector investments while protecting existing land-based agricultural livelihoods, addressing competing claims on land without leaving any claimants worse off, and mitigating social and environmental impacts related to land acquisition, resettlement of claimants and new investments. The FRILIA comprises of a total of 33 principles organized into: (i) overarching principles; (ii) principles on recognizing and protecting land rights; (iii) principles on state land acquisition and resettlement; and (iv) principles related to environmental and social sustainability. The principles are derived from two internationally negotiated agreements on responsible land-based investments: (i) the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security; and (ii) the United Nations Committee on World Food Security’s Principles for Responsible Investment in Agriculture and Food Systems (CFS-RAI).

The overarching FRILIA overarching principles are:

- Investments in (agricultural) lands should occur transparently
- Investments should be consistent with the objectives of social and economic growth and sustainable human development

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49 Butler 2012
50 World Bank, 2018
51 Data provided by Ogun State government during consultations on the World Bank financed Ogun State Economic Transformation Project.
52 The state of Jigawa has adopted the Land Acquisition and Resettlement Framework (LARF).
53 Kaduna State Economic Transformation Program for Results and Ogun State Economic Transformation Project
- Responsible investment should protect against dispossession of legitimate, including derivative, tenure rights holders
- Responsible investment should protect against environmental damage
- Investments should contribute to policy objectives, including, but not limited to poverty reduction, food security, sustainable land use, employment creation and socio-economic support to local communities
- Where possible, a range of production and investment models such as joint-ventures, outgrower schemes and other inclusive models that encourage partnerships with legitimate tenure holders should be considered as alternatives to the large-scale transfer of land
- Investment models should seek to ensure that affected communities have the opportunity and responsibility to: decide whether or not to make non-state land available for investments, based on informed choices, receive secure sustained and well-defined benefits, receive fair compensation for the land (including common areas) and natural resources (excluding subsurface resources) that they make available to investment, engage in partnerships with investors and Government, be able to hold investors accountable to their commitments; and respect and abide by their own commitments
- Investment should include consultation with affected people and communities, including those that are disadvantaged or vulnerable, and they should be informed of their rights and assisted by government and/or others to develop their capacity to engage in consultations and negotiations
- Large-scale investments should be preceded by independent assessments of potential positive and negative impacts on tenure rights, food security, livelihoods, and the environment
- All existing legitimate rights, including customary and informal rights, and rights to common property resources, should be systematically and impartially identified
- Investments should be monitored, and grievance redress mechanisms provided for aggrieved parties.

The specific FRILIA principles on land acquisition and resettlement are:

- Land acquisition and related adverse impacts should as much as possible be minimized or avoided
- Economic and social impacts caused by land acquisition or loss of access to natural resources (excluding subsurface resources) shall be identified and addressed, including those affecting people who may lack legal rights to assets or resources they use or occupy
- Compensation will be provided sufficient to purchase replacement assets of equivalent value and to meet any necessary transitional expenses, paid prior to taking of land or restricting access
- Supplemental livelihood improvement or restoration measures will be provided if taking of land causes loss of income-generating opportunity (e.g. loss of crop production or employment)
- Public infrastructure and community services that may be adversely affected will be replaced or restored
- Where livelihoods of displaced persons are land-based, or where land is collectively owned, displaced persons should be offered an option for replacement land, unless equivalent land is not available
- Economically displaced people with legal rights or claims should receive replacement property (e.g. agricultural or commercial sites) of equal or greater value, or, where appropriate, cash compensation, at replacement cost
- If it is demonstrated that replacement land or resources are unavailable, economically displaced people should be provided with options for alternative income earning opportunities, such as
credit facilities, skills training, business start-up assistance, employment opportunities, or cash assistance additional to the compensation

- Transitional support will be provided as necessary to all economically displaced persons, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living
- Displaced persons need to be engaged about their options and rights pertaining to involuntary resettlement, including processes on involuntary resettlement, and livelihood restoration should include options and alternatives from which project-affected persons may choose. Disclosure of relevant information and meaningful consultation should take place throughout the design and implementation phases of the resettlement process
- Compensation standards for categories of land and fixed assets need to be disclosed and applied consistently. Compensation rates may be subject to upward adjustment where negotiations strategies are employed. In all cases, a clear basis for calculation of compensation will be documented, and compensation distributed in accordance with transparent procedures
- Particular attention should be paid to the engagement and needs of vulnerable groups among those displaced, especially those below the poverty line, the landless, elderly, women and children, people with disabilities, or other displaced persons who may not be protected through national land compensation legislation
- Grievance redress mechanisms need to be established to provide accessible and affordable procedures for third-party settlement of disputes arising from displacement or resettlement; these mechanisms should consider the availability of judicial recourse and community and traditional dispute mechanisms
- Any action related to the displacement of people must comply with federal and state laws and be conducted in a manner consistent with basic principles of due process (including provision of adequate advance notice, meaningful opportunities to lodge grievances and appeals, and avoidance of the use of unnecessary, disproportionate or excessive force)

The specific FRILIA principles on environmental and social sustainability are:

- Investments should incorporate recognized elements of environmental and social assessment good practice, including: early screening of potential effects, consideration of strategic, technical, and site alternatives (including the “no action” alternative), explicit assessment of potential induced, cumulative, and trans-boundary impacts, identification of measures to mitigate adverse environmental or social impacts that cannot be otherwise avoided or minimized and responsiveness and accountability through stakeholder consultation, timely dissemination of program information, and responsive grievance redress measures
- Investments should incorporate due consideration for social risks and impacts, including: threats to human security through the escalation of personal, communal or inter-state conflict, crime or violence, risks that project impacts fall disproportionately on individuals or groups who may be disadvantaged or vulnerable, any prejudice or discrimination toward individuals or groups in providing access to investment benefits, particularly in the case of those who may be disadvantaged or vulnerable, any risks related to conflict or contestation over land and natural resources
- Investments should include appropriate measures for early identification and screening of potentially important biodiversity and cultural resource areas
- Investments should: support and promote the conservation, maintenance, and rehabilitation of natural habitats, avoid the significant conversion or degradation of critical natural habitats,
including legally protected forest reserve, and if avoiding the significant conversion of natural habitats is not technically feasible, include measures to mitigate or offset impacts of program activities.

- Investments should consider potential adverse impacts on physical cultural property and, as warranted, provide adequate measures to preserve such property, and avoid, minimize, or mitigate such adverse impacts.
- Investments should promote community, individual, and worker safety through the safe design, construction, operation, and maintenance of physical infrastructure, industrial and agricultural facilities, or in carrying out activities that may be dependent on such infrastructure and facilities, with safety measures, inspections, or remedial works incorporated as needed.
- Investments should promote the fair treatment, non-discrimination and equal opportunity of workers and prevent the use of all forms of forced labor and child labor in accordance with national and state laws.
- Investments should include measures to avoid, minimize, or mitigate community, individual, and worker risks when program activities are located within areas prone to natural hazards such as floods, hurricanes, earthquakes, or other severe weather or climate events.

Major Challenges in Off-farm Agribusiness SMEs

Access to Skills and Quality Certification

Agribusinesses in Nigeria scored average on workforce skills development and tend to have relatively inexperienced managers. Like other private enterprises, growth of off-farm agribusiness depends on the abilities of its workforce, including entrepreneurial skills, technical knowledge, and managerial capacity.\(^{54}\) With respect to workforce development, Nigerian agribusinesses scored on average in terms of offering formal training, with only 36 percent of Nigerian agribusinesses offering formal training (figure 4.4). In addition to private sector initiatives for skills development, there is need for private-public partnerships (PPP) with government to develop curriculums for technical colleges that enable students to learn critical skills demanded for transformation of the food industry. For example, the World Bank-financed Ogun State Economic Transformation Project integrates support for agricultural value chains with skills development and improvement in the business enabling environment. Investments that augment skills include adoption of quality standards and processes. About 43.8 percent of Kenyan and Pakistan agribusiness possessed an internationally recognized quality certification, compared to 11.4 percent and 16.7 percent in Nigeria and Ghanaian respectively (figure 4.5).

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\(^{54}\) Yumkella et al., 2011; Rao, 2012; World Bank 2013
Access to Finance

In countries where businesses struggle, particularly across Sub-Saharan Africa, financial institutions (FI) have difficulty lending to business that cannot provide sufficient evidence of past performance or convey their ongoing financial viability with clarity. Agricultural SMEs may go out of business frequently, change their main activity, or evolve in unplanned ways. Financing discrete projects by obscure entrepreneurs who may disappear, or against whom FIs have little legal recourse is riskier than financing an established agribusiness. In these situations, businesses may be able to get small amounts of financing, but it is rare for them to obtain sufficient capital to grow. FIs require large guarantees from these borrowers, and interest rates are high. Agribusinesses and FIs have difficulty reconciling their respective needs and a dynamic may emerge where agribusinesses feel that FIs do not provide sufficient investment and working capital financing for profitable projects, while FIs feel that agribusinesses do not take measures to share sufficiently the considerable downside investment risks of the projects presented for financing.

Off-farm agribusinesses in Nigeria have difficulty accessing investment and working capital financing from banks. Access to finance is a common problem faced by agribusinesses across all comparator countries (figure 4.6), such that firms rely more on internal financing for majority of their investment needs and less on financing from banks. However, the problem appears to be more severe in Nigeria as only 6.7 percent of agribusinesses have a credit or loan from a bank compared to more than 40 percent in Ethiopia, Vietnam, and Kenya (figure 4.7). Furthermore, access to Bank financing for working capital is lowest among Nigerian agribusinesses, with only 1.7 percent of working capital financed by banks compared to about 18 percent in Kenya and Ethiopia, 27 percent in Vietnam, and 7 in Ghana (figure 4.8). Faced with difficulties in obtaining working capital from banks, Nigeria agribusinesses rely more on credit from suppliers and customers to meet about 41 percent of their working capital needs (figure 4.9). The usage of supplier and customer-financed to finance working capital in Nigeria is comparable to Kenya and higher than Ethiopia, Pakistan, and Vietnam. Such financing arrangements are used extensively in developing countries to lower repayments risks, and are promoted widely through public programs, private business to business efforts and by NGOs.
In Nigeria, less than 10 percent of investments are financed by banks (Figure 4.6). Nigeria has the lowest proportion of agribusinesses accessing finance (Figure 4.7). Less than 2 percent of working capital for agribusinesses in Nigeria is financed by banks (Figure 4.8). Nigeria agribusinesses rely more on supplier/customer for working capital (Figure 4.9).

Source: Enterprise Surveys Data
Coordinated “value chain financing” arrangements can concurrently address the financing needs faced by farmers and off-farm agribusinesses, while removing fragmentation of agricultural chains. The factors contributing to weak access to credit by agribusinesses are varied and include foundational and structural issues in the financial services sector, weak competitiveness of agribusinesses in domestic and export markets, high risk of failure and stunted growth, lack of financing instruments such as warehousing receipt systems, and the structure of primary agriculture, which is dominated by smallholders that are perceived as bad risks by the banks. These challenges require a multi-pronged approach that includes reforming the financial services sector, improving the agribusiness enabling environment and disruption of the financial services sector with fintech products that meet the needs of agribusiness SMEs and smallholders while generating information on creditworthiness of the farmers and riskiness of specific agricultural enterprises. In addition to these reforms, there is evidence that coordinated “value chain financing” arrangements can be very successful in Nigeria as they take a “whole-of-agribusiness” approach to concurrently address financing needs across multiple actors in the value chains. The Babban Gona model provides important lessons on interventions that can effectively link smallholder farmers to input suppliers and output markets, while providing financial services and building capacity of farmers organizations (see Box 4.1). It’s worth pointing out that the model is operational in Northern parts of Nigeria and could be scaled out to other value chains around the country.

**Box 4.2. The Babban Gona model**

Babban Gona works with growth-oriented smallholder farmer and provides them a private sector channel for cost effective delivery of enhanced agricultural technologies and end-to-end services that optimize yields and labor productivity, while simultaneously improving market access. In particular, the model provides member smallholder farmers the following services: (i) financial services – de-risking members of farmer groups to access cost-effective financing; (ii) agricultural input services – timely provision of quality inputs at competitive prices to increase productivity and product quality, while minimizing impacts on environment; (iii) training and development – strengthening of farmer organizations; and (iv) market access – access to market services, good warehousing practices and increased profits. Among other goals, Babba Gona aims to reach 1 million farmers by 2025 and increase their incomes 4 times

Source: [https://babbangona.com/our-model/](https://babbangona.com/our-model/)

**Without value chain financing, SMEs that face relatively more severe financial constraints cannot invest in innovative technologies and risk being eliminated from the value chains.** A case study of soybean value chain in Kaduna illustrates the gradual elimination of SMEs that cannot access finance to invest in solvent process technologies – see box 4.2.
Box 4.3. The lack of coordinated value chain financing is eliminating soybean SMEs that carry out primary processing

The SMEs in soybean oil processing operate in the middle segment of the value chain, receiving soybean from farmers and carrying out primary processing to produce oil. Soybean yields have not increased appreciably over the years but demand and prices for the commodity are rising. Most of the value chain is organized through spot markets such that processors make deals with farmers at the point of harvest. Contract farming is uncommon.

The incentives for processors to develop vertical coordination arrangements are weak, because of the poor environment for contract enforcement and the risk that competitors can buy the commodity from farmers under contract without any recourse. The organization of the value chain is such that the SMEs would carry out primary processing and sell the oil to large enterprises for final processing. However, the technology gap in processing between the large enterprises and the SMEs keeps widening. The large enterprises are increasingly investing in solvent extraction, but the SMEs are faced with more severe access to capital constraints and continue to rely on mechanical extraction technologies. Mechanical extraction is increasingly inefficient, and the increasingly unfavorable cost-structure of SMEs means that large enterprises with more efficient technology can increase margins by avoiding the SMEs and integrating backwards into primary processing.

More of the SMEs are competing with the large enterprises they used to work with, and these large enterprises can offer better prices to farmers because their technology of extraction is more efficient, and their costs are lower. Coordinated value chain financing would enable SMEs to upgrade the technology of processing from mechanical to solvent and develop new/quality by products such as oil cakes for the feeding industry. Furthermore, the arrangement could also benefit other value chain actors – for example enable research institutions to develop high-yielding varieties and farmers to adopt high-yielding soybean varieties and use complementary inputs.

Informality

Informality is widespread among business in Nigeria and is evident through a range of characteristics that firms may possess. Firms may possess aspects of informality but still behave like formal businesses. For example, some firms may register their businesses with the authorities but then operate without obtaining necessary licenses or fail to maintain financial statements or a system of accounting. Others may be registered and obtained all legally required licenses, yet they hire employees without using formal employment contracts, or fail to withhold income taxes, or fail to make legally mandated payments into the national social security system on behalf of their employees.

Nigerian agribusinesses perceive less competition from unregistered or informal firms, but this is likely because they tend to possess more characteristics of informality themselves. Nearly 48 percent of agribusinesses in Nigeria compete with unregistered informal sector, which is lower than Ghana (71 percent) and Kenya at 60 percent (figure 4.10). However, less than 15 percent of Nigeria’s agribusinesses consider the practices of the informal sector as a major constraint, compared to 32.3 percent and 48 percent in Ghana and Kenya respectively (figure 4.11). Nigerian agribusinesses may perceive less competition from unregistered or informal firms than their counterparts in Ghana and Kenya because the Nigerian agribusinesses tend to possess more characteristics of informality themselves. It’s also possible that operating as a formal agribusiness business in Ghana and Kenya has costs that put agribusinesses in these countries at a relatively greater cost disadvantage with respect to informal and unregistered agribusinesses. These assumptions are worth exploring through a more rigorous analysis of informality.
Figure 4.10. Many agribusinesses in Nigeria compete with the informal sector

Figure 4.11. However, less than 15 percent find practices of the informal sector a major issue

An innovation system encompasses “a network of organization, enterprises and individuals focused on bringing new products, new processes and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance. The innovation concept embraces not only the science suppliers, but the totality and interaction of actors involved in innovation. It extends beyond knowledge creation to encompass factors that affect demand for and use of knowledge in novel and useful ways”\textsuperscript{55}. The development and adoption of innovations depends on (i) knowledge and education – the supply side, (ii) business and enterprise – the demand side, and (iii) bridging institutions that facilitate knowledge transfer between the supply and demand side\textsuperscript{56}. Agribusinesses are increasingly using innovations to improve efficiency in various parts of the food system, including inputs delivery, primary production, trading, processing, food services etc. More recently, innovations in digital technologies have been transforming various aspects of primary agriculture in African countries that offer a more conducive environment, especially in South Africa and Kenya\textsuperscript{57}.

Innovation and technology adoption are lagging in Nigeria’s agribusinesses and this is constraining competitiveness. Only 6.4 percent of Nigerian agribusinesses reported using technology licensed from foreign companies and 13.3 percent reported spending on research and development (R&D). Both these indicators are higher in Kenya, Ghana, and Vietnam (figure 4.12 and 4.12 respectively). However, Nigeria agribusinesses lead the comparator countries in terms of introducing new products and services and process innovation (figure 4.14 and 4.14 respectively). The relatively higher rates of introducing new processes or service (70 percent) may indicate that Nigerian agribusinesses are catching up with peers elsewhere, where the rates are much lower (about 38 percent in Ethiopia and Vietnam and less than 26 percent in Pakistan and Kenya). Furthermore, Nigerian agribusinesses compare unfavorably with respect to internet usage with only 19.7 percent of firms reported having a website.

\textsuperscript{55} World Bank (2006)
\textsuperscript{56} Arnold and Bell, 2001
\textsuperscript{57} Kim et. al. 2020
Access to Infrastructure

Access to various types of infrastructure is a major problem across the countries. However, access to electricity is a bigger problem in Nigeria than transportation and water services. About 48 percent of agribusinesses in Nigeria consider access to electricity as a major constraint while transportation and water are considered major constraints by 18 and 15 percent respectively. Electrical outages are quite rampant with more than 75 percent of agribusinesses reporting experiencing electrical outages across the all the comparator countries except Vietnam (figure 4.16). The figures are highest in Nigeria and Kenya – 93 percent and 96 percent respectively. On average, Nigerian agribusiness reported 24.5 outages per month (nearly every weekday) with each lasting about 15 hours, which is considerably higher than the rest of the countries except Pakistan (figure 4.17). Each power outage lasts more than half
a day in Nigeria (figure 4.18) and the outages resulted in an estimated loss of 17.8 percent of sales (figure 4.19), higher than the average of the comparator countries. Transportation problems were cited as major constraints by 18 percent of Nigerian agribusinesses, which is lower than in Ghana, Pakistan, and Kenya.

**Figure 4.16. Electrical outages is a common problem faced by agribusinesses**

![Firms experiencing electrical outages](image)

**Figure 4.17. Nigerian agribusinesses experience electrical outages nearly every weekday**

![Electrical outages in a typical month](image)

Source: Enterprise Surveys Data

**Figure 4.18. Each power outage lasts more than half a day in Nigeria**

![Average duration of a typical electrical outage](image)

**Figure 4.19. Electrical outages cause significant loss of sales and spoilage of products in Nigeria**

![Average losses due to electrical outages](image)

Source: Enterprise Surveys Data

**Conclusions**

This chapter examined the major issues determining whether on-farm and off-farm agribusinesses can attain sufficient productivity growth to achieve their potential in creating jobs, reducing poverty, and improving nutrition outcomes. The on-farm segment is dominated by smallholder farmers that rely on
rainfed production systems rather than irrigated agriculture. Working with smallholder farmers presents several challenges to agribusinesses. Perhaps the foremost challenges, at least from the perspective of downstream agribusinesses are: (i) variable quality of production due to poor technology of production, and (ii) ineffective farmer organizations that cannot effectively monitor disparate smallholders to adhere to obligations under contract farming or other vertical coordination arrangements. Smallholders often deliver variable quality due to poor technology of production. Smallholder farmers are slow to invest in improved technology of production and tend to rely on methods learnt from their peer or parents to produce food for their subsistence needs. Transitioning such farmers to adopt improved technologies requires effective extension and education, using methods than demonstrate the benefits in local settings. Farmer organizations tend to be ineffective, despite a long history of development projects organizing smallholder farmers into groups. Such groups are formed primarily to pursue livelihoods objectives and it takes significant investments to transition them into growth-oriented farmer organizations, such as cooperatives or producer companies, that can form long-term relationships with growth-oriented agribusinesses and incentivize member farmers to invest in appropriate technology of production to produce the quality desired by remunerative markets.

**Total Factor Productivity (TFP) in primary agriculture has not improved for decades.** The lack of progress is mainly explained by: (i) the significant underinvestment in agriculture research that is required to generate high-yielding and climate-resilient crop varieties and livestock breeds, and (ii) weak farmers extension and advisory services that is required to disseminate proper crop and livestock management practices that would enable farmers to use existing technologies efficiently. Nigeria’s investment in agricultural research as a share of agricultural GDP fell from an already low of 0.39 percent in 2008 to 0.22 percent in 2017. In comparison, Ghana’s share is 0.99 percent and South Africa’s is 2.79 percent. TFP can be increased through investments in research to develop and disseminate crop varieties and livestock breeds that are more productive and resilient to agroclimatic changes. In the face of changing climate, targeted agricultural research & development and effective advisory & extension services are critical to deliver the triple wins of improved productivity, enhanced resilience and adaptation, and reduction of greenhouse gas emissions.

**Majority of the farmers use fertilizers inefficiently and without improved seeds, perhaps due to poor design of fertilizer subsidy programs and inadequate supply of improved seeds.** Farmers are unlikely to purchase fertilizers at full cost only to combine it with traditional seeds. But to the extent that farmers can access fertilizers through subsidy programs at less than full cost, and if such programs don’t provide the fertilizers as a package with improved seeds, it would lead to farmers using inorganic fertilizers together with traditional seeds. This is even more likely when the market supply of improved seeds is limited. Efficiency in the use of inorganic fertilizers can be improved by transitioning fertilizer supply programs to adapt the principles of smart subsidies. The two key principles of smart subsidies are: (i) targeting farmers that need to learn about proper use of fertilizers or those who could use it profitably but are not able to do so due to working capital constraints; and (ii) deliver the subsidy through the private sector by adopting voucher systems that mandate the farmers to purchase a package of fertilizers and improved seeds together.

**Digital technologies have enormous potential to improve access to finance and delivery of services. Governments can support digital agriculture through various type of foundational public investments and policy and regulatory reforms.** Access to finance is a major challenge for

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58 Agricultural R&D Factsheet, ASTI, 2017
smallholder farmers and downstream agribusinesses. While the federal government has implemented various schemes to de-risk the sector, there is still a lot of unfinished business. In particular, there is enormous scope for disruption in the financial sector through fintech, mobile money and innovations that deepen financial inclusion, generate information on creditworthiness of entrepreneurs, and return on investments in specific value chains. Recent advances in fintech and mobile money (e.g. MPESA in Kenya) have really enabled smallholders and informal enterprisers across sectors to access small and high-frequency loans with repayment terms that match their cashflow profiles. In addition, fintech and mobile money applications have proven effective in generating credit records for smallholders and this information can be harnessed by traditional banks to identify good risks among smallholder farmers. The main areas for public interventions include policies that lay the foundations for innovation and scaling out of digital technologies, expansion of rural broadband and supporting infrastructure, and collecting and digitizing plot-level data on farmers to lay strong foundations for platforms and innovations for service delivery.

**Coordinated “value chain financing” arrangements can concurrently address the financing needs faced by farmers and off-farm agribusinesses.** The factors contributing to weak access to credit by agribusinesses are varied and include foundational and structural issues in the financial services sector, weak competitiveness of agribusinesses in domestic and export markets, high risk of failure and stunted growth, lack of financing instruments such as warehousing receipt systems, and the structure of primary agriculture, which is dominated by smallholders that are perceived as bad risks by the banks. These challenges require a multi-pronged approach that includes reforming the financial services sector, improving the agribusiness enabling environment and disruption of the financial services sector with fintech products that meet the needs of agribusiness SMEs and smallholders while generating information on creditworthiness of the farmers and riskiness of specific agricultural enterprises. In addition to these reforms, there is evidence that coordinated “value chain financing” arrangements can be very successful in Nigeria as they take a “whole-of-agribusiness” approach to concurrently address financing needs across multipole actors in the value chains. Without value chain financing, SMEs that face relatively more severe financial constraints cannot invest in innovative technologies and risk being eliminated from the value chains.

**In addition to the poor overall business enabling environment, agribusinesses in Nigeria have to cope with significant disadvantages brought about by weak sectoral policies.** The climate for doing business is slowly improving and Nigeria ranks 131 out of 190 in the World Bank ease of doing business survey 2020, far behind the top countries in SSA – Rwanda and Kenya at 38 and 56 respectively. The poor business enabling environment is reflected in an unconducive and burdensome operating environment for local businesses (especially MSMEs) and a weak policy and institutional framework for the attraction of domestic and foreign investment. Furthermore, the agribusiness enabling environment can be strengthened by completing and operationalizing ongoing reforms on legal and regulatory framework for warehouse receipt systems, seed development and marketing, fertilizers, etc.

**Completion of the legal and regulatory framework for warehouse receipt system is critical.** Warehouse receipt systems (WRS) enable farmers and traders to access finance by liquidating part of the value of their non-perishable commodities while searching for better prices. The system is composed of

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59 In May 2018 the Senate passed the Companies and Allied Matters Act (CAMA) which included several major reforms including new business ownership forms such as sole proprietorships and limited liability companies, improved company registration procedures (including e-signatures for registration), improved insolvency process, enhanced protection of minority investors. However, it has yet to be passed by the House of Representatives and assented to by the Presidency.
the following parties: (a) depositors of commodities, mainly farmers, farmer organizations and traders; (b) warehousing facilities and collateral management services; (c) banks and financial institutions; (d) buyers of commodities and warehouse receipts, including traders, millers, exporters, etc. The laws and regulatory frameworks for WRS do not operate in isolation but rather work in parallel with broader laws defining negotiable instruments, passage of title for goods, use of assets as collateral, bankruptcy laws, contract laws, etc. This understanding was not sufficiently factored into the previous bill (2019), and for this reason it was contested by the SEC and did not obtain presidential assent. A new WRS bill is pending in parliament as of November 2020. The lack of legal and regulatory framework means that any warehouse receipts issued are not negotiable instruments and cannot be used as collateral in the commercial banking sector.

The legal and regulatory framework for seed development has improved with the passage of the National Agricultural Seeds Council Act 2019. However, there are still some important regulatory gaps and unfinished business to operationalize the policy. Among the major reforms embedded in the Act is that it empowers the Council to encourage the establishment of seed companies for the purpose of carrying out research, production, processing, and marketing of seed. Plant breeders’ rights are recognized in the Act, although there are no specific measures to protect the rights beyond empowering the Council to approve and implement programs and measures to protect the rights. Private companies can access early generation seed if their registration allows handling of the seed. Nigeria has a Variety Release Committee and the variety catalog is regularly updated, which is important for crop variety registration, however, there are important areas for improvement. In particular, the law in Nigeria does not allow varieties already registered in another country to be automatically approved for commercialization. Variety release data from foreign countries regarding seed distinctiveness, uniformity, and stability (DUS) is not universally accepted. However, under the new Act the Minister may, on the advice of the Seed Registration and Release Subcommittee, waive the testing requirements if an imported variety is already registered under a West Africa regional variety release system. The new Act does not require varieties for exports or varieties to produce commodities for exports to be subject to variety release or registration requirements unless required by the importing country. However, the related legislation on phytosanitary and bio-safety controls legislation apply.

Several aspects of seed quality control system will be strengthened when the new Act is operationalized, especially to improve transparency in the processes and remove poor quality seeds from the market. In particular, the new Seed Act clarifies the functions of seed inspectors and provides them sufficient powers to take samples of any seeds of any variety from any person or entity marketing or purchasing seed, carry out seed testing, search premises handling seed, carry out field inspection necessary to monitor seed production and certification. The Act not only encourages random market inspections but also stipulates clear penalties for sale of mislabeled seed bags. However, private seed companies or third parties, including private laboratories, still cannot certify seed in Nigeria, nor is a fee schedule for seed certification published, potentially constraining the provision of high-quality seed to producers throughout the country. While post control testing of certified seed is required, the enforced.
References


5. Competitiveness and Policy Priorities in Cashew Nut Value Chain

The main conclusions from chapter 3 are that: (i) traditional cash crops, cassava, rice, oil seeds and pulses have most potential to create jobs, (ii) pulses, livestock value chains, and traditional cash crops have most potential to reduce poverty, and (iii) livestock value chains and vegetables are key to improving nutritional outcomes. The next four chapters dive deeper to identify opportunities for increasing the competitiveness of specific value chains with most potential to create jobs, reduce poverty and improve nutrition. In particular, each of the next four chapters considers a specific value chain – cashew nuts representing traditional cash crops, rice, cassava, and poultry – representing livestock value chains. Clearly, productivity growth in these value chains needs to increase significantly to contribute to jobs and poverty reduction. Increasing productivity growth calls for strategic and coordinated investments between on-farm and off-farm segments and improvements in the agribusiness enabling environment. With the aim to identify sources of competitiveness and policy priorities in Nigeria, the analysis benchmarks yields, costs, prices, and other aspects of competitiveness with similar value chains in Vietnam. The analysis also draws lessons on policy and regulatory actions that can increase productivity and competitiveness in domestic and export markets. The conclusions are presented at the end of each chapter.

Why Compare Nigeria with Vietnam?

Vietnam’s has within the past two decades emerged as a global leader in agribusiness and a top exporter in several commodities and products that are important in Nigeria’s agribusiness sector. In 2019, Vietnam generated export earnings of at least US$ 3 billion from each of the following commodities – cashew nuts, rice, cassava, fish, coffee, tea, black pepper, and rubber (figure 5.1) – resulting in total agricultural export revenue of US$ 40 billion\(^60\). These eight value chains have experienced strong export growth, founded on productivity growth in on-farm and off-farm segments and improved coordination of investments across the value chains. Access to remunerative export markets has generated broad-based gains in the incomes of farmers and higher returns for agribusinesses, thus increasing foreign exchange earnings and public revenues.

The strong performance of the agribusiness sector in Vietnam has ushered a model of structural transformation that could serve Nigeria very well. The growth of agricultural value chains in Vietnam is driven by increased productivity in primary production and improved coordination with downstream value addition. Agricultural wage rates and farmer incomes increased rapidly between 2010 and 2018, contributing to about 75 percent of the poverty reduction in rural areas\(^61\). The strong performance of agricultural value chains has spurred the rural economy as farm incomes have been invested in rural sectors and created job opportunities outside farming. Perhaps the most interesting feature of Vietnam’s model of structural transformation is that labor released from farming has been productively absorbed in the rural non-farm sector, which differs from the usual pattern where labor migrates to urban sectors leaving rural sectors without skills and demand for services and goods necessary to catalyze rural development. While about 80 percent of rural households in Vietnam continue to engage in agriculture, many of these households are increasingly involved in the rural non-farm sector, and the diversification

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\(^{60}\) World Bank. 2020. Vietnam: Improving agricultural interventions under the new National Target Programs

of income sources have not only raised rural incomes but also increased their resilience to economic shocks.

**Figure 5.1. Vietnam agricultural exports in selected commodities doubled in the past decade**

<table>
<thead>
<tr>
<th>Vietnam agricultural export value (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seafood</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>10,000</td>
</tr>
<tr>
<td>20,000</td>
</tr>
<tr>
<td>30,000</td>
</tr>
<tr>
<td>40,000</td>
</tr>
<tr>
<td>50,000</td>
</tr>
</tbody>
</table>

Source: World Bank. 2020

**Table 5.1. Selected economic indicators for Nigeria and Vietnam**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Viet Nam</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (current USD)(^a)</td>
<td>USD mil.</td>
<td>205,276</td>
</tr>
<tr>
<td>Population</td>
<td>Inhabitants</td>
<td>96,491,000</td>
</tr>
<tr>
<td>Agriculture GDP share</td>
<td>Percent</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Source: (a) World Development Indicators, (b) FAOSTAT

**Cashew nuts**

Nigeria led the world in cashew nuts production in the early 2000s. Within the past two decades, Nigeria lost its position and now ranks 13th in the world and 8th in Africa. Nigeria currently produces about 97 thousand tons of cashew nuts annually, which is less than 1.7 percent of global cashew nut production. Cashew nuts sub-sector contributes less than 0.1 percent to Agriculture GDP, with a gross production value of US$ 15 million in 2018, which is a fraction of Vietnam’s gross production value of US$ 4.2 billion. Vietnam has since 2002 ranked as the world’s leading cashew nuts producer, with production quantity of 2.7 million tons in 2018, accounting for 45 percent of World’s cashew nut production. Cashew nut production in Vietnam achieved average annual growth rate of 16.1 percent between 2001 and 2018 – and contributed about 13 percent to agriculture GDP. Globally, cashew is grown in most of the tropical countries around the world. But most of the commercial cashew production is concentrated in South-Eastern Asia, West Africa, East Africa, and Brazil. The major five producers of cashew nuts are Vietnam, India, Cote d’Ivoire, Benin, and Philippines.

**Cashew nuts production in Nigeria is clustered around the South West “cashew belt”**. The production of cashew nuts requires specific agroclimatic conditions and is sensitive to temperature and rainfall conditions. In both countries, production is concentrated in areas where the temperatures range from 20°C to 30°C, annual precipitation of 1000 to 2000 mm and a well-defined dry season covering least four months. In Nigeria, production occurs in 27 out of 36 states. Cashew is the main crop in the major producing states such as Kwara where the crop occupies more than 20,000 hectares. Although Kwara
leads other states in terms of production volumes, the best quality originates from Oyo State\textsuperscript{62}. Most of export quality cashew nuts are produced in the South West region, especially Oyo and Osun states\textsuperscript{63}. The cashew belt of Vietnam transverses the Southern East Region and production is centred in Binh Phuoc province.

Table 5.2. Importance of cashew nut in Nigeria and Vietnam

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Year</th>
<th>Nigeria</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP (current USD) (billion)\textsuperscript{a}</td>
<td>2018</td>
<td>397.3</td>
<td>245.2</td>
</tr>
<tr>
<td>Cashew nut production value (tonnes)\textsuperscript{b}</td>
<td>2018</td>
<td>97,863</td>
<td>2,663,885</td>
</tr>
<tr>
<td>Share of world’s production (%)</td>
<td>2018</td>
<td>1.7</td>
<td>45.0</td>
</tr>
<tr>
<td>Gross production value (Current million USD)\textsuperscript{b}</td>
<td>2018</td>
<td>15.0</td>
<td>4211.8</td>
</tr>
<tr>
<td>Share of agriculture GDP (%)</td>
<td>2018</td>
<td>0.06</td>
<td>13.0</td>
</tr>
<tr>
<td>Cropland (million hectares)\textsuperscript{b}</td>
<td>2018</td>
<td>40.50</td>
<td>11.5</td>
</tr>
<tr>
<td>Harvested area (% of cropland)</td>
<td>2018</td>
<td>0.15</td>
<td>2.5</td>
</tr>
</tbody>
</table>

\textsuperscript{a} World Development Indicators (2020)
\textsuperscript{b} FAOSTAT (2020)

Technology of Production

Nigeria lost its pole position primarily because old orchards were not replaced with new and higher-yielding varieties. In particular, production in Nigeria dropped rapidly by -87 percent between 2010 and 2014 and then stabilized at a very low-level of about 98,000 tons in 2018 (figure 5.2). The rapid decline in production was driven by a -67 percent contraction in area harvested (figure 5.3) and -62 percent decline in yields (figure 5.4), although the yields rebounded to some extent and are now higher than India and West Africa neighbors, including Cote d’Ivoire. Considering that cashew nuts is a perennial tree crop, such a rapid contraction in area harvested suggests widespread aging of trees without replacement. In general, cashew trees attain commercial levels of production after 4 years at around 300kg/ha, but the peak yields are attained after 10 years at about 1800kg/ha – and last for another 10 years. The yields decline from year 25 since planting and the trees lose commercial value after year 30. Production in Nigeria is expected to increase in the coming years, primarily because estimates of the age distribution of cashew trees indicate that at least 40 percent of the trees were planted within the last 10 years and have not reached peak production. In contrast with Nigeria, the production in Vietnam followed what could be described as the expected trend for cultivation of perennial tree crops where old trees are continuously replaced with new and higher-yielding varieties. Production increased rapidly for 6 years (2000-2007) due to new trees reaching maturity and then stabilized as some of the old orchards were replaced (2007-2014). Production has been rapidly increasing again since 2014 as newer orchards reached maturity.

Production growth in Vietnam was in the past decade solely driven by yields, reflecting strong push by the government to develop and disseminate high-yielding and early maturing varieties. Cashew nut yields depend on the variety and age of the trees, weather patterns in the preceding year and fertilizer application rates. The government of Vietnam has been at the forefront in ensuring that farmers have access to new and high-yielding varieties, including varieties that mature early and begin to produce nuts around 24 months after planting, and dwarf varieties that allow higher density planting of up to 500 trees per hectare compared to normal density of 200 trees per hectare. More recently, the Binh Phuoc

\textsuperscript{62} Große-Rüschkamp, A. Topper, C. and Grenzebach E. 2010
\textsuperscript{63} CashewInfo, 2017
Department of Agriculture has aggressively supported replanting with higher yielding varieties and is also promoting more intensive production systems, with higher fertilization rates and irrigation. However, processors have warned that variety selection should focus more on Kernel Outturn Rate (KOR) because some of the newer varieties tend to have a higher percentage of empty shells. The Ministry of Agriculture of Viet Nam recommends the following varieties – PN1, MH4 and MH5 – and local varieties such as PL18, DP41, DP27 and DC44 (MARD, 2019).

**Figure 5.2. Cashew nut production in Nigeria’s decreased rapidly in the past two decades**

![Cashew nut production in Nigeria and leading countries](image1)

Source: FAOSTAT

**Figure 5.3. Area harvested contracted in Nigeria between 2010 and 2014, contributing to declining production**

![Area harvested](image2)

Source: FAOSTAT

**Figure 5.4. Yields in Nigeria declined between 2010 and 2014, but rebounded quickly and are now higher than major producers in West Africa**

![Cashew nut yields in five largest producers](image3)

Source: FAOSTAT
Trade Competitiveness

Nigeria is the 4th largest exporter of Cashew nuts in Africa, exporting about 64 percent of the national production in the form of Raw Cashew Nuts (RCN) and earning about US$ 0.1 billion in 2018. In contrast, Vietnam – the world’s largest exporter – earned US$ 2.6 billion from cashew nuts exports in 2018 (figure 5.5). Exports have soared in Vietnam by more than 1,200 percent in the past two decades. However, Vietnam is also a large importer of RCN sourced from around the world, including Nigeria, and processed into various products for exports. Net exports of cashew nuts in Vietnam are estimated at US$ 1.4 billion in 2018. The importation of RCN, processing and export has soared since 2011 (figure 5.6 and contributed enormously to net foreign earnings in the country. Processed cashew nuts occupies 99 percent of export share in Vietnam with only 1 percent exports being RCN. In contrast, 93 percent of exports from Nigeria are RCN and only 7 percent is value added. Nigeria. Imports to Nigeria are 98 percent processed cashew nuts with only a small share of RCN.

Figure 5.5. Vietnam has achieved tremendous export growth in the past two decades while export growth Nigeria has been fleeting

![Graph showing export growth of Nigeria and Vietnam](source: FAOSTAT)

Figure 5.6. The tremendous export growth in Vietnam is driven by imports of RCN that are processed and exported

![Graph showing import growth of Nigeria and Vietnam](source: FAOSTAT)

The main export markets for RCN from Nigeria are Vietnam and India. In turn, Vietnam exports processed cashew nuts mainly to USA and China. Nigeria formally exports RCN and processed cashew nuts to more than 30 countries, however; Vietnam and India are the major export destinations. Between 2017 and 2019, exports to Vietnam accounted for 62 percent of all exports of processed cashew nuts and 43 percent of exports of RCN (figure 5.7). Exports to India accounted for 25 percent and 6 percent of processed and RCN respectively. The rest of exports go to China, Malaysia, Tanzania, Senegal, and United Arab Emirates. Olam International is the largest processor of cashew nuts in Nigeria. The company recently installed processing capacity of 33,000 tons within the last 4 years. However, the capacity utilization is low and there are indications that Olam has increasingly exported RCN to Vietnam. Olam’s exports to Vietnam might be a more profitable business adventure because they have significant shares in the largest processing company in Vietnam – Long Son. Vietnam exports processed cashew nuts to...
more than 40 countries and the main destinations are USA and China, respectively accounting for 34 percent and 15 percent of exports in 2017-2019 (figure 5.8).

The quality of RCN from Nigeria is lower than Vietnam and far lower than Guinea Bissau, the world’s leading producer of cashew nuts in terms of quality. The quality of cashew nuts is measured using the kernel outturn rate (KOR) and nut count (small nuts). The KOR for Nigeria is 45-48 lbs/bag, comparable to Benin, Ghana, and Ivory Coast\(^\text{65}\), and lower than Vietnam (KOR 48-52) and Guinea Bissau (KOR 50-54). A low KOR is partly caused by a high nut count (relatively small nuts), high percentage empty shells and difficulty of peeling. Both KOR and nut count is a function of a combination of variety, climatic conditions, soil characteristics and crop husbandry practices. Some regions such as Oyo State are known for larger nuts, while others reportedly have smaller nuts, like Nasarawa\(^\text{66}\). Furthermore, KOR tends to be higher at the start of the harvesting season and lower at the end of the season. The RCN from Nigeria tend to have high moisture content because nuts are not properly dried, resulting in price discount and some cases outright rejection of consignments. On average, RCN from Nigeria attract price discount of 14 percent compared to RCN from Benin\(^\text{67}\). There have also been multiple cases of rejections – for example about 37,000 tons exported to Viet Nam was rejected on arrival in 2018\(^\text{68}\). Table 5.3 illustrates data from processors in Vietnam showing how RCN quality parameters (KOR and nut quality) affected the quality of the processed kernels in 2019, comparing RCN from Nigeria, Cote d’Ivoire, Ghana, Cambodia, and Vietnam.

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\(^{64}\) As reported by importing countries  
\(^{65}\) ACA, 2019a  
\(^{66}\) SAP, 2016  
\(^{67}\) African Cashew Alliance, 2019a,b  
\(^{68}\) Economic Confidential, 2020
Table 5.3. Relationship between quality of RCN and quality and prices of processed kernels by country of origin

<table>
<thead>
<tr>
<th>Country of origin</th>
<th>Vietnam and Cambodia</th>
<th>Cote d’Ivoire and Ghana</th>
<th>Nigeria</th>
<th>Sales price (US$/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KOR (Lb./bag)</td>
<td>51.2</td>
<td>48</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>KOR (%)</td>
<td>29</td>
<td>27</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Nut count</td>
<td>155</td>
<td>202</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Processed Kernels</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WW240 and larger (%)</td>
<td>32</td>
<td>11</td>
<td>10</td>
<td>8.5</td>
</tr>
<tr>
<td>WW320 and smaller (%)</td>
<td>40</td>
<td>51</td>
<td>45</td>
<td>7.3</td>
</tr>
<tr>
<td>Lightly Blemished whites (%)</td>
<td>8</td>
<td>13</td>
<td>3</td>
<td>7.0</td>
</tr>
<tr>
<td>White splits (%)</td>
<td>11</td>
<td>10</td>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>Large pieces (%)</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>Other (%)</td>
<td>5</td>
<td>9</td>
<td>22</td>
<td>4.0</td>
</tr>
<tr>
<td>Weighted average price (US$/kg)</td>
<td>7.0</td>
<td>6.5</td>
<td>6.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: IPSARD 2020

Nigeria saves its best quality RCN for domestic processing and the kernels are generally priced better than Vietnam’s. However, the volume of processed kernels exported from Nigeria is a fraction of Vietnam’s – export value of US$ 0.1 billion from Nigeria compared to US$ 2.6 billion from Vietnam. A comparison of prices of processed kernels exported to USA in 2019 shows that kernels from Nigeria fetched a better price than competitors for a good part of the year (figure 5.9). In particular, the prices for Kernels from Nigeria fetched the highest prices between March and June, outperforming the world’s largest exporters – Vietnam, Cote d’Ivoire, India, and Brazil. The higher prices fetched by Kernels from Nigeria shows that there is great potential to add value to RCN within the country. Going forward, cashew nut trade is expected to focus more on quality as the prices have dampened because global supplies have caught up with demand. A price analysis shows that the FOB price of processed kernel more than doubled between 2001 and 2017, driven by high demand in high-income countries. However, the prices have decelerated significantly from the 2017-2018 peak, reducing margins for processors that had already purchased the 2019 crop. The price drops are related to reduced demand for kernels and oversupply of almond markets in the US – a substitute for kernels. The future price outlook for RCN and processed kernels is uncertain as the COVID 19 pandemic has affected the global markets, partly due to reduction of processing activity in India69 and reduced availability of working capital credit to exporters in West-Africa70.

A strategy for developing the cashew nuts sub-sector in Nigeria should consider providing incentives for importation of RCN from neighboring West African countries to be processed in Nigeria for export markets. This approach has been successfully adopted and executed by Vietnam. A large share of the US$ 2.6 billion value of kernels processed in Vietnam consists of RCN imported from West Africa (figure 5.10). Nigeria enjoys stronger economic relations with the major cashew nuts producers in West African than India or Vietnam and can harness the apparatus of the Regional Economy Community ECOWAS to establish partnerships among actors in these countries. However, deliberate efforts are needed to encourage RCN imports from West Africa. Currently, RCN imports to Nigeria attract import duties of 20 percent – same as imports of processed kernels. This tariff regime needs to be reconsidered to provide incentives for expanding processing in the country, including by ensuring that

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69 Cashewinfo, 2020

70 ACA, 2020
import duties are lower for RCN and higher for processed kernels. The installed processing capacity for cashew nuts in Nigeria operates below optimum levels. Recent estimates suggest that the installed capacity for cashew nuts processing in Nigeria was about 48,000 tons in 2015, however; only 30 percent of the capacity is utilized. Nigeria could draw lessons from some of the approaches it has been using to increase processing capacity for agricultural commodities. For example, the country has been implementing preferential tariff quota systems for millers to import rice and wheat with the aim to expand processing capacity and establish backward linkages with farmers through outgrower schemes. Olam International has previously benefitted from these arrangements. There are also opportunities to expand the domestic consumer market as the consumption per-capita of cashew nuts is quite low – 0.004 kg annually compared to 0.23 kgs in Vietnam.

**Figure 5.9. Processed kernels from Nigeria fetched a better price than competitors for a good part of 2019**

![Graph showing prices of processed kernels over months](image)

Source: CashewInfo, 2019

**Figure 5.10. West African countries are a major source of imports of RCN processed in Vietnam**

![Bar chart showing sources of RCN processed in Vietnam](image)

Source: UN COMTRADE as reported by Vietnam: domestic production figures obtained from VINACAS and GSO Viet Nam: INC production data converted from kernel basis to RCN at KOR 28%

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71 Most of the industrial capacity is with one company – Olam International.
72 (Fitzpatrick, 2017; Ricau (2019); Vanguard (2015)
73 Global Trade, 2020
Characterization of cashew nuts value chains

The organization of cashew nuts value chains in Nigeria and Vietnam depends on whether the end product is RCN or processed kernels. The main actors in the RCN export value chains in Nigeria are producers/farmers, licensed buying agent and RCN exporter. In the value chain for processed kernels, the RCN exporter is replaced by a processor that also plays the role of exporter. In Vietnam, the main actors in the value chain that relies on domestic production are producer/farmer, local traders, and processors/kernel exporter. The processors also import RCN from the other countries (see figure 5.10 above). In both countries, the licensed buying agents (LBAs) or local traders intermediate between farmers and processors/RCN exporters to provide the important functions of aggregation and transport to the processing/export facility, often as a commission agent of the processor/exporter. Some LBAs in Nigeria work through sub-buyers strictly as commission agents of the LBAs. There is a lot of competition for RCN in the LBA/trader part of the value chains, especially in Nigeria, and this often leads to farmers facing pressure to harvest immature nuts – leading to poor quality RCN. The problem is compounded by a delay in drying the nuts once harvested, often leading to poor peeling quality. The storage and dying of nuts mainly occurs at the processor/RCN exporter level and neither the farmers nor the LBAs/traders invest in storage capacity. The competition for nuts has been tempered in Vietnam since 2018 and the processors no longer buy future harvests in import countries and have increasingly preferred spot transactions.

Processors in both countries convert RCN to intermediate kernels for bulk exports. The final processing and packaging is carried out in the countries where the kernels are consumed. The intermediate processing for bulk exports includes roasting and shelling, peeling of the skin covering the kernel, cleaning, sorting, grading and bulk packaging. The final processing is mostly done in Europe and USA, and it includes roasting, salting, spicing, mixing with other nuts and packaging. The technology of intermediate processing has evolved significantly in Vietnam over the years, transitioning from use of manual labor in shelling and peeling to the development of a competitive range of equipment for all stages of the processing. Despite increased mechanization, the cashew processing industry in Vietnam is a major employer with each facility employing about 2,000-3,000 people on average and the largest facilities employing about 12,000 people. In addition to industrial processing for export markets, there is a cottage industry of low-volume processing for the domestic market by so-called “backyard processors”. These processors undertake all operations themselves, or procure low-grade (broken, small, or scorched kernels from exporters and sell in local shops.

Vertical coordination is weak in both countries, despite the existence of national industry level associations that bring together farmers/producers, processors, exporters, and other actors. Contract farming arrangements and outgrower schemes are rare in both Nigeria and Vietnam. However, Olam International – and probably other companies – support farmers with seedlings of high yielding varieties and training. Farmer organizations in Nigeria tend to be weak, and even cooperatives tend to pursue short-term needs rather than growth-oriented investments in productive assets, enforcement of quality standards and establishment of long-term relationships with buyers and suppliers. The National Cashew Association of Nigeria (NCA) brings together farmers, exporters, processors, and other actors.

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74 CashewInfo, 2015
75 The main processors in Nigeria include Olam Edible Nuts (the biggest processor and their facility is located at Ilorin, Kwara State), Oxley, Farmforte, Lion Ltd, Foodpro, Abod Success, KD Foods, Valency, Esteema Diamonds Global Inv. Ltd (EDGIL) and ACET Nigeria Ltd
76 According to discussions with Vietnam Cashew Association (VINacas)
stakeholders. It is recognized as the national umbrella organization representing the sector. In Viet Nam, the Vietnam Cashew Association (VINACAS) is an important multi-stakeholder platform representing the industry, but farmers are under-represented.

The processing capacity in Vietnam was built when global demand for kernels was soaring and without much competition from other parts of the world. The processors enjoy first-mover advantages and scale economies. The main competitive advantage of Vietnamese processors is the sheer scale of installed capacity which enables efficient processing and shipping of one grade per container. Emerging processors in West Africa are entering the global market at a time that global kernel prices are falling (supply has just caught up with demand) and must face competition from established processors in Vietnam. However, given that the processors in Vietnam produce intermediate kernels that undergo final processing in the final consumption markets, the emerging processors in West Africa have an option to “move up the value chain” and deliver final processed kernels to final consumers in USA and Europe. Furthermore, it’s likely that final processing costs are lower in West Africa than Europe and USA, suggesting that various business models could be considered, for example franchising and joint ventures. Perhaps a more rewarding option would be to develop niche, branded and differentiated cashew nut products for direct selling to supermarkets in western countries, including organic and fair-trade labelled products. These strategies call for strong public-private partnerships to improve the business enabling environment, reform policies that discourage importation of RCN from neighbouring countries, develop infrastructure (especially roads and energy) in clusters where processing can efficiently occur, etc.

The enabling environment needs to improve significantly in Nigeria to support growth of the cashew nuts sub-sector and there are important lessons to learn from Vietnam. Although the Nigerian Export Promotion Council (NEPC) subsidizes the export of cashew nuts, the process to obtain the subsidy is very bureaucratic resulting in high administrative costs that may exceed the value of the subsidy. In addition, the payment of the subsidy is often delayed sometimes for up to 3 years. The Nigeria Export Levy (NXP) and the Nigeria Export Supervision Scheme (NESS) both charge a fee on exports leading to claims of “double taxation”. At the state level, the promotion and monitoring of cashew production is part of the mandate of the Tree Crops Development Units (TCDUs) of the States’ Ministry of Agriculture. However, the TCDU at federal level lacks information about the cashew nuts sub-sector and there is no readily available data on production areas, volume of processing or exporting. Furthermore, there is no specific policy developed for cashew production and no strategy exists for promoting the commodity. Provision of technical support in the form of extension services is weak. The mandate for research and promotion of cashew nuts production was transferred to the Cocoa Research Institute of Nigeria (CRIN) with the TCDU focussed on providing cashew seed nuts to interested farmers. The focus on cashew nuts varies greatly across the states, with Kwara being the most active in promoting cashew production and processing. For example, Kwara State in 2016 started a program where 13,000 hectares of land were to be cleared and made available to unemployed youths for cashew cultivation. The youth were to be provided with training and micro-credit services. Several local markets in the state have laws prohibiting the street selling of cashew kernels by vendors to control theft of cashew nuts.

77 JMSF, 2020
78 JMSF Agribusiness (2020)
79 National Cashew Association of Nigeria (NCAN), 2016
### Box 5.1. Policy lessons for developing the cashew value chain from Vietnam

The following major policy milestones in the Vietnam cashew nuts sector provide important lessons for Nigeria:

- **Viet Nam has developed a sector specific policy strategy.** The strategy is outlined in Decision No. 579 / QD-BNN-TT of February 13, 2015 “General Development Planning for Viet Nam Cashew industry to 2020 and orientation to 2030”. The policy aims to guide all aspect of development of the cashew nuts industry. *Production support to farmers has centred on provision of high-yielding and early maturing varieties to replace aging trees.* The national ministry responsible for agriculture and provincial authorities implement long-term plans that have involved the distribution 522,000 seedlings to farmers, including 2,153 distributed in Binh Phuoc alone in 2019 to farmers through farmers associations.

- **The Vietnam Cashew Association (VINACAS) has developed into an influential multi-stakeholder platform that provides effective coordination and stewardship to the industry.** The Vietnam Cashew Association was established in 1990 under Decision No. 346 NN-TCCB/QD of the former Ministry of Agriculture and Food Industry. Today, VINACAS members are researchers, farmers, processors, and exporters.

- **The government provides incentives for private sector investments in agriculture and agribusiness, including schemes to improve access to finance for agricultural production.** In particular, Decree 57 of 2018 put forward several investment incentives and instruments aimed at increasing the private sector investments in agriculture and supporting agri-business enterprise development, including investment subsidies, reduced land and water surface rents, preferential interest rates, marketing, and training. Furthermore, a series of decrees in 2010, 2015 and 2018 (Decree 41/2010/ND-CP; Decree 55/2015/ND-CP; and Decree 116/2018/ND-CP) helped to remove difficulties in accessing capital and credit for agricultural production, including setting specific loan amounts that farmers could obtain without collateral under risk sharing arrangements that involve the government.

- **The Viet Nam cashew industry has developed standards for RCN trading.** In January 2019, the Vietnamese Ministry of Science and Technology published a national standard for RCN imports: TCVN:2018. The standard was developed by the Ministry of Agriculture in collaboration with VINACAS. This is the first time in the world that a specialized standard for raw cashew nuts has been issued. The standard serves as a basis for grading and quality inspection to support trading and handling disputes of raw cashew nuts. It is intended to help the Vietnamese cashew industry to adapt to market demand by enhancing the quality and safety management of RCN imports.

- **The trade tariff regime aims to encourage imports of RCN and discourage imports of processed kernels to create incentives for the domestic processing industry.** Since 2010, the import duty for RCN has been 5 percent or lower for most origin countries (MFN rate) and 0 percent for ASEAN countries (Indonesia, Cambodia), which is much lower than import duty of for coconuts and Brazil nuts (30 percent) in the same HS 0801 group. The import tax on cashew kernels is significantly higher at 25 percent (MFN). In contrast, the import duties for both RCN and processed kernels is 20 percent in Nigeria.

### Costs and Margins of Value Chain Actors

This section compares costs and margins for the actors of cashew nuts value chains. Figure 5.11 and 5.12 provides a summary of the costs, selling prices and margins for each actor along the value chain in Nigeria and Vietnam respectively. Cashew is a perennial crop with economic useful life of about 30 years. The producer costs in any particular year are just a snapshot and the costs in figure 5.11 and 5.12 reflect a

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80 VINACAS, 2019
mature crop and exclude establishment costs. Prices are in US$ per kg of kernel, meaning that the prices and costs for producers correspond to the amount of RCN needed to produce one kilo of kernel, which is 3.61 kgs in Viet Nam and 4 kgs in Nigeria. The cost build-up relies on data from primary surveys carried out in Nigeria and Vietnam, corroborated by secondary sources of data. In particular, the data for Nigeria was collected from Kwara, Ogun and Oyo states in 2020\(^81\) and corroborated with additional data collected in 2019 for the baseline of the Agro-Processing, Agricultural Productivity Enhancement and Livelihood Improvement Support Project (APPEALS). The production level data from Vietnam was collected in 2019\(^82\) while the processing level data was collected in 2020\(^83\). Efforts to collect trader level data for Vietnam proved futile due to restrictions to combat COVID-19. Therefore, trader costs could not be included in figure 5.12 and the trader’s sales price corresponds to the difference between the factory purchase price paid by processors for RCNs and the farm gate sales price of producers.

**Figure 5. 11. Cost build-up for the cashew nuts value chain in Nigeria**

![Diagram showing cost build-up for cashew nuts value chain in Nigeria](image1)

**Figure 5. 12. Cost build-up for the cashew nuts value chain in Vietnam**

![Diagram showing cost build-up for cashew nuts value chain in Vietnam](image2)

Source: Dankers et. al. 2020 and JMSF 2020

**Nigeria has cost advantages in cashew nuts production, despite the higher yields in Vietnam.** Cashew is a perennial crop that does not produce nuts until about 4 years after planting. The cashflows are negative until after production begins and the trees reach highest yields from years 10-25, which is the period when cashflows are highest. Production declines from year 25 onwards and the trees are usually replaced after 30 years. The comparison of costs and margins shows that cashew nuts production is more profitable in Nigeria than Vietnam, despite the higher yields in Vietnam. This is primarily because the costs of production are significantly lower in Nigeria, even without considering the opportunity cost of land which is certainly higher in Vietnam as farmers there have more alternative value chains that compete with cashew nuts for land. Assuming average yields for both countries and excluding planting costs, the estimated costs of production is US$ 4.476 per kg of RCN in Vietnam and US$ 0.6 – 1.96 in in Nigeria, depending on the location of production (table 5.4). The main cost advantages arise from lower hired labor costs and low use of variable inputs, especially fertilizers and other agrochemicals. Hired labor

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\(^81\) JMSF 2020 collected data for this report  
\(^82\) The original data supported the Rural Investment Plan prepared by Cora Dankers, FAO Investment Centre  
\(^83\) The data was collected by IPSARD for this report
costs are at least 4 times higher in Vietnam than Nigeria, accounting for 43 percent of total costs in Vietnam and 13-21 percent of labor costs in Nigeria. The revenues illustrated in table 5.4 do not include value of cashew apple – the other product of the cashew tree.

**Table 5.4. Cost of production per kg of RCN based on average farm size and yields on mature trees**

<table>
<thead>
<tr>
<th></th>
<th>Nigeria (Enugu)84</th>
<th>Nigeria (Kwara, Ogun and Oyo)85</th>
<th>Viet Nam (Binh Phuoc)86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>0.176 (8%)</td>
<td>0.068 (3%)</td>
<td>1.282 (27%)</td>
</tr>
<tr>
<td>Transportation</td>
<td>0.04 (2%)</td>
<td>-</td>
<td>0.256 (5%)</td>
</tr>
<tr>
<td>labor</td>
<td>0.3 (13%)</td>
<td>0.564 (21%)</td>
<td>2.531 (31%)</td>
</tr>
<tr>
<td>Agrochemical cost</td>
<td>0.088 (4%)</td>
<td>0.04 (1%)</td>
<td>0.412 (9%)</td>
</tr>
<tr>
<td>Mechanization</td>
<td>-</td>
<td>1.021 (38%)</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>0.28 (11%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td><strong>0.6</strong></td>
<td><strong>1.96</strong></td>
<td><strong>4.476</strong></td>
</tr>
<tr>
<td>Gross Margins</td>
<td>1.724</td>
<td>0.712</td>
<td>0.191</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td><strong>2.328</strong></td>
<td><strong>2.672</strong></td>
<td><strong>4.668</strong></td>
</tr>
<tr>
<td>Yield, kg/ha</td>
<td>786</td>
<td>417</td>
<td>1,215</td>
</tr>
</tbody>
</table>

Source: Dankers et. al. 2020 and JMSF 2020

**Investing in cashew plantations generates positive Internal Rate of Return for farmers in both countries, with higher returns in Nigeria.** Assuming a plantation of one hectare and cashflows over a 25-year period, the cost-benefit analysis for cashew nuts production shows that the Net Present Value (NPV) of cashflows are positive (table 5.5). The investment costs occur in the first year and include the costs of seedlings, which varied from US$600 to US$1,100 per hectare in Nigeria depending on variety and location. The seedling costs are about 10 times lower in Vietnam – US$ 69 per hectare. The estimated NPV in Nigeria is US$ 647 in the states of Kwara, Ogun and Oyo – and US$ 886 in Enugu, corresponding to Internal Rate of Return (IRR) of 15 percent and 16 percent respectively. The NPV in Vietnam is US$ 883, which corresponds to IRR of 12 percent. These calculations do not include income from cashew apple and the streams of cashflows from the crops cultivated in cashew fields, which could be significant because cashew is usually intercropped in both countries. On the same vein, the calculations do not include the opportunity costs of land, which is certainly higher in Vietnam than Nigeria.

**Cashew nut processing costs are lower in Nigeria than Vietnam, but processors in Vietnam earn better margins because their selling price for processed kernels is higher** (table 5.6). The kernels processed in Vietnam fetch higher prices because the quality is better and the conversion rate from RCN to kernels is relatively higher – 28 percent in Vietnam compared to 25 percent in Nigeria. But processors in Vietnam are faced with higher costs because RCN are cheaper in Nigeria, costing US$ 2.83 per kg of kernel equivalent compared to US$ 4.86 in Vietnam. The RCN price differences reflect Nigeria’s comparative advantage in production relative to Vietnam (table 5.6) and the CIF costs of importing RCN from West African countries with a similar production cost profile as Nigeria. However, the variable costs of processing are remarkably higher in Nigeria, including higher costs of transport, energy, labor and operating costs. Weak transportation and energy infrastructure diminish the competitiveness of processors in Nigeria. For example, the cost of energy in Nigeria is nearly twice that of Vietnam because

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84 2019 data for the APPEALS project
85 2020 data collected for this study
86 2019 data collected for the Rural Investment Plan prepared by Cora Dankers, FAO Investment Centre
the lack of regular supplies of electricity pushes the industry in Nigeria to also use generators. Transport costs are 4 times higher in Nigeria, reflecting weak roads network and long distances.

Table 5. Cost-benefit analysis of cashew investments in Nigeria and Vietnam

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2-4</th>
<th>Year 5-8</th>
<th>Year 9-25</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nigeria (Enugu)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment costs</td>
<td>854.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent costs</td>
<td>118</td>
<td>118</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>Yield</td>
<td>0</td>
<td>100</td>
<td>550</td>
<td>871</td>
</tr>
<tr>
<td>Farm gate price</td>
<td>0.58</td>
<td>0.58</td>
<td>0.58</td>
<td>0.58</td>
</tr>
<tr>
<td>Revenues</td>
<td>0</td>
<td>58</td>
<td>320</td>
<td>506</td>
</tr>
<tr>
<td>Gross margin</td>
<td>-972</td>
<td>-60</td>
<td>202</td>
<td>388</td>
</tr>
<tr>
<td>NPV @10%, US$</td>
<td>886</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRR</td>
<td></td>
<td></td>
<td></td>
<td>16%</td>
</tr>
<tr>
<td><strong>Nigeria (Kwara, Ogun and Oyo)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment costs</td>
<td>572.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent costs</td>
<td>204</td>
<td>205</td>
<td>205</td>
<td>205</td>
</tr>
<tr>
<td>Yield</td>
<td>0</td>
<td>100</td>
<td>475</td>
<td>943</td>
</tr>
<tr>
<td>Farm gate price</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
<td>0.67</td>
</tr>
<tr>
<td>Revenues</td>
<td>0</td>
<td>67</td>
<td>317</td>
<td>630</td>
</tr>
<tr>
<td>Gross margin</td>
<td>-777</td>
<td>-138</td>
<td>113</td>
<td>426</td>
</tr>
<tr>
<td>NPV @10%, US$</td>
<td>651</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRR</td>
<td></td>
<td></td>
<td></td>
<td>15%</td>
</tr>
<tr>
<td><strong>Vietnam (Binh Phuoc)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment costs</td>
<td>745.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent costs</td>
<td>703</td>
<td>832</td>
<td>988</td>
<td>1191</td>
</tr>
<tr>
<td>Yield</td>
<td>0</td>
<td>100</td>
<td>700</td>
<td>1743</td>
</tr>
<tr>
<td>Farm gate price</td>
<td>1.29</td>
<td>1.29</td>
<td>1.29</td>
<td>1.29</td>
</tr>
<tr>
<td>Revenues</td>
<td>0</td>
<td>129</td>
<td>905</td>
<td>2254</td>
</tr>
<tr>
<td>Gross margin</td>
<td>-1448</td>
<td>-703</td>
<td>-83</td>
<td>1063</td>
</tr>
<tr>
<td>NPV @10%, US$</td>
<td>883</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRR</td>
<td></td>
<td></td>
<td></td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: Dankers et. al. 2020 and JMSF 2020
Notes: All costs, revenues and margins are US$/ha and yield is Kg/ha

Table 5.6. Cashew nut processing costs in Nigeria and Vietnam

<table>
<thead>
<tr>
<th></th>
<th>Nigeria</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCN</td>
<td>2.83 (60%)</td>
<td>4.86 (73%)</td>
</tr>
<tr>
<td>Labor</td>
<td>0.44 (9%)</td>
<td>0.24 (4%)</td>
</tr>
<tr>
<td>Transport</td>
<td>0.18 (4%)</td>
<td>0.04 (1%)</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.03 (1%)</td>
<td>0.05 (1%)</td>
</tr>
<tr>
<td>Generators</td>
<td>0.04 (1%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Operating costs</td>
<td>0.71 (15%)</td>
<td>0.58 (9%)</td>
</tr>
<tr>
<td>Total Costs</td>
<td><strong>4.24</strong></td>
<td><strong>5.76</strong></td>
</tr>
<tr>
<td>Margin</td>
<td>0.52</td>
<td>0.91</td>
</tr>
<tr>
<td>Revenues</td>
<td><strong>4.75</strong></td>
<td><strong>6.67</strong></td>
</tr>
</tbody>
</table>

Source: Dankers et. al. 2020 and JMSF 2020
Conclusions

Nigeria led the world in cashew nuts production in the early 2000s. Within the past two decades, Nigeria has lost its position and now ranks 13th in the world and 8th in Africa. Nigeria currently produces about 97 thousand tons of cashew nuts annually, which is less than 1.7 percent of global cashew nut production. Cashew nuts sub-sector contributes less than 0.1 percent to Agriculture GDP, with a gross production value of US$ 15 million in 2018, which is a fraction of Vietnam’s gross production value of US$ 4.2 billion. Vietnam has since 2002 ranked as the world’s leading cashew nuts producer, with production quantity of 2.7 million tons in 2018, accounting for 45 percent of World’s cashew nut production. Cashew nut production in Vietnam achieved average annual growth rate of 16.1 percent between 2001 and 2018 – and contributed about 13 percent to agriculture GDP. Globally, cashew is grown in most of the tropical countries around the world. But most of the commercial cashew production is concentrated in South-Eastern Asia, West Africa, East Africa, and Brazil. The major five producers of cashew nuts are Vietnam, India, Cote d’Ivoire, Benin, and Philippines.

Nigeria lost its leading position in global cashew nuts production primarily because old orchards were not replaced with improved, higher-yielding and early maturing varieties. Countries that actively replace old orchards with improved, high-yielding and early maturing varieties have been able to steadily increase cashew nuts production. Vietnam serves a useful example. Despite being a high-cost producer, at least relative to Nigeria, cashew nuts production in Vietnam increased by 885 percent in the last two decades. Production growth was mostly driven by yields, reflecting strong push by the government to develop and disseminate high-yielding and early maturing varieties. Cashew nut yields depend on the variety and age of the trees, weather patterns in the preceding year and fertilizer application rates. The government of Vietnam has been at the forefront in ensuring that farmers have access to new and high-yielding varieties, including varieties that mature early and begin to produce nuts around 24 months after planting, and dwarf varieties that allow higher density planting of up to 500 trees per hectare compared to normal density of 200 trees per hectare. More recently, the Binh Phuoc Department of Agriculture has aggressively supported replanting with higher yielding varieties and is also promoting more intensive production systems, with higher fertilization rates and irrigation.

Nigeria will need to embark on strategic improvements in the institutional and enabling environment for the cashew nuts sub-sector. Although cashew nuts production in Nigeria is expected to increase in the coming years as younger trees reach maturity, the levels would still be far lower than the countries potential. Therefore, efforts should be intensified to ensure farmers continuously have access to improved, high-yielding and early maturing varieties to replace old trees. This agenda will require strategic improvements in the institutional and enabling environment for on-farm production. Part of this will require strengthening and rationalizing the mandates of the Tree Crops Development Units (TCDUs) at the federal and state levels and Cocoa Research Institute of Nigeria (CRIN). Currently, there is no specific policy for cashew production and no strategy exists for promoting the commodity. In contrast, Vietnam has developed a sector specific policy strategy to guide all aspect of development of the cashew nuts industry – Decision No. 579 / QD-BNN-TT of February 13, 2015 “General Development Planning for Viet Nam Cashew industry to 2020 and orientation to 2030”. Production support to farmers has centered on provision of high-yielding and early maturing varieties to replace aging trees. In addition, the Viet Nam cashew industry has developed standards for RCN trading. The standards serves as a basis for grading and quality inspection to support trading and handling disputes of raw cashew nuts. It is intended to help the Vietnamese cashew industry to adapt to market demand by enhancing the quality and safety management of RCN imports.
A strategy for developing the cashew nuts sub-sector in Nigeria should consider providing incentives for importation of RCN from neighboring West African countries to be processed in Nigeria for export markets. This approach has been successfully adopted and executed by Vietnam. A large share of the US$ 2.6 billion value of kernels processed in Vietnam consists of RCN imported from West Africa. The trade tariff regime in Vietnam aims to encourage imports of RCN and discourage imports of processed kernels to create incentives for the domestic processing industry. Since 2010, the import duty for RCN has been 5 percent or lower for most origin countries (MFN rate) and 0 percent for ASEAN countries (Indonesia, Cambodia). But the import tax on cashew kernels is significantly higher at 25 percent (MFN). In contrast, RCN imports to Nigeria attract import duties of 20 percent – same as imports of processed kernels. This tariff regime needs to be reconsidered to provide incentives for expanding processing in the country, including by ensuring that import duties are lower for RCN and higher for processed kernels. Nigeria enjoys stronger economic relations with the major cashew nuts producers in West Africa than India or Vietnam and can harness the apparatus of the Regional Economy Community ECOWAS to establish partnerships among actors in these countries. There are also opportunities to expand the domestic consumer market as the consumption per-capita of cashew nuts is quite low – 0.004 kg annually compared to 0.23 kgs in Vietnam.

Investors in cashew nut processing could aim to “move up the value chain” and develop niche, branded, and differentiated cashew nut products for direct selling to supermarkets in western countries, including organic and fair-trade labelled products. The business model of processors in Vietnam centres on intermediate processing for bulk shipments to consumption markets where final processing occurs. The main competitive advantage of Vietnamese processors is the sheer scale of installed capacity which enables efficient processing and shipping of one grade per container. However, given that the processors in Vietnam produce intermediate kernels that undergo final processing in the final consumption markets, the emerging processors in West Africa have an option to “move up the value chain” and deliver final processed kernels to final consumers in USA and Europe. The final processing costs are likely lower in Nigeria than Europe and USA, suggesting that various business models could be considered to get into final processing, for example franchising and joint ventures. Perhaps a more rewarding option would be to develop niche, branded and differentiated cashew nut products for direct selling to supermarkets in western countries, including organic and fair-trade labelled products. These strategies call for strong public-private partnerships to improve the business enabling environment, reform policies that discourage importation of RCN from neighbouring countries, develop infrastructure (especially roads and energy) in clusters where processing can efficiently occur, etc.

87 Global Trade, 2020
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6. Competitiveness and Policy Priorities in Rice Value Chain

Rice is a strategic crop in both Nigeria and Vietnam, but for different reasons. In Nigeria, rice provides the single largest source of income to farmers. Food diets are shifting strongly in favor of rice with consumption per-capita increasing rapidly. The increasing importance of rice has elevated the crop to the cornerstone of food price policy in Nigeria. In Vietnam, rice is the main staple food and a major source of export earnings, generating revenues of nearly US$ 3 billion in 2019 alone. Vietnam has a comparative advantage in producing rice for the domestic, regional, and international markets – and competes in the global markets with leading exporters such as Thailand and Pakistan. The domestic market in Vietnam is larger than in many countries with similar population size. For example, the per-capita consumption of rice in Vietnam is nearly three times that in Nigeria and therefore the domestic market is relatively larger, despite Vietnam being a smaller country. In 2018, per-capita consumption in Vietnam stood at about 97 kgs per year compared to 34 kgs per year in Nigeria.

However, even with the relatively low per capita consumption, Nigeria leads other African countries in aggregate consumption and used to be one of the largest rice importers in the world until 2013. Nigeria also ranks first in rice production in Africa. Farmers in Nigeria sell about 80 percent of their total production to domestic consumers and use the remaining 20 percent as food. The rice sector contributes about 3.2 percent of total annual agriculture production value in Nigeria and occupies 8 percent of total cultivated crop land. About 1.4 million farmers are directly employed in rice production while the rice milling industry employs another 0.3 million88. These employment figures pale in comparison with Vietnam where the rice value chain employs over 21 million people, including about 8.5 million in rice cultivation and 13 million people working in various segments of the rice value chain. In Viet Nam, rice contributes to 28.5 percent of the total annual agriculture production value and occupies 36 percent of total cultivated cropland.

Table 6.1. Contribution of rice to the economies of Nigeria and Vietnam

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Viet Nam</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture gross production value(^b)</td>
<td>US$ million</td>
<td>43,312</td>
<td>30,998</td>
</tr>
<tr>
<td>Paddy production value(^b)</td>
<td>US$ million</td>
<td>12,324</td>
<td>981</td>
</tr>
<tr>
<td>Share of GDP</td>
<td>%</td>
<td>6.00%</td>
<td>0.24%</td>
</tr>
<tr>
<td>Employment (primary production)</td>
<td>million</td>
<td>1.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Employment (downstream value addition)</td>
<td>million</td>
<td>8.5</td>
<td>13</td>
</tr>
<tr>
<td>Share of agriculture production value</td>
<td>%</td>
<td>28.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Harvested area(^bc)</td>
<td>hectare</td>
<td>7,737,100</td>
<td>3,745,134</td>
</tr>
</tbody>
</table>

Source: (a) World Bank, (b) FAOSTAT, (c) Viet Nam: GSO
Note: *17 % irrigated land is double cropped, double cropped land counted twice

88 Data on number of people employed in other off-farm segments of rice value chains (e.g. trading and transportation) is not available
Technology of Production

In Nigeria, the main source of growth in the rice sector has been increasing domestic demand from urban consumers. The rising demand led to sharp rises in rice imports and prompted both import restrictions and supply side push by the government to increase domestic production. Rice consumption in Nigeria was limited to special occasions and events in the 1960s. Since then, consumption demand has increased faster than any other West African country, driven by urbanization and economic growth. Demand for rice is concentrated in urban centers as higher income consumers increasingly demand foods that are “easy to prepare” or “ready to eat”. Rice is preferred by this class of consumers because it is easier to prepare and with much shorter cooking times compared to traditional cereals like millet, sorghum, fresh cassava, and yam roots. While growth of rice sector in Nigeria has been driven by consumer demand, the dramatic growth of yields in Vietnam has has been largely driven by supply side interventions by the government for self-sufficiency and exports. The first modern varieties were introduced in Vietnam at the end of the 1960s, and by the 1970s rice yields in Viet Nam reached the average yields in Nigeria today. Achieving rice self-sufficiency and export surplus was the main goal of agricultural production planning and investments in irrigation in Vietnam. However, following the liberalization of the economy and increased population growth, demand for rice increased rapidly providing further impetus to growth.

The average rice yields in Nigeria are nearly three times lower than Vietnam. Yields in Nigeria are estimated to be about 2.1 tons per ha compared to 5.8 ton per ha in Viet Nam. It’s important to note that rice production volume and yields in Nigeria and Vietnam were growing at the same pace until early 1980s (figure 6.1). Since then, yields dramatically increased in Vietnam but remained relatively flat in Nigeria (figure 6.2). The only source of production growth in Nigeria is increased area under cultivation, mainly in rain-fed lowlands or drylands as irrigated rice area has hardly changed in the last two decades. In Vietnam, production growth is driven by both yields and increased cultivated area. While the average rice yields are 2.1 ton/ha in Nigeria and 5.8 ton/ha in Viet Nam, the highest yields reported in both countries – the observed yield frontier – is about 6.5 tons/ha. It means that the average farmer in Vietnam operates closer to the observed national frontier than the average farmer in Nigeria. This is not surprising because the production environment is relatively more homogenous in Vietnam where rice is grown either on irrigated plains around the Mekong River Delta and the Red River Delta, or in rice terraces in the mountainous North. In contrast, the production environment varies greatly in Nigeria from the mangroves of the Niger Delta to the dry Sahel zones, and it’s likely that there are multiple production frontiers depending on agroecological zone and technology of production. Going forward, climate change could have a major impact on rice yields in Nigeria as recent estimates suggest that yields could decrease by 5.7 percent by 2030.

The yields vary widely in Nigeria depending on the varieties cultivated, quality of seeds, technology of water management and agroecological zones. The main rice systems in Nigeria are irrigated, rain-fed lowland (Fadama lands), or rain-fed upland (or dryland). Overall, yields are higher in

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89 IPSARD 2017 for Vietnam and JMSF 2020 for Nigeria
90 IFAD, 2019
91 Fadama means fertile or rich low-lying land in Hausa language. The flooding occurs during the rains after which the water drains away. Where water remains easily accessible, it may be used to irrigate the rice late in the growth cycle of the crop or to irrigate a dry season crop through pumping of water from aquifer or use of canals for flood irrigation. Therefore, the control over the water is very variable within the Fadama area. Improved Fadama’s have increased control over the water table and are comparable to irrigated rice fields.
irrigated rice fields than under rain-fed conditions, although Fadama lands with improved water control and management can achieve yields comparable to irrigated fields\textsuperscript{92}. A survey conducted by IFPRI in 2019 in six States found the lowest yields in Enugu at an average of 2.0 tons per ha and the highest in Kano with an average of 3.7 tons per ha. Another survey from 2019 reported even lower average yields of 1.5 tons per ha in Benue and Nasarawa States\textsuperscript{93}. In contrast, rice yields are less variable in Vietnam because the agroecological zones and technology of production are more homogenous. Overall, farm sizes are relatively higher in Nigeria and average 2.2 ha compared to 0.35 ha in Vietnam, but the averages mask wide differences across the various regions in both countries (table 6.2).

Figure 6. 1. Rice production in Nigeria and Vietnam was growing at similar rates until early 1980s

![Comparative production volumes](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Nigeria</th>
<th>Viet Nam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>1964</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>1967</td>
<td>30</td>
<td>35</td>
</tr>
</tbody>
</table>

Figure 6. 2. Rice yields in Vietnam increased rapidly since 1980s while in Nigeria the yield declined in most of the 1990s

![Comparative yield](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Nigeria</th>
<th>Viet Nam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>1964</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>1967</td>
<td>3</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Source: FAOSTAT

The technology of production differs greatly between Nigeria and Vietnam. Only 17 percent of rice area is irrigated in Nigeria compared to about 80 percent in Vietnam. Furthermore, use of improved seeds and fertilizers is considerably lower in Nigeria. About 80 percent of the irrigated fields in Vietnam can cultivate 2-3 crops per year, while in Nigeria only 2 crops per year are possible in the irrigated fields and improved Fadama lands. The use of chemical fertilizers differs greatly between the two countries. In Nigeria, farmers on average use 40 to 77 kgs per ha of Nitrogen compared to an average 195 kgs Nitrogen (N) per ha in Vietnam. The fertilizer application rates in Nigeria vary greatly depending on the agroecological zones and the use of irrigation. For example, very low rates of were reported in Niger and Taraba States of less than 9.4 kg of N per ha\textsuperscript{94}, average rates of 40 kg of N per ha were reported in Ebonyi state\textsuperscript{95}, and higher rates of about 86 kg of N per ha were reported in Abuja\textsuperscript{96}. Although high use of fertilizers has contributed to high yields in Vietnam, the application rates are considerably above the

\textsuperscript{92} The draft Implementation Completion and Results Report for World Bank-funded FADAMA project reports yield increases from 2.83 tons per ha to 4.93 tons per ha in the most improved and productive Fadamas
\textsuperscript{93} Ayedun and Adeniyi (2019)
\textsuperscript{94} Erhabor and Ahmadu, 2013
\textsuperscript{95} Chidiebere-Mark, 2018
\textsuperscript{96} Julius and Chukwumah, 2014
recommended levels and have led to sub-optimal returns in farm profitability and high environmental costs.

**Part of the reason driving excessive fertilizer use in Vietnam is the lack of soil testing and small plots.** Without soil testing, farmers are unable to know the combination of nutrients needed to optimize productivity. The excessive fertilizer use together with inadequate water management practices means that a large proportion of fertilizer either runs off into streams and groundwater or is emitted as nitrous oxide. Farmers in Vietnam would use about 30-35 percent less of fertilizers and pesticides if they were to apply Good agricultural Practices (GAPs). The Viet Nam Ministry of Agriculture and the extension system are now making efforts to extend the use of GAPs, including integrated pest management, and these efforts are beginning to show some results in terms of reduced use of fertilizers. In addition to low fertilizer application rates, farmers in Nigeria lack access to improved varieties and good quality seed and rely on seed from previous seasons. The use of improved seed varies greatly in Nigeria and recent surveys suggest it is relatively higher in Kebbi State where farmers use purchased seed every 3 years and retain seed from previous harvests in between. In Vietnam about 65-70 percent of paddy area is grown with certified quality seeds every year.

**Table 6.2. Summary of the characteristics of rice production in Nigeria and Vietnam**

<table>
<thead>
<tr>
<th></th>
<th>Viet Nam</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. rice area per</td>
<td>0.35 ha</td>
<td>2.2 ha</td>
</tr>
<tr>
<td>household</td>
<td></td>
<td>a, b</td>
</tr>
<tr>
<td>Small-scale farmers</td>
<td>&lt;0.2 ha</td>
<td>&lt; 2.5 ha</td>
</tr>
<tr>
<td>(54%)</td>
<td></td>
<td>90% &lt; 5.0 ha c</td>
</tr>
<tr>
<td>Medium-scale farmers</td>
<td>0.2 -2.0</td>
<td>2.5 to 5</td>
</tr>
<tr>
<td>ha (43%)</td>
<td></td>
<td>ha</td>
</tr>
<tr>
<td>Large-scale farmers</td>
<td>&gt;2ha (3%)</td>
<td>&gt; 5 ha</td>
</tr>
<tr>
<td>Farm employment</td>
<td>3.7 million people, from 8.5</td>
<td>Estimated 1.43 million rice farmers in</td>
</tr>
<tr>
<td></td>
<td>million households</td>
<td>total d</td>
</tr>
<tr>
<td>Irrigation</td>
<td>2.8 million ha (70% of total rice</td>
<td>293 117 ha e, if most double cropped, is</td>
</tr>
<tr>
<td></td>
<td>area)</td>
<td>17% of total area harvested</td>
</tr>
<tr>
<td>% area double cropped</td>
<td>Est. 80%</td>
<td>Est. 28% (irrigated and part of fadama)</td>
</tr>
<tr>
<td>Average yield</td>
<td>5.81 MT/ha</td>
<td>2.17 Mt/ha</td>
</tr>
<tr>
<td>Yield potential</td>
<td>6.5 MT/ha (reached by large scale</td>
<td>Irrigated: 6.5 MT/ha large scale farm in</td>
</tr>
<tr>
<td></td>
<td>farms in MRD with low-grade</td>
<td>Kano f</td>
</tr>
<tr>
<td></td>
<td>IR50404)</td>
<td></td>
</tr>
</tbody>
</table>

Sources: (a) Tran 2020, using IPSARD, 2017 data; (b) Ayedun and Adeniyi 2019; (c) Bamba et al. 2010; (d) KPMG, 2019a; (e) World Bank, 2014; (f) JMSF, 2020;

**Trade Competitiveness**

Vietnam is ranked among the top three rice exporters in the world, but most exports originate from a relatively small percentage of rice farmers in the Mekong River Delta. Beginning 2009, Viet Nam’s has been exporting more than 4 million tons per year with the value of rice exports averaging US$ 3 billion annually (figure 6.3) – a major contribution to foreign exchange earnings. However, the national surplus and exports come from a relatively small percentage of rice farmers. For example, the

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97 World Bank, 2016  
98 Osawe (2018)  
99 Giong Ca Mau, 2019
Mekong River Delta produces 55 percent of Viet Nam’s rice by volume and accounts for 90 percent of total national export, most of which originates in three provinces (Kien Giang, An Giang and Dong Thap) which form “the core rice belt”\(^{100}\). Rice is cultivated by about 1.4 million households, but two-thirds of the net surplus is produced by the top 20 percent of growers\(^{101}\) – the commercial farmers with larger landholdings. For example, in An Giang province rice area under cultivation ranges from 3-4 ha to 10-20 ha per household, compared to the national average of 0.35 ha. The price of Viet Nam rice exports generally follows Thai export price trends (figure 6.4). The average FOB export price of 5 percent broken rice reached 418 USD/tonne in 2018, which was higher than India (401 USD/tonne), Pakistan (402 USD/tonne), and nearly the same as Thailand (419 USD/tonne).

**Figure 6.3.** In the last 10 years, Viet Nam’s has been exporting more than 4 million tons per year with the value of rice exports fluctuating around 3 billion USD

**Figure 6.4.** The price of Viet Nam rice exports generally follows Thai export price trends

Nigeria has for many years been one of the world’s largest rice importers until 2013. Rice imports have decreased dramatically in recent years due to import restrictions and increased domestic production. However, even with the increased domestic production the local rice has not been able to meet domestic demand in terms of quality and taste. Growth in rice imports to Nigeria started to increase rapidly in 1995 and this prompted trade policy responses to reduce the import bill, beginning with introduction of import tariffs in 1995. The tariffs have been revised several times over the years. For example, import tariffs increased from 50 percent to 150 percent between 1995 and 2008, were reduced to 30-50 percent between 2008 and 2012, and then raised again to 110 percent in 2013. A major shift in import policy occurred in 2016 when the government banned rice imports, in addition to the 110 percent import tariffs\(^{102}\). Rice trade policy milestones are illustrated in figure 6.5.

\(^{100}\) Tran, 2020

\(^{101}\) World Bank (2016)

\(^{102}\) Abbas, Agada and Kolade, 2016
Rice import volumes responded to the varying import tariff regime, with imports rapidly expanding after relaxation of tariffs in 2008 and then falling rapidly after 2013 following the higher tariffs (figure 6.5). The rapid decline in rice imports which started in 2013 has been sustained through the years. However, imports into neighbouring countries (especially Benin) have increased rapidly and most of the incremental imports into the neighbouring countries were re-exported unofficially to Nigeria through porous borders, with recent estimates suggesting that about 80 percent of rice imports to Benin are generally destined to the Nigeria market. The ban on rice imports in 2016 did not stop imports and in 2017 the Central Bank of Nigeria introduced monetary measures that bars importers from using formal and informal sources of foreign exchange for rice imports. In 2019 the government decided to close borders with neighbouring countries to eliminate smuggling of agricultural commodities such as rice into the country. It’s important to note that rice import tariffs did not have an impact on domestic prices until after 2015 (figure 6.6), perhaps because more rice was smuggled through the borders. In parallel to the import tariffs, ban, and border closures, the government during various periods issued import quotas for paddy and brown rice at preferential tariff rates. The quota volumes were based on the supply gap between domestic production and consumption, and eligibility was linked to importers’ investments in rice mills and out-grower schemes.

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**Box 6. 1. Rice trade policy milestones in Nigeria**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Import tariff set at 100%</td>
</tr>
<tr>
<td>1996 – 2000</td>
<td>Import tariff revised to 50%</td>
</tr>
<tr>
<td>2001</td>
<td>Import tariff revised to 85%</td>
</tr>
<tr>
<td>2002</td>
<td>Import tariff revised to 100%</td>
</tr>
<tr>
<td>2003</td>
<td>Import tariff revised to 50%</td>
</tr>
<tr>
<td>2005</td>
<td>Import tariff revised to 100%, but preferential tariff of 50% to two companies</td>
</tr>
<tr>
<td>2006</td>
<td>duty suspended</td>
</tr>
<tr>
<td>2008</td>
<td>duty reintroduced, at 30%</td>
</tr>
<tr>
<td>2009</td>
<td>Import tariff revised to 5% to 30% tariff</td>
</tr>
<tr>
<td>2010</td>
<td>Import tariff revised to 30% to 50% tariff</td>
</tr>
<tr>
<td>2011</td>
<td>Import tariff revised to 50%</td>
</tr>
<tr>
<td>2012</td>
<td>Import quota, outside quota tariff at 72%</td>
</tr>
<tr>
<td>2013</td>
<td>Import quota, outside quota tariff at 110%</td>
</tr>
<tr>
<td>2014</td>
<td>import quota, of which 70% of volume at 30% tariff, and 30% of volume at 70% tariff</td>
</tr>
<tr>
<td>2016</td>
<td>ban of imports through land borders</td>
</tr>
<tr>
<td>October 2016</td>
<td>increase in the import tariff from 10% to 60%</td>
</tr>
<tr>
<td>2017</td>
<td>70%, and de facto ban on rice imports through monetary measures</td>
</tr>
<tr>
<td>2018-2019</td>
<td>70% (10% and a 60% levy)</td>
</tr>
<tr>
<td>August 2019</td>
<td>closure of the land borders, to prevent the imports of rice through Benin</td>
</tr>
</tbody>
</table>


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103 World Bank (2020b)
The prices for imported and local rice vary greatly across Nigeria. Most of the variation in rice prices is explained by distance from the production areas (local rice) or port of entry and grade (imported rice). Most of the imported rice enters the country through the South, while most of local rice is produced in the North and transported to large urban consumption markets in the South. Imported rice tends to be cheaper in the Southern markets and more expensive further North, while local rice tends to be cheaper in the North and relatively more expensive in the South. Other factors causing differences in rice prices are the retail channels in which the rice is sold and the quality of rice. Traditional retail channels include street vendors and small shops that sell produce that is often not packaged. Consumers use traditional retailers because they are cheaper and close to where they live. However, in recent years there has been an increase in sales of packaged rice in urban centres through supermarkets and branded products identifying the processing company, weight, and grade. Rice is increasingly substituting for traditional staples as urban consumers seek foods that are easy to prepare and store. Higher income urban consumers show a distinct preference for higher-priced imported aromatic rice and are willing to pay a premium for these attributes.

Characterization of Rice Value Chains

Rice value chains in both Nigeria and Vietnam are characterized by spot-market transactions and weak vertical coordination. The main actors in the rice value chains are farmers, input dealers, traders (small and large), millers, exporters (Vietnam), wholesalers and retailers. Most of the rice in both countries is marketed through value chains that rely on spot markets, even when the actors have engaged repeatedly. However, there are millers in both countries that contract farmers to produce rice and these relationships typically involve millers providing farmers with inputs on credit, including seeds, fertilizers, agrochemicals, and technical advice. About 275,000 ha of rice in Nigeria is cultivated on out-grower schemes, contracted tenants and independent farmers supplying to mills. This amounts to about 7.3
percent of total rice acreage. Where contract farming arrangements exist, the relationships are fraught with several challenges such as high transaction costs in Viet Nam and side-selling in Nigeria. The main approach taken by millers to limit the practice is threshing the rice for the farmer and then taking delivery on the spot.

**Contract farming in Nigeria works better where farmer organizations are strong and modelled as producer companies with growth objectives, rather than livelihood-oriented farmer organizations.** In Nigeria, large scale industrial millers such as Olam and Vetee have a well-structured out-growers system to source high quality local rice that can compete with imported rice for the same consumer segment. Contracts with small scale farmers are usually organized through their cooperatives. But the contracts performance of such farmer organizations is mixed, primarily depending on whether they are pursuing a relationship to enable their medium-term growth or short-term profits. Rice exporters in Vietnam prefer operating contracts with large farmers because of the high transaction costs involved in monitoring many small farmers, especially when the commodity is destined to export markets that demand higher quality. The monitoring aspects include the use of a specific certified variety, good practice in application of agrochemicals, and consistent quality of grain. In the case of the Loc Troi Group, farmers are supervised by the company’s technicians and the exporter only buys rice from farmers that strictly follow technical guidelines. Medium size mills that contract farmers as out-growers tend to also integrate backwards and produce their own paddy.

**More than three quarters of rice produced in Nigeria is processed by small-scale millers with processing capacity of less than 3,000 tons per year, while in Vietnam millers of this size hardly exist.** Millers are bigger in Vietnam such that more than 60 percent of millers have capacity of more than 10,000 tons per year, while in Nigeria only 23 percent of millers have this capacity. The large-scale milling capacity in Nigeria is mostly located in the States of Kebbi and Kano, milling about 36 percent of the rice in Nigeria (figure 6.7 and 6.8). The relatively small size of millers in Nigeria is partly because of the lack of a consistent, reliable supply of high-grade paddy to the mills. Establishing a large viable mill requires investment in developing a reliable supply, either through vertical integration towards farming or vertical coordination with farmers. However, the milling segment in Nigeria has integrated forward into parboiling such that 90 percent of the local rice is parboiled. This forward integration has not happened in the milling segment in Vietnam. The technology employed by large-scale millers is quite advanced in both countries, but small-scale millers in Nigeria use old equipment and are facing challenges obtaining spare parts. The rice conversion factor of paddy to rice is higher in Vietnam (70 percent) relative to Nigeria (63-66) percent. However, there are significant differences across Nigeria States. For example, the State of Kebbi – a leader in many aspects of the rice sector, including yields and installed processing – has a conversation factor of 70 percent compared to 60 percent in Kano.

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104 PWC, 2018
105 Johnson and Masias, 2016; USDA, 2019
106 JMSF, 2020
Table 6.3: Small scale millers handle more than three quarters of rice produced in Nigeria

<table>
<thead>
<tr>
<th>Milling segment of rice value chains</th>
<th>Viet Nam</th>
<th>Nigeria</th>
</tr>
</thead>
</table>
| **Small scale**<br> <10,000 tonnes/year (38.5% of mills) | <3,000 tonnes/yr (77% of rice milled)
<sup>d,e</sup> | |
| **Medium scale**<br> 10-100,000 tonnes/year (58.5% of mills) | 3 – 10,000 tonnes/yr (3% of rice milled)
<sup>d,e</sup> | |
| **Large scale**<br> > 100,000 tonnes/year (3% of mills) | > 10,000 tonnes/yr (20% of rice milled)
<sup>d,e</sup> | |
| Conversion factor | 70% | Average: 63%<sup>h</sup> to 66%<sup>d</sup>.
Kebbi: 70% (paddy to parboiled milled)<sup>c</sup>
Kano: 60% (paddy to milled rice)<sup>c</sup> |

Sources: <sup>a</sup>Tran Cong Thang, 2020; <sup>b</sup>Udemeze, 2013; <sup>c</sup>JMSF, 2020; <sup>d</sup>Johnson and Masias, 2016; <sup>e</sup>KPMG, 2019a;

Figure 6.7: At least 60 percent of the rice milling capacity in Nigeria is in the North West region

**The technology used for post-harvest drying by farmers in Nigeria leads to poor quality rice and high post-harvest losses.** Most farmers in Nigeria dry paddy on tarpaulin or concrete blocks and this results in high foreign matter and high moisture content of the paddy. In contrast, farmers in Viet Nam increasingly use combine harvesters that integrate threshing and winnowing in the harvest process and about 50 percent of the rice is machine dried. The government policy encourages farmers to combine small plots that are managed as one large field, allowing for mechanization even in small pieces of land. It is estimated that the rate of mechanization is 93 percent in land preparation, 75 percent in pesticide applications, and 50 percent in harvesting operations. The policy has also encouraged vertical coordination arrangements between farmers and millers, although spot transactions still dominate the value chains. The poor technology of harvesting and on-farm drying in Nigeria has translated into poor rice quality and high post-harvest losses. Farm-level post-harvest losses in Nigeria during harvesting,
threshing, and winnowing are estimated at 9.5 percent\textsuperscript{107} compared to 3 percent in Vietnam\textsuperscript{108}. Overall, the loss and waste in Nigeria is estimated at nearly 25 percent compared to 14 percent in Vietnam.

**Farmers have less bargaining power in setting market prices compared to all actors in the value chains.** Traders in Nigeria aggregate paddy purchased from many small-scale farmers and deliver to the mills. The prices are largely set by the traders after considering their costs of aggregating and delivering to the mills. Similarly, traders in Viet Nam have more bargaining power relative to the farmers. The price is in many cases negotiated with farmers while the crop is still in the field based on a trader’s assessment of expected quality of paddy and prevailing market prices.

### Box 6. 2. Policy and public investments lessons that have supported growth in Vietnam’s rice sector

The Vietnam government has set strategic policies and made investments that have contributed to the rapid growth of the rice sector. The nature of these investments provides important lessons that can be considered in Nigeria. The specific investments include:

- **Publicly funded research to develop high yielding varieties that meet consumer tastes and management practices to optimize productivity under local growing conditions.** The improved varieties and management practices are disseminated through a professional technician system from the central to communal level, delivering effective extension to farmers.

- **Institutional transformation of old cooperatives into new generation cooperatives modelled as producer companies.** Cooperatives play an important role in organizing small farmers and facilitate public and private service delivery. Since 1997, successive laws have facilitated the transformation of old-style cooperatives into service cooperatives and the formation of new cooperatives. As a result, cooperatives play an important role in the rice sector, providing various services to its members including input supply, irrigation management, extension management and marketing.

- **Vietnam’s traditional policy of protecting rice land and restricting its conversion to other uses has prevented diversification and reduced farmers earnings.** Irrigation systems were specifically designed for rice crops (up to 3 crops a year) and rotations with other crops has proved difficult. The government policy has shifted recently to support diversification to more high value crops, and indeed the rice acreage has been decreasing since 2013. While rice cultivation has significantly benefitted most stakeholders, research shows that earlier diversification into other sectors could have resulted in higher earnings for farmers and more efficient use of public funds\textsuperscript{109}.

- **Private sector development.** The private sector plays a major role in the distribution of inputs in Vietnam, while in Nigeria the governments input distribution programs have crowded out private sector input delivery networks.

### Costs and Margins of Value Chain Actors

This section compares costs and margins for the actors of rice value chains in Nigeria and Vietnam. Figure 6.9 and 6.10 provides a summary of the costs, selling prices and margins for each actor along the value chain in Nigeria and Vietnam respectively. Prices are in milled-rice equivalent, which means that costs and

\begin{footnotesize}
\begin{itemize}
  \item \textsuperscript{107} Udemeze, 2013
  \item \textsuperscript{108} Đoàn Lập Vũ (2012) citing Dr. Pham Van Tan, Deputy Director of the Sub-institute of Agricultural Mechanics and Post-harvest Technology (Ministry of Agriculture and Rural Development
  \item \textsuperscript{109} World Bank, 2016
\end{itemize}
\end{footnotesize}
margins for paddy have been adjusted to correspond to the amount of paddy needed to make one kg of milled rice. The amount of paddy needed to make 1 kg of milled rice (milled-rice equivalents) are 1.4 kg for Viet Nam and 1.5 kg for Nigeria. The comparisons treat rice as a homogenous commodity and do not distinguish between variety or quality. On average, the rice produced and milled in Nigeria can be considered lower quality compared to rice from Vietnam which exports about 70 percent of production. On the other hand, about 90 percent of the rice milled in Nigeria rice is parboiled, which increases the nutrition value, while rice from Viet Nam is not parboiled. The margins correspond to the difference between the identified costs and the sales price at each level of the value chain, which means any other costs not identified are subsumed under the listed costs.

The data is drawn from farmers in Kano State in Nigeria and Mekong River Delta in Vietnam. The costs at the producer (farm) level for both countries include costs incurred by farmers to purchase various inputs, including seeds, fertilizers, chemicals, irrigation water, land preparation, labor and hiring a harvester. The share of most of these inputs in the cost of production are within the 5 percent difference range between Nigeria and Vietnam, except for the cost of labor which contributes 23 percent to the cost of production in Nigeria\textsuperscript{10} compared to 6 percent in Vietnam. Overall, production costs account for 6.9 percent of the retail sales price in Nigeria and 6.10 percent in Vietnam. The margins are higher at the production level as farmers deal with relatively lower volumes compared to other actors in the chain. The costs for millers include asset depreciation costs as millers incur significant up-front investment to buy the machinery and start the mill. The margins for millers do not include sales of by-products as the cost build-up is focused on milled rice.

\begin{figure}
\centering
\includegraphics[width=\linewidth]{Figure6.9}
\caption{Build-up of costs, prices, and margins for rice value chains in Nigeria}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\linewidth]{Figure6.10}
\caption{Build-up of costs, prices, and margins for rice value chains in Vietnam}
\end{figure}


**Although farmers in Nigeria have higher margins per-kg of rice sold, their counterparts in Vietnam earn higher margins annually because of higher yields and an additional crop per year.** The total value of margins from production to milling levels is nearly three times higher in Nigeria – US$ 0.35 per kg in Nigeria compared to US$ 0.13 per kg in Viet Nam. On the other hand, the total costs at the same levels of the value chains (from production to milling) are quite similar – US$ 0.28 per kg in Nigeria compared to US$ 0.27 per kg in Viet Nam. However, the actors in Nigeria tend to work with much lower

\textsuperscript{10} Labor accounts for a higher cost of production in Cross River State where it accounts for 45 percent of cost of production.
volumes per year, which leads to relatively lower annual margins even though margins per kg are higher. The differences in volumes begin at the production level. Most farmers in Vietnam’s Mekong River Delta (the study area) can grow between 2 and 3 crops per year, compared to 2 crops in Kano (the study area in Nigeria). Furthermore, the estimated yields from the value chain studies are higher in Vietnam (6.5 tons kg/ha) than in Nigeria (3.7 tons per ha). These field estimates are higher than respective national averages, which are 5.8 kg/ha in Vietnam and 2.1 kg/ha in Nigeria. Accounting for the higher yields but without the additional crop per year in Vietnam, the average farmer in Vietnam earns margins (revenue minus costs) annually that are 24 percent higher than the average farmer in Nigeria, that is about US$ 2,570 in Vietnam compared to US$ 2,072 in Nigeria.

Table 6.4. Farmers in Nigeria have higher per-kg margins, but their counterparts in Vietnam earn higher annual margins because of higher yields and an additional crop

<table>
<thead>
<tr>
<th>Cost elements</th>
<th>Viet Nam (Mekong River Delta), per year</th>
<th>Nigeria (Kano), per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plot size, ha</td>
<td>3.00</td>
<td>2.20</td>
</tr>
<tr>
<td>Yield per season, kg/ha</td>
<td>6,500</td>
<td>3,710</td>
</tr>
<tr>
<td>Number of seasons</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Volume of milled equivalent, kg</td>
<td>27,300</td>
<td>11,100</td>
</tr>
<tr>
<td>Gross margin per kg of milled rice, USD</td>
<td>0.09</td>
<td>0.19</td>
</tr>
<tr>
<td>Total annual gross margin, USD</td>
<td>2,570</td>
<td>2,072</td>
</tr>
<tr>
<td>Revenue per kg of milled rice, USD</td>
<td>0.32</td>
<td>0.41</td>
</tr>
<tr>
<td>Total revenue, USD</td>
<td>8,717</td>
<td>4,520</td>
</tr>
<tr>
<td>Millers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of milled equivalent, kg</td>
<td>4,200,000</td>
<td>1,278,000</td>
</tr>
<tr>
<td>Gross margin per kg of milled rice, USD</td>
<td>0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>Total annual gross margin, USD</td>
<td>292,355</td>
<td>40,207</td>
</tr>
<tr>
<td>Revenue per kg of milled rice, USD</td>
<td>0.45</td>
<td>0.63</td>
</tr>
<tr>
<td>Total revenue, USD</td>
<td>1,872,143</td>
<td>802,080</td>
</tr>
</tbody>
</table>


The volume advantages of Vietnam actors go beyond farming and are especially higher in the milling segment where size really matters. The milling segment is bigger in Vietnam such that about 60 percent of millers have capacity of more than 10,000 tons per year, while in Nigeria only 23 percent of millers have this capacity. The rest of the milling capacity in Nigeria (about 77 percent) is comprised of small-scale millers with capacity of less than 3,000 tons per year – a size that rarely exists in Vietnam. The capacity of millers sampled in both Nigeria and Vietnam is lower than the respective national averages (table 6.4). In Vietnam, the average milling capacity of the surveyed millers is 4,200 tons per year compared to national median of more than 40,000 tons per year – and in Nigeria the field surveys sampled millers with average margins of 1,300 tons per year compared to national median of more than 2,000 tons per year. Although the discrepancy is clearly higher in Vietnam than Nigeria, the millers’ margins are seven times higher in Vietnam compared to Nigeria (table 6.4). In both countries, millers have the second largest share of the total margin (figure 6.11 and 6.12) but enjoy the largest volumes (table 6.4). The higher volumes enable the millers to obtain the highest annual margins in the rice value chains. On the other hand, farmers get the highest share of margins per kg but their annual revenues are modest relative to millers because the farmers are small-scale and deal in small volumes.
Although Vietnam is not a traditional exporter of rice to Nigeria, its rice is competitive in Nigeria’s domestic markets in the absence of import tariffs. Vietnam is the third largest exporter of rice in the World after India and Thailand, however; the country does not have a history of exporting rice to Nigeria. Most of the official rice imports into Nigeria originate from Thailand and India, which respectively accounted for 51 percent and 35 percent of rice imported into Nigeria in 2014 (figure 6.13). Rice export prices in Vietnam generally follow rice export prices in Thailand and are sometimes lower, which gives Vietnam a competitive advantage (figure 6.14). For example, the average FOB export price of 5 percent broken rice reached US$ 418 per ton in 2018, which was nearly the same as Thailand (US$ 419 per ton) but higher than India (US$ 401 per ton) and Pakistan (US$ 402 per ton). In 2019, the export price of Viet Nam rice declined and was much lower than Thailand. This was because China, the main export market for Vietnam, dramatically reduced the quantities of rice imported from Viet Nam. The import parity price for rice from Vietnam is US$ 0.72 per kg without tariff, which is comparable to local rice from Kano at the price of US$ 0.73 per kg in Lagos. However, the price of imported rice increases significantly with tariff, and for example a 70 percent tariff increases the price to US$ 1.07 per kg making imported rice uncompetitive (figure 6.14). The ratio of imported rice without tariffs to imported rice with tariffs is 0.67. However, this ratio does not adequately reflect the economic trade-offs involved because it does not account for all the subsidies along the value chains in Nigeria and Vietnam, including the subsidies on inputs such as fertilizers and equipment.

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111 China accounted for 22 percent of rice exports from Vietnam in 2018
112 In 2018, China imported 1.33 million tonnes of rice from Vietnam but this reduced to 477,000 tonnes in 2019
113 The reference market is Lagos and it’s likely that a different reference market could lead to different results because of transportation costs from Kano
114 A similar analysis carried out by FEWS NET recorded prices estimated an average of USD/kg 0.73 for local rice and USD/kg 0.87 for imported rice and the difference was mainly due to lower costs of freight and handling
Figure 6.13. More than 80 percent of official rice imports in Nigeria originated from Thailand and India.

Source: UN Comtrade as reported by Nigeria

Figure 6.14. Export rice prices in Vietnam track Thailand prices and have been lower in some periods, most recently in 2019.

Source: FAO-FPMA

Figure 6.15. Without tariffs, rice imports from Vietnam are competitive in Nigeria domestic market.

Source: This graph is based on several sources. IFPRI-APPEALS (2019) is used for costs in Nigeria, with the exception of the traders’ costs and margins that come from JMSF 2020. The imported rice data come from IPSARD (2017) adjusted for inflation. The import tariffs were computed based on a tariff of 70%. The costs in Nigeria for imported rice from Johnson and Ajibola (2016) and correspond to 2012 data adjusted for inflation.
Conclusions

Rice provides the single largest source of income to farmers in Nigeria. Demand has been growing faster than domestic production and this has prompted policy measures that have elevated rice to the fore of food price policy in Nigeria. Farmers sell about 80 percent of their total production to domestic consumers and use the remaining 20 percent as food. The main source of growth in the rice sector. Demand for rice is concentrated in urban centres as higher income consumers increasingly demand foods that are “easy to prepare” or “ready to eat”. Rice is preferred by this class of consumers because it is easier to prepare and with much shorter cooking times compared to traditional cereals like millet, sorghum, fresh cassava, and yam roots. Demand is increasing faster than domestic production. The rising demand led to sharp rises in rice imports and prompted both import restrictions and supply side push by the government to increase domestic production. The increasing importance of rice has elevated the crop to the cornerstone of food price policy in Nigeria. A major shift in import policy occurred in 2016 when the government banned rice imports, in addition to the 110 percent import tariffs. In 2019 the government decided to close borders with neighbouring countries to eliminate smuggling of agricultural commodities such as rice into the country.

The supply response from import restrictions has waned out and it’s becoming clear that rice trade policy alone will not improve competitiveness in the domestic market. Rice production grew steadily by more than 12 percent between 2010 and 2016, fueled by supply response from the import restrictions. However, the supply response was driven by expansion of area under cultivation and the yields did not appreciably change and have remained persistently low relative to major producers in the world. Cultivated area increased from 6.74 percent in 2010-2014 to 10.63 percent in 2015-2016. Clearly, the expansion in area under cultivation could not be sustained and there was negative growth of -5.23 percent in cultivated area in 2017-2018. Furthermore, the increased production alone will not meet the demand until the quality attributes of local rice improves to match imported rice quality.

There is need to invest in research and development to develop high-yielding varieties and improve quality attributes of local rice (taste, aroma, texture, etc.) under local growing conditions, coupled with broad-based dissemination to farmers. The technology of production differs greatly between Nigeria and Vietnam, including the attributes of varieties available to farmers and use of irrigation and complementary inputs. Only 17 percent of rice area is irrigated in Nigeria compared to about 80 percent in Vietnam. Furthermore, use of improved seeds and fertilizers is considerably lower in Nigeria. About 80 percent of the irrigated fields in Vietnam can cultivate 2-3 crops per year, while in Nigeria only 2 crops per year are possible in the irrigated fields and improved Fadama lands. The use of chemical fertilizers differs greatly between the two countries. In Nigeria, farmers on average use 40 to 77 kgs per ha of Nitrogen compared to an average 195 kgs Nitrogen (N) per ha in Vietnam. The demand for imported rice can be traced to urban, middle- and high-income consumers that show a distinct preference for clean high-quality aromatic rice that is properly packaged. On the other hand, local rice varieties do not possess these attributes and can hardly compete with this consumer segment. There is need to improve quality of local rice through supply side interventions such as varietal development and broad-based dissemination of high-yielding and better tasting varieties to farmers.

Contract farming in Nigeria works better where farmer organizations are strong and modelled as producer companies with growth objectives, rather than livelihood-oriented farmer organizations. In Nigeria, large scale industrial millers such as Olam and Vetee have a well-structured out-growers system to source high quality local rice that can compete with imported rice for the same
consumer segment. Contracts with small scale farmers are usually organized through their cooperatives. But the contracts performance of such farmer organizations is mixed, primarily depending on whether they are pursuing a relationship to enable their medium-term growth or short-term profits. But the relationships are fraught with several challenges such as high transaction costs and side-selling. The main approach taken by millers to limit the practice is threshing the rice for the farmer and then taking delivery on the spot. A key lesson for Nigeria is that the Vietnam government has a deliberate policy for institutional transformation of old cooperatives into new generation cooperatives (NGCs) modelled as producer companies. The NGCs have been quite effective at taking a long-term investment approach to asset building and service provision in critical areas such as input supply, irrigation management, extension management and marketing.

**Coordinated investments to expand the milling capacity while improving the varieties with desired attributes can increase competitiveness of domestic rice.** More than three quarters of rice produced in Nigeria is processed by small-scale millers with processing capacity of less than 3,000 tons per year, while in Vietnam millers of this size hardly exist. The relatively small size of millers in Nigeria is partly because of the lack of a consistent, reliable supply of high-grade paddy to the mills115. Establishing a large viable mill requires investment in developing a reliable supply, either through vertical integration towards farming or vertical coordination with farmers. Small-scale millers in Nigeria use old equipment and are facing challenges obtaining spare parts, leading to a poor paddy-rice conversion factor of (63-66) percent compared to 70 percent in Vietnam. Furthermore, the technology used for post-harvest drying by farmers in Nigeria leads to poor quality rice and high post-harvest losses. Most farmers in Nigeria dry paddy on tarpaulin or concrete blocks and this results in high foreign matter and high moisture content of the paddy. Overall, the loss and waste in Nigeria is estimated at nearly 25 percent compared to 14 percent in Vietnam.

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115 PWC, 2018
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7. Competitiveness and Policy Priorities in Cassava Value Chain

Nigeria has been the world’s highest cassava producing country since 2005. Production reached 59.5 million metric tons in 2018, following a period of robust average annual growth rate of 3.5 percent between 2001 and 2018. As the world’s leading producer of cassava, Nigeria accounts for 21.4 percent of World’s cassava production (table 7.1). Growth in the cassava sub-sector started around 1985 (figure 7.1) and was fueled by a rapidly increasing population, which created demand for the traditional food staple and supply of labor to cultivate the land. During this period, the government provided several incentives that catalyzed growth, including the Presidential Cassava Initiative (2001-2007) and more recently the Presidential Agricultural Transformation Agenda (2011-2015). Cassava is cultivated by both men and women, but for different purposes and typically, women and men would have separate cassava fields. While men produce cassava primarily for sale of fresh cassava roots to middlemen (who then process the crop immediately), cassava produced by women is primarily processed into pellets, flour or garri for both household consumption and sales. In South-West Nigeria, women farmers commonly participate in cassava processing groups, often paying a fee to use equipment owned by private individuals116. Overall, the crop is mostly grown by over 90% of small-scale farmers and cultivated on less than 1.0 ha of land.

Table 7.1. Contributions of cassava to GDP and agricultural production in Nigeria and Vietnam

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Year</th>
<th>Nigeria</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture GDP (%)</td>
<td>2018</td>
<td>21.2</td>
<td>14.7</td>
</tr>
<tr>
<td>Cassava production value (million tonnes)</td>
<td>2018</td>
<td>59.5</td>
<td>9.8</td>
</tr>
<tr>
<td>Share of world’s cassava production (%)</td>
<td>2018</td>
<td>21.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Gross production value (billion USD)</td>
<td>2018</td>
<td>3.2</td>
<td>2.1</td>
</tr>
<tr>
<td>Cassava share of agriculture GDP (%)</td>
<td>2018</td>
<td>12.7</td>
<td>3.3</td>
</tr>
<tr>
<td>Cassava share of agriculture production (%)</td>
<td>2018</td>
<td>13.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Cassava harvested area (% of cropland)</td>
<td>2018</td>
<td>16.9</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: a World Development Indicators (2020), b FAOSTAT (2020)

Technology of Production

Cassava in Vietnam transitioned to an industrial crop that is mostly processed into starch. The transition started around 2000 and led to tremendous increase in yields and exports. But in Nigeria cassava has remained a staple food crop that is mostly used to prepare traditional dishes. The transition in Vietnam was driven by industrial demand from cassava starch factories that were processing starch for exports, mainly to China. Cassava prices increased rapidly, and the ensuing supply response was remarkable as growth in production increased rapidly by more than 10 percent annually, from 1.9 million tons in 2000 to reach 9.8 million metric tons of cassava in 2018 (table 7.1). The production increase was due to both expansion of area under cultivation and increased yields. New high-yielding varieties were developed through collaboration between industrial starch processors and institutes for research and development. In addition to the high-yielding varieties, farmers were also able to access extension services on proper crop management practices. Vietnam now ranks as the 8th highest cassava producer in the world and 3rd in Asia – after Thailand and Indonesia. Cassava contributes about 3.3 percent to Agriculture GDP in Vietnam.

116 Forsythe et al., 2016; Bentley et al., 2017
Cassava yields in Vietnam leapfrogged Nigeria for the first time in the year 2001, and by 2018 the yields in Vietnam were more than twice the yields in Nigeria. Cassava yields in Vietnam have been consistently growing over the past two decades and reached about 19 tons/ha in 2018, compared to about 8.7 tons/ha in Nigeria in 2018 (figure 7.3). In terms of yields, Vietnam ranks third in the world after Indonesia and Thailand, while yields in Nigeria are comparable to the Democratic Republic of Congo. Furthermore, cassava yields in Nigeria have not fully recovered from the steep drop in 2013 that was caused by drought. The adverse climatic shock affected yields across many other West African countries,
primarily because farmers were not using drought resistant varieties. Climate change is expected to increase the frequency and severity of droughts in the region and recent estimates suggest that these effects could decrease cassava yields by about 3.5 percent by 2030\textsuperscript{117}. With persistent low yields, production growth in Nigeria has been fueled by expansion of area under cultivation. On the other hand, both yields and area under cultivation have provided important sources of growth in Vietnam. Cassava acreage in Vietnam has been relatively stable since 2008 while yields have continued to drive production growth. Cassava acreage plateaued because of government policy prohibiting further expansion of cassava areas to avoid negative impact on other crops and forest resources.

Figure 7. 4. Cassava yields have stagnated in Nigeria for decades, but acreage increased

Figure 7. 5. Since 2000 both yields and acreage have grown tremendously

Source: FAOSTAT

Source: FAOSTAT

The cassava processing sectors in Nigeria and Vietnam could not be more different. Vietnam’s processing sector is predominantly for high value non-food products to meet export demand while in Nigeria most of the cassava is processed to food products for the domestic market. Cassava is a highly perishable crop and therefore processing is critical to maintain its value for food and non-food uses. Cassava processing in Vietnam is oriented to high value non-food industrial products for the export market. Nearly 70 percent of processed cassava is converted to starch for exports. China is the most important destination for starch exports from Vietnam, accounting for about 83 percent. In addition to starch, the cassava processing industry in Vietnam generates products such as animal feeds (14 percent of processed cassava) and food products (5.6 percent of processed cassava). In contrast, about 83 percent of processed cassava in Nigeria is converted into gari – a low value food product used to prepare traditional meals – and about 3 percent is converted to High Quality Cassava Flour (HQCF). In 2015, the government passed legislation that requires 10 percent of bread to be constituted of HQCF. Interviews with flour millers suggest that the industry is reluctant to use HQCF because of variable quality.

\textsuperscript{117} According to IFAD projections, cassava yields in Nigeria will decrease as a result of climate change by about 3.5% by 2030, albeit less than rice yields, which are projected to decrease by 5.7 percent (IFAD, 2019)
Furthermore, the legislation has not been enforced and the industry continues to make bread from wheat flour, most of which is imported by the major food agribusinesses under preferential tariff rate quotas. Non-food cassava products account for about 7 percent of processed cassava and the main products include dried cassava chips which are used for animal feed, ethanol production, paints, pharmaceuticals, sweeteners, etc.

Sources of On-farm Competitiveness

Investments in research and development and provision of extension services have enabled cassava farmers in Vietnam to widely adopt high-yielding improved varieties. Since early 2000’s, the development and distribution of new varieties have continued to improve cassava yields in Vietnam. The country has invested heavily in research and development and plant protection. The investments have produced new and high yielding cassava varieties, including the popular KM94 and KM419. These varieties are cultivated in almost 70 percent of the country’s area under cassava and produce about 29.4 tons/ha under good management practices. In addition, the investments have generated other improved varieties such as KM98-7, SM937-26, KM140, KM98-5, and KM98. Although these varieties have relatively lower yields compared to KM94, their growing cycles are shorter and are more adaptable to changing climatic conditions that often result in shortened growing seasons. Overall, improved varieties account for more than 90 percent of the cassava cultivated area in Vietnam\textsuperscript{118}. The high adoption of improved varieties is attributed to accessibility of the planting material and awareness by the farmers. For example, the Vietnam Cassava Programme (VNCP) distributed ten million sticks of new varieties to various provinces between 2005 and 2018, which resulted in average yields increasing from 13 tons/ha in 2005 to 18 tons/ha in 2018.

Access to improved cassava varieties is poor in Nigeria and adoption rates are much lower than Vietnam. About 95 percent of farmers cultivating cassava in Nigeria are smallholder farmers growing cassava on less than 2 hectares. Similarly, in Vietnam more than 85 percent of cassava is produced by small-scale farmers cultivating less than one hectare of land. The National Root Crop Research Institute (NRCRI) and International Institute of Tropical Agriculture (IITA) have made considerable efforts to improve cassava productivity in Nigeria. These efforts led to development of several improved cassava varieties, with the most recent being UMUCASS 42 and UMUCASS 43. The potential yield from these varieties are 49-53 tons per ha under research conditions, but actual yields on farmers’ fields have been much lower due to lack of proper crop management practices. Both varieties perform well in different production regions of Nigeria. Furthermore, they contain moderate levels of pro-vitamin A with high dry matter and good disease resistance. Despite the advancement in research and development of improved cassava varieties in Nigeria, actual yield growth is constrained by weak access to improved planting materials, low adoption, and weak extension systems. The adoption of improved cassava varieties showed a large spatial heterogeneity across the country. For example, adoption rates are estimated to be as high as 79 percent in the Southwest region, but only about 31 percent in the Southeast\textsuperscript{119}. Adoption rates are constrained by lack of awareness and weak access to improved cassava varieties. These are major problems as only about 13 percent and 4.7 percent of farmers in 2017 obtained planting materials through research institute and extension/government sources respectively\textsuperscript{120}. There is need to rethink the formal

\textsuperscript{118} CIAT 2016
\textsuperscript{119} Cassava Monitoring Survey by Wossen et al (2017)
\textsuperscript{120} Wossen et al (2017)
seed system and extension service in Nigeria because access to high-yielding improved varieties and extension services are imperatives to increase productivity in smallholder systems.

**A major constraint faced by farmers in Nigeria is availability of fertilizers, which leads to low fertilizer application rates and low cassava yields.** Although cassava is quite resilient to varying agroclimatic conditions, the crop responds well to proper crop management practices, including fertilization. But farmers in Nigeria do not apply fertilizers directly to cassava and instead the fertilizers are applied to maize that is intercropped with cassava. Both adoption and fertilizer application rates are remarkably low compared to Vietnam. About 86 percent of farmers in Vietnam apply fertilizers on cassava fields compared to 36 percent in Nigeria. Furthermore, in Vietnam cassava is usually intercropped with leguminous crops that have natural ability to fixate nitrogen from the air, thereby improving soil fertility. The fertilizer application rates vary greatly in Vietnam. The application rates are highest in the North (about 664.17 kg/ha) and lowest in the Central Highlands (352.7 kg/ha). In contrast, the Federal Ministry of Agriculture and Rural Development in Nigeria estimates average fertilizer application rates at 13 kg/ha by, which is a fraction of both the lowest amounts applied in Vietnam and the 200 kg/ha recommended by the United Nations Food and Agriculture Organization (FAO). There is evidence that the primary constraint to fertilizer use in Nigeria is that the input is not readily available at the time it is needed, rather than affordability or farmers’ lack of knowledge about the importance of using fertilizers. Demand far outstrips the supply each year and the government fertilizer programs are fraught with several challenges that lead to late and insufficient delivery.

**The Cassava Mosaic Disease continues to dampen yields in Nigeria and the various control measures have largely been rendered ineffective by farmers use of contaminated planting materials.** The Cassava Mosaic Disease (CMD) is a viral disease that is rampant in Africa and the Indian subcontinent. Despite attempts to restrict spread through early quarantine controls, the viruses behind the disease have spread rapidly with the intensification of cassava production in Africa. The practice of farmers using own cuttings for planting or sharing cuttings with neighbors makes it harder to control the spread of the disease because farmers cannot determine if the cuttings are contaminated. The reported yield loss from CMD varies widely from complete loss of the crop to insignificant impacts, in part depending on the cassava varieties. As such, cassava varieties are often classified on the basis of tolerance to CMD into the following categories: (i) susceptible; (ii) tolerant – becomes infected but with little symptoms, or (iii) resistant – difficult to be infected but may be susceptible to substantial yield loss if infection occurs. Cassava plants grown from infected cuttings sustain a greater yield loss while plants infected at a late stage of crop growth are virtually unaffected. Therefore, the most effective control measure is a system that supplies farmers with disease-free cuttings coupled with removal of diseased from fields. The CMD is not present in Viet Nam (CABI); however, the Cassava Witches Broom disease is becoming a growing problem there since 2017. Similarly, cassava witches broom disease is propagated by diseased planting material. Unfortunately, farmers in both countries continue to use their own cuttings for several years in succeeding crops.

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121 Wossen et al, 2017; Le, 2019
122 Liverpool-Tasie, Olaniyi, Salau & Sackey, 2010; Le et al, 2019
123 Banful et al. (2010) and Liverpool-Tasie (2019)
124 The disease is caused by one, or a mixture, of around 10 species of Cassava Mosaic Geminiviruses (CMGs)
125 https://www.cabi.org/isc/datasheet/2747
Trade Competitiveness

Vietnam is the world’s third largest exporter of cassava with export revenues exceeding US$ 1.3 billion in 2017\(^{126}\). In contrast, Nigeria currently plays a very minor role in cassava international trade despite being the world’s largest producer. Exports of cassava products from Vietnam have grown rapidly since 2000 in response to the growing global demand and rising world market prices for starch (figure 7.6). About 85.6 percent of domestic cassava production in Vietnam is exported. The main cassava products exported are starch and dried cassava. Starch exports have been growing rapidly in the country and accounted for about 72 percent of total export value of cassava products in 2017, a significant increase from zero in 2008 (figure 7.7). On the other hand, dried cassava exports have declined significantly from being the only product exported in 2008 to accounting for only 27.5 percent of export value in 2017. These dynamics represents a clear transition of Vietnam’s cassava processing industry from low-value product (dried cassava) to high-value cassava starch. Furthermore, Vietnam started importing dried cassava around 2014 and the imports are processed into high-value starch for exports. The value of dried cassava imports increased from about US$ 4 million in 2016 to US$ 335 million in 2017, enabling Vietnam to increase value of exports from US$ 472 million in 2016 to US$1.36 billion in 2017. The data suggests that quality of starch from Vietnam is also improving. For example, the FOB price of Vietnamese cassava starch increased from US$ 270 per ton in 2017 to US$ 395 per ton in 2018. However, the price was still relatively lower compared to Thailand and China, and this mainly due to quality differences. The quality demands are higher in starch for consumption relative to industrial use. The main quality attributes are white color, fine texture, neutral taste, and absence of odor.

Figure 7.6. Vietnam earned US$1.3 billion from cassava exports in 2017 while Nigeria played a very minor role in cassava trade

Figure 7.7. Vietnam’s exports have rapidly transitioned from low-value dried cassava to high starch since 2008

\(^{126}\) 2017 is the latest year where data is available
Although Nigeria is still a very minor player in the cassava export market, exports of cassava products have been growing in recent years and there is scope to exploit the emerging opportunities. Exports of cassava products from Nigeria doubled between 2014 and 2017 to reach about US$ 1.26 million, but the remarkable growth started from a very low base. During this short time period, Nigeria increasingly transitioned from exporting low-value dried cassava to high-value starch and cassava flour (table 7.2). Israel and China are the major export destinations of cassava starch from Nigeria, respectively accounting for 51 percent and 37 percent of starch exports (figure 7.8). The main export destination for dried cassava from Nigeria is Chad, accounting for about 88 percent of exports (figure 7.9). Nigeria also exports dried cassava and starch to several other African countries, including Niger, Togo and Cote d’Ivoire. Other export destinations for these cassava products from Nigeria are Netherlands, Norway, Belgium, Malaysia, US, Saudi Arabia, UK, Canada, and Brazil. The trade data suggests that there might be potential to increase cassava exports from Nigeria.

A strategy for export promotion would require investments in research and development to develop varieties that have high starch content and improvements in the technology of production. The key investments include effective systems to transfer clean planting materials to the farmers, removing old plants contaminated with CMD and treating soils, and effective extension to ensure farmers apply the correct agronomic practices and proper fertilization. In addition, private sector investments into cassava processing can be encouraged to improve coordination between organized farmers with the cassava processing industry, Interviews with SMEs in starch processing suggest that many are running below capacity and have no vertical coordination arrangements with farmers but instead rely on spot market arrangements. The industrial demand for cassava also includes production of starches, paints, pharmaceuticals, sweeteners and feed for livestock and aquaculture. Field surveys conducted in the course of the value chain study suggested that the problem of variable quality of cassava-based feed is the main reason the industry prefers imported feed based on non-cassava products such as maize. Cassava could also substitute maize as feed ingredient in the poultry sector. However, the overall growth potential of the animal feed segment in Nigeria is not clear because aquaculture and poultry segments require highly nutritious feeds. In Vietnam, for example, the 14 percent of cassava used for animal feed goes mostly to pig feeding, which is not an important livestock sector in Nigeria.

Table 7.2. Nigeria is transitioning from exporting low-value dried cassava to high-value starch and cassava flour

<table>
<thead>
<tr>
<th>Year</th>
<th>Export Value (million US$)</th>
<th>Share of Export Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dried Cassava</td>
<td>Flour</td>
</tr>
<tr>
<td>2014</td>
<td>0.62</td>
<td>39.4</td>
</tr>
<tr>
<td>2015</td>
<td>0.75</td>
<td>32.7</td>
</tr>
<tr>
<td>2016</td>
<td>1.02</td>
<td>15.5</td>
</tr>
<tr>
<td>2017</td>
<td>1.26</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Source: FAOSTAT
Characterization of Cassava Value Chains

The cassava value chains in Nigeria and Vietnam are organized quite differently. The main actors in cassava value chains in Nigeria are producers, processors, industrial processors, wholesale traders/transporters, retailers, and consumers. On the other hand, the main actors in Vietnam are producers, collectors/assemblers, processors/exporters, and consumers. In Nigeria, the transactions between farmers and the next actors (middlemen or processors) are predominantly spot and only few processing companies have started working with farmers through vertical coordination arrangements. In contrast, in Vietnam, the relationship between farmers and village assemblers is mostly vertical coordination with some form of contracting, although spot markets also exist. Farmers living in remote areas in Vietnam with little or no access to the nearest market or city sell their produce to village assemblers, while farmers living close to city sell to commune assemblers or to factory/processors, depending on volumes and prices. Since cassava is highly perishable, the distance to roads and markets hugely determines a farmers’ bargaining power. Furthermore, due to high demand of fresh cassava in Vietnam, most village and commune assemblers pay in advance in to secure the produce. Village assemblers procure cassava roots or dry chips from farmers and sell them to commune assemblers.

In Nigeria, farmers are typically involved in the initial processing of cassava due to high perishability of fresh tubers and the lack of vertical coordination with organized off-takers with advanced processing technology. There are three main value chains through which processed cassava products in Nigeria reaches the end users: (i) small-scale farmers that produce for direct consumption and processing into various food products; (ii) medium scale farmers that produce primarily for processing into food products, and (iii) large-scale farmers that produce for industrial processing into ethanol, starch and glucose. More than 80 percent of the fresh tubers pass through the traditional channel, with processing occurring at the village-level using simple tools and techniques to convert fresh cassava into a

![Figure 7. 8. Israel and China are the main export markets for cassava starch processed in Nigeria](image1)

![Figure 7. 9. Chad is the main export markets for dried cassava processed in Nigeria](image2)
wide array of products. This channel is wholly supplied by smallholder farmers that produce more than 90 percent of cassava in Nigeria. The industrial processing channel handles just about 10 percent of processed cassava and employs advanced processing technology.

The industrial processing capacity in Nigeria needs to expand significantly from its current share of 10 percent. The additional capacity should move closer to the production areas to stimulate transformation in the cassava sector. The conversion rate of cassava processing into starch is relatively low (17 percent) in Nigeria, compared with industry average of 25 percent in Vietnam. The low starch conversion rates suggest enormous scope in research and development to increase the starch content of cassava varieties cultivated in Nigeria. In contrast with Nigeria, demand for fresh cassava tubers is very high in Vietnam such that there are little incentives for farmers and traders to engage in processing. The scale of processing in Vietnam varies greatly and include: (i) small scale processors that mainly produce up to 10 metric tons of wet starch; (ii) medium scale processors that produce 10-15 metric tons of starch per day; and (iii) large scale processors generating more than 50 metric tons starch per day. Access to electricity is fairly consistent in the processing segment Vietnam, while the processors in Nigeria rely on power generators due to unreliable supply of electricity.

Spot market arrangement characterize transactions relationship between cassava producers and traders in Nigeria. In contrast, most traders in Vietnam pay farmers in advance to secure the supplies. Nearly 90 percent of the total fresh cassava produced in Vietnam is purchased by three main types of buyers – village assemblers, commune assemblers, and large processors (factories). Village assemblers procure cassava roots or dry chips from farmers and sell them to commune assemblers. The procurement of cassava roots and dry chips is based on verbal contract and prevailing market price.

**Box 7.1. Policy highlights for cassava in Nigeria and Vietnam**

Both countries have made significant policies to guide the development of the cassava sector. The major policy highlights include the following:

- **Vietnam policy on sustainable cassava development.** A major policy milestone in the cassava sector in Vietnam was in the early 2000s when the government introduced the cassava research programme (VNCP), focussed on distribution of high starch yielding varieties and extension advice. The program led to rapid increase in yields and area under cultivation such that production growth increased by more than 10 percent annually through 2010. Demand for land to cultivate cassava grew rapidly. In some regions of the country, farmers cut down sugarcane and illegally deforested woodlands to grow cassava. The government issued a directive on sustainable cassava development in 2008. And in 2012, the government directed cassava area should be maintained at 450,000 hectares by 2020 and on land with a slope of less than 15 degrees. The directive was issued at a time when the cassava acreage reached almost 560,000 ha. Although these directives have not been successful in reducing cassava acreage, they probably did help to stop the rapid expansion and further deforestation. Area under cultivation has remained stable since 2012.

- **Government policies in Vietnam have emphasized the needs of producers.** Cassava can be grown in economically disadvantaged areas and by poor farmers, and therefore it is viewed as an important crop to reduce income inequalities. The governments’ current tariff structure is mainly designed to protect the interest of the farmers and ahead of interest of the processing industry. For example, in 2017 the Ministry of Finance rejected a request of the Viet Nam Cassava Association to impose high export taxes on fresh cassava, which was meant to reduce direct exports by producers to China and increase supplies.

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127 PIND, 2011
to the domestic processing industry. Nevertheless, there is government support for processing enterprises in the form of tax exemption on land and subsidies for credit, research, and training.

- **The government of Vietnam has slowly phased in mandatory use fuel blended with ethanol (E5 biofuel) to create a market for cassava-based ethanol.** The regulation aims to make E5 biofuel cheaper than gasoline. However, the policy has so far been less successful because the price differential is not high enough to create spontaneous consumer demand. In addition, there are no measures to protect the domestic industry against cheaper ethanol coming from the international and regional markets. Overall, biofuel policies have had less impact on domestic cassava demand than was expected and there is no evidence that cassava exports have reduced due to demand for biofuels.

### Costs and Margins of Value Chain Actors

This section compares costs and margins for the actors of cassava value chains in Nigeria and Vietnam. Figure 7.10 and 7.11 provides a summary of the costs, selling prices and margins for each actor along the value chain in Nigeria and Vietnam respectively. The costs at the producer (farm) level for both countries include costs incurred by farmers to purchase various inputs, including planting materials (seedlings and cassava stem cuttings), fertilizers, chemicals, and labor. The profit margins correspond to the difference between the production costs and the sales price at each level of the value chain, which means any other costs not identified are subsumed under the listed costs. The data for Nigeria was collected from farmers in the states of Ogun, Delta and Kogi – and these states were selected to respectively represent the major cassava growing regions in the country, which are South-West, South-East and North-Central. Average cassava yields in these states are about 8.8 tons per hectare. The data for Vietnam was collected in Yen Bai province of Northern Midlands and Mountains region. Because of proximity to China, most of the cassava produced in the region is processed into starch for exports to China – the major export markets for starch from Vietnam. Average cassava yields in the study area are estimated at 19.4 tons per hectare. The yields are equivalent to national average yields in Vietnam but more than twice higher than the study area in Nigeria. A major challenge in comparing costs and margins between Nigeria and Vietnam is that the countries process cassava into different products and sell in different markets. In Vietnam, cassava is processed into industrial products such as starch, modified starch, dried sliced cassava, and ethanol – mainly for the export markets. In Nigeria, cassava is typically processed into food products for the domestic market. To address this challenge, the price and cost comparisons are based on roots equivalent, which means that that prices for all products correspond to the quantity obtained from one kilo of cassava root to enable comparison across diverse products.

**Although the cost of cassava production is nearly three times higher in Vietnam, farmers revenues are four times higher than Nigeria due to higher yields and better farm-gate prices.** Cassava farm-gate prices in Vietnam doubled in the last 10 years while prices in Nigeria remained flat. The total variable cost of cassava production per hectare in Vietnam was US$ 696 compared to US$ 235 in Nigeria, which translates to $0.036 per kg in Vietnam and $0.014 in Nigeria because of higher yields in Vietnam. The relatively low cost of production in Nigeria is mainly attributed to low input use, especially low use of fertilizers and agrochemicals. However, the combination of higher yields and better farm-gate prices make cassava farming more profitable in Vietnam with profit margins per hectare of US$683 compared to $147 in Nigeria. Labor is the major cost component in Nigeria with a cost-share of nearly 60 percent while in Vietnam it is fertilizers with a cost share of about 51%

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128 It is estimated that about 86 percent of farmers in Vietnam apply cassava to fertilizers compared with 36 percent in Nigeria (Wossen et al, 2017 and Le, 2019)
percent. The relatively higher cost share for labor in Nigeria is not surprising because production is mainly through smallholder farmers that lack access to mechanization services. Tractor services are used in about 10 percent of cultivated area, typically in medium and large-scale farms that produce for industrial processing. It is estimated that the average labor requirement in one cassava season in Nigeria is about 260 man-days per hectare, compared to 66 man-days/hectare in Vietnam. On aggregate, production costs account for a relatively large share of farm-gate prices in Nigeria (62 percent) than Vietnam (51 percent), which means that profit margins for farmers in Vietnam comprise a relatively higher share of farm-gate prices than for farmers in Nigeria.

**Figure 7.10.** Cassava yields have nearly tripled in Vietnam since 2000, while in Nigeria yields became more volatile and declining

**Figure 7.11.** Cassava prices doubled in Vietnam in the last 10 years while prices in Nigeria remained flat

Farmers participating in starch value chains in Vietnam earn higher profit margins than those participating in the starch value chain in Nigeria. The higher profit margins can be traced to higher yields, better farm-gate prices and higher starch conversion ratio of the cassava varieties grown in Vietnam. The cassava starch conversion ratio is 25 percent in Vietnam compared to 17 percent in Nigeria – and the difference is mainly attributed to differences in the starch content of cassava varieties cultivated in the two countries and the conversion efficiency in the processing segment. The estimated profit margin for producers (farmers) in starch value chains is US$ 0.036 per kg in Vietnam compared to US$ 0.018 in Nigeria (figure 7.12 and 7.13. The profit margins for farmers in Vietnam account for 72 percent of total margins in the starch while chain, which is higher than the 50 percent share of margins earned by farmers in Nigeria. Although the farmers in both countries earn the highest margins per kg relative to other actors, total margins are by far the lowest at the producer level because farmers cultivate small plots with low volumes of production. This suggests that profits for farmers in Nigeria can be increased through raising yields and forming producer organizations at a scale that can deliver the agglomeration economies of scale. In both countries, the starch processors capture the highest total margins. The estimated margins for a large-scale starch processor in Vietnam with installed capacity of 40 million tons annually is about US$ 4.3 million. A large-scale starch processor in Nigeria with installed capacity of 32 million tons annually would earn profit margins of about US$ 2.8 million. The margins of
intermediate actors (traders and assemblers) depend on the aggregate number of actors in the value chain (length of the value chain) and the volumes traded. These intermediaries tend to earn higher margins when they participate in shorter value chains or handle higher volumes.

![Figure 7. 12. Cost build-up of starch value chain in Vietnam](image1.png)

![Figure 7. 13. Cost build-up of starch value chain in Nigeria](image2.png)

Source: Cora et al. 2020; JMSF 2020

![Figure 7. 14. Cost build-up of gari value chain in Nigeria](image3.png)

![Figure 7. 15. Farmers in gari value chain earn a relatively smaller share of value chain margins](image4.png)

Source: Cora et al. 2020; JMSF 2020

Farmers in the gari value chain earn a relatively smaller share of total profit margins compared to those in the starch value chain, but the relatively small share is offset by higher total margins in the gari value chain. A comparison of the total profit margins in cassava value chains in Nigeria show
that the gari value chain have higher margins (US$ 0.053 per kg) compared to US$ 0.038 per kg in the starch value chains (figure 7.14). The share of value chains profit margins accruing to the farmers in gari value chains is 36 percent (figure 7.15), which is lower than the 50 percent received by farmers in the starch value chain. However, the value chains for starch and gari in Nigeria are not differentiated at the producer level and so farmers earn the same margins regardless of the value chain. The lack of differentiation points to the underdeveloped nature of the value chain for industrial starch. The same varieties for food products are processed into starch as there are no specialized varieties with high starch content. Investment costs for gari processing are estimated to be relatively lower than starch processing.

Conclusions

Cassava in Vietnam transitioned to an industrial crop that is mostly processed into starch starting from the year 2000. The transition led to tremendous increase in yields and exports. But in Nigeria cassava remains a staple food crop that is mostly used to prepare traditional dishes. The transition in Vietnam was driven by industrial demand from cassava starch factories that were processing starch for exports, mainly to China. Cassava prices increased rapidly, and the ensuing supply response was remarkable as growth in production increased rapidly by more than 10 percent annually from 1.9 million tons in 2000 to reach 9.8 million metric tons of cassava in 2018. The production increase was due to both expansion of area under cultivations and increased yields. New high-yielding varieties were developed through collaboration between industrial starch processors and institutes for research and development. In addition to the high-yielding varieties, farmers were also able to access extension services on proper crop management practices. Vietnam now ranks as the 8th highest cassava producer in the world and 3rd in Asia – after Thailand and Indonesia. Cassava contributes about 3.3 percent to Agriculture GDP in Vietnam.

The cassava processing sectors in Nigeria and Vietnam could not be more different. Vietnam’s processing sector is predominantly for high value non-food products to meet exports demand while in Nigeria most of the cassava is processed to food products for the domestic market. Cassava is a highly perishable crop and therefore processing is critical to maintain its value for food and non-food uses. Cassava processing in Vietnam is oriented to high value non-food industrial products for the export market. Nearly 70 percent of processed cassava is converted to starch for exports. China is the most important export destination for starch, accounting for about 83 percent of starch exports from Vietnam. In addition to starch, the cassava processing industry in Vietnam generates products such as animal feeds (14 percent of processed cassava) and food products (5.6 percent of processed cassava). In contrast, about 83 percent of processed cassava in Nigeria is converted into gari – a low value food product used to prepare traditional meals – and about 3 percent is converted to High Quality Cassava Flour (HQCF). In 2015, the government passed legislation that requires 10 percent of bread to be constituted of HQCF. Interviews with flour millers suggest that the industry is reluctant to use HQCF because of variable quality. Furthermore, the legislation has not been enforced and the industry continues to make bread from wheat flour, most of which is imported by the major food agribusinesses under preferential tariff rate quotas. Non-food cassava products account for about 7 percent of processed cassava and the main products include dried cassava chips which are used for animal feed, ethanol production, paints, pharmaceuticals, sweeteners, etc.

Nigeria may pursue a dual strategy for transformation of the cassava sector, focusing on (i) increasing the competitiveness of the industrial starch value chain and (ii) modernizing the
food products value chains to improve quality of gari and high-quality cassava flour. The industrial starch value chain currently handles only 10 percent of the processed cassava and there is scope for growth to meet the needs of the domestic sector and expand exports. The data exports of cassava products from Nigeria have been growing rapidly, albeit from a low base. In particular, the share of starch in exports of cassava products nearly doubled within three years, from 23 percent in 2014 to 45 percent in 2017. Nigeria is rapidly transitioning from exporting low-value dried cassava to high-value starch and cassava flour. The main export destinations for starch from Nigeria are China and Israel. In addition to industrial starch, there is enormous scope to modernize the food products processing industry to increase the quality of gari and high-quality cassava flour (HQCF). Currently, the quality of HQCF varies widely such that flour millers have been reluctant to embrace the 2015 government legislation which required that 10 percent of bread to be constituted of cassava flour. Improving the quality of HQCF would help create conditions for successful enforcement of the 2015 legislation for the benefit of the domestic cassava sub-sector.

A strategy for developing the industrial starch value chain would require coordinated investments between researchers, farmers, and the processing sector – so that farmers can access varieties that yield high starch content and produce for the specific needs of starch processors under vertical coordination schemes. The conversion rate of cassava processing into starch is relatively low (17 percent) in Nigeria, compared with industry average of 25 percent in Vietnam. The low starch conversion rates suggest enormous scope in research and development to increase the starch content of cassava varieties cultivated in Nigeria. The research and development work will need to be complemented with effective system to transfer clean planting materials to the farmers while removing old plants contaminated with Cassava Mosaic Disease (CMD) and treating soils, effective extension to ensure farmers apply the correct agronomic practices and proper fertilization, providing business incentives for private sector investments into cassava processing, linking organized farmers with the cassava processing industry, and effective export promotion. Interviews with many SMEs in starch processing suggest that many are running below capacity and have weak backward vertical coordination with farmers. The industry needs to transition from spot transactions and develop dedicated supply chains through vertical coordination arrangements with growth-oriented farmer organizations. To stimulate transformation in the cassava sector, the capacity would not only need to expand significantly but also move closer to the production areas.

A strategy for modernizing the value chains for cassava food products should aim to deliver quality gari and HQCF to support healthy diets and meet the needs of higher-income consumers and the milling and baking industry. While demand for gari remains high among low income consumers, it is not growing in the diets of middle- and higher-income consumers, partly due to lack of product differentiation. In particular, urban consumers demand differentiated and branded gari products, with superior attributes in terms of taste, color, and texture. Expanding the market for high-quality differentiated gari products would require coordinated investments between the milling sector and upstream segments of the value chains – farmers and researchers – to reduce produce cassava that is healthy (perhaps low in starch) and with better taste and color. Such coordinated investments would also improve the quality of HQCF, which is critical to enforcement of the 2015 legislation that required bread to be co-constituted from cassava and wheat.
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8. Competitiveness and Policy Priorities in Poultry Value Chain

The gross production value of chicken was comparable between Nigeria and Vietnam in 2007. However, it increased rapidly in Vietnam in the past 10 years and fell sharply in Nigeria such that it is now at least nine times higher in Vietnam. The chicken population has been declining in Nigeria since 2008 (figure 8.1), dragging down the gross production value which recorded average annual growth of about -2.4 percent, a significant drop from the 1.9 percent growth achieved between 1991 and 2008 (figure 8.2). The drop was caused by escalated influx of poultry meat from Benin between 2008 and 2011 and the 2006-2008 outbreak of the High Pathogenic Avian Influenza (HPAI) epidemic, which was followed by another outbreak in 2014. The data suggests that the poultry sector in Nigeria has not been able to recover from the impacts of the HPAI shock. Currently, production value of broiler in Nigeria is about $315.5 million, which is nearly a tenth of the USS2.9 billion value of production in Vietnam. The chicken population in Vietnam is estimated at 317 million birds producing meat output of 839.6 thousand tons annually and contributing 6.7 percent to agricultural GDP. In comparison, there are about 139 million birds in Nigeria\footnote{Nigeria has the second largest chicken population in Africa after South Africa (SAHEL, 2015)} producing about 192.7 thousand metric tons of chicken meat (figure 8.3). Although poultry production is one of the most commercialized subsectors in Nigerian agriculture, the share of broiler meat in agricultural GDP is relatively lower at only 1 percent.

\textbf{Figure 8. 1.} Chicken population has dropped in Nigeria since 2010 but continues to increase in Vietnam  
\textbf{Figure 8. 2.} Chicken production value in Nigeria dropped rapidly since 2008 while it increased steadily in Vietnam

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{chicken_population_production.png}
\caption{Chicken population and production value comparison between Nigeria and Vietnam.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{chicken_productivity.png}
\caption{Chicken meat productivity in Nigeria and Vietnam.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{ext_service_access.png}
\caption{Access to extension services in Nigeria and Vietnam.}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{farm_level_change.png}
\caption{Farm-level technical change in Nigeria and Vietnam.}
\end{figure}

\textbf{Source: FAOSTAT}

\textbf{Source: FAOSTAT}

\textbf{Source: FAOSTAT}

\textbf{Source: FAOSTAT}

\textbf{Source: FAOSTAT}

\textbf{Chicken meat productivity has remained flat in Nigeria\footnote{Based on FAOSTAT data which suggests no change since 1990 which appears highly unlikely} and is about 50 percent lower than Vietnam.} In the early 1990s, chicken meat productivity in Vietnam was lower than Nigeria but it is now 50 percent higher thanks two decades of steady growth (figure 8.4). The lack of growth in Nigeria reflects weak ability to recover from shocks, slow technical change at the farm-level and weak access to extension and advisory services. For example, less than 15 percent of poultry farmers accessed extension services...
in 2015 in Oyo state\textsuperscript{131}. In contrast, poultry farmers in Vietnam receive regular extension support from central and local government, including annual transfer of new technologies such as new breeds, biosafety protocols, etc. Without growth in chicken productivity and as a supply response to the 2002 government policy of restricting importation of poultry products, the population of birds (flock size) in Nigeria increased by about 5.4 percent annually between 2000 and 2010 compared to 3.9 percent in Vietnam (figure 8.1 above). But the growth era was short-lived, and the flock size has been on a declining trend such that the current flock size is comparable to 2000 levels. The declining trend is related to several factors, including weak enforcement of the 2002 import ban, heightened smuggling of imported chicken through the Benin border, and the 2014 outbreak of HPAI epidemic. Part of the government’s response to the epidemic involved culling about 1.4 million birds within the first 6 months of the epidemic (January to June 2015)\textsuperscript{132}.

\textbf{Technology of Production}

\textit{In both countries, most of the chickens are raised in the backyard and in poultry farms less than 1,000 birds. Majority of the birds are indigenous breeds, accounting for 80 percent of bids in Nigeria and 70 percent in Vietnam. The scale of production in Nigeria is very similar to Vietnam. About 83 percent of broiler production in Nigeria occurs in small-scale farms with flock sizes ranging between 100 and 600 birds, which is comparable to Vietnam where about 86 percent of chicken farms have less than 600 birds. Large-scale chicken farms with flock size of more than 1,000 birds comprise about 4 percent of broiler production in both countries. Commercial poultry farming in Nigeria is concentrated in the South-West region – the part of the country located close to Lagos where a large market of nearly 17.5 million people is accessible. There are also significant poultry production operations in the Northern}

\textsuperscript{131} Oladeji, 2011
\textsuperscript{132} Sahel, 2015
parts of the country, close to the city of Kano, the second largest market in the country. The systems of production can be classified as free range/backyard (extensive), semi-commercial (semi-intensive) and commercial (intensive), depending on size of investments and technology of production in breeding, feeding and disease control (Box 8.1). About 44.4 percent of chickens in Nigeria are raised in extensive systems by 6.6 million households. The semi-intensive system accounts for 33.3 percent of chickens raised by 1.3 million households and the remaining 22.3 percent are raised in intensive systems by 17 thousand commercial farms. The most prominent breeders have licenses to import day-old chicks and include Ajanla farms (CHI), Amobyng, Olam farms, Shonga, Tuns farm, etc. The breeder farms are mainly concentrated in the South-West, with Olam and Shonga in the North-West. In Vietnam, there are 219 registered breeding farms (mainly concentrated in Red River Delta and South-east regions). However, just like in Nigeria, the extensive system is more predominant in Vietnam and accounts for about 92 percent of poultry farmers, followed by the semi-intensive system (6 percent of farmers) and the intensive system (2 percent of farmers).

Box 8.1. Technology of poultry production in Nigeria and Vietnam

<table>
<thead>
<tr>
<th>Production system</th>
<th>Nigeria</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive</td>
<td>Mixed breed flocks with birds roaming freely, mainly in rural areas</td>
<td>Practiced by about 92 percent of poultry farmers</td>
</tr>
<tr>
<td>(backyard/free-range)</td>
<td>Low capital investment and operational costs (labor, feed, etc.)</td>
<td>Small scale with low capital investment. Average of 50–60 birds with high mortality rate</td>
</tr>
<tr>
<td></td>
<td>Biosecurity measures are poor or non-existent in many instances</td>
<td>(45–50 percent)</td>
</tr>
<tr>
<td></td>
<td>Most common in northern region</td>
<td>Different animal species raised together in residential areas</td>
</tr>
<tr>
<td></td>
<td>Accounts for about 44.4 % of chickens</td>
<td>Minimal biosecurity.</td>
</tr>
<tr>
<td>Semi-intensive</td>
<td>Combines traditional practices in the extensive system with improved technology</td>
<td>Combines traditional practices with improved technology - improved breeds and quality feed</td>
</tr>
<tr>
<td></td>
<td>Accounts for about 33.3% of chickens</td>
<td>About 6% of poultry farmers practice the system.</td>
</tr>
<tr>
<td></td>
<td>Flocks size is 50-2,000 birds and includes including both improved and local breeds</td>
<td>Flock size ranges from 150-2000 and includes mixed breed flocks</td>
</tr>
<tr>
<td></td>
<td>Most common in the southern regions and characterized by wooden/metal/brick houses with deep litter farming system.</td>
<td>Farms typically integrate meat production with breeding and hatching.</td>
</tr>
<tr>
<td></td>
<td>Mostly used by out-growers and contract farmers.</td>
<td>Mostly used by out-growers</td>
</tr>
<tr>
<td></td>
<td>The biosecurity measures may range from low to mid-level.</td>
<td>Poultry houses are small and simple,</td>
</tr>
<tr>
<td></td>
<td>Capital investment lower than intensive system but operation costs usually higher</td>
<td>Biosecurity is medium</td>
</tr>
<tr>
<td>Intensive</td>
<td>Characterized by full automation with exact temperature control, high biosecurity level, with minimal labor costs</td>
<td>Capital investment higher than extensive system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>About 2% of poultry farmers practice intensive system, consisting of 37 broiler, 30%</td>
</tr>
</tbody>
</table>

133 Africa Sustainable Livestock 2050, 2018
134 Nguyen & Long, 2008
- About 22.3% of chicken are raised in the systems, consisting of 55% layers and 45% broilers, mostly exotic breeds.
- Unit sizes are large depending on the technology used and can reach 20,000 birds per pen house (either caged or open floor).
- Investment costs are high and pen houses are 100% imported with no local manufacturing.
- Efficient feeding and watering systems, low wastage, high feed conversion ratio, and optimum live weight is achieved within 42 to 45 days.
- Layers 23% duck and geese, 10% breeding stock.
- Facilities are well equipped and relatively mechanized, including both semi-automatic and automatic equipment with high biosecurity measures.
- Mainly improved or exotic breeds supplied by foreign companies or national breeding centers.
- Flock size ranges from 2,000 to 100,000.
- High capital investment and short production period (up to 4–5 batches of birds per year).

Trade

Imports of poultry meat have been remarkably low in Nigeria, primarily because of a government policy to restrict imports since 2002. The policy restricts traders from accessing foreign exchange permits issued by the Central Bank to import chicken, eggs, turkey, and processed poultry meat products. Traders could still import with own financing but at a higher exchange rate. Day Old Chicks (DOCs) are excluded from the import restrictions. Also excluded from the policy are poultry equipment, vaccines, drugs, antibiotics, vitamins, and additives. However, these equipment’s and inputs are subject to import tariffs ranging from 5-10 percent and VAT ranging from 7.5-15 percent and additional levy. Enforcement of the restrictions on importation of chicken has been a challenge and there have been periods where imports of poultry meat increased rapidly through both official channels and smuggling. For example, imports soared during 2008-2010 because the avian flu epidemic of 2006-2008 reduced local supply of chicken meat, creating room for influx of imports. The imports arrived in Nigeria from Benin (figure 8.5) but the chickens were produced in a third country. It is estimated that about 3 million tons of poultry products were imported into Benin between 2009-2011 and then re-exported to Nigeria. Indeed, a comparison of data shows that imports of chicken meat in Nigeria closely tracks exports from Benin and imports to Nigeria.

The price incentives to import chicken through Benin are remarkably high, enough to pay for rents associated with the smuggling business. Frozen chicken from Benin often arrives at the Nigeria market at a cost of US$ 2.50 to US$ 3.50 per kg while the farm-gate price of locally produced frozen chicken costs US$ 5.00 to US$ 5.50 per kg at retail locations and approximately US$ 3.39 at the farm gate. The cost disadvantage between imported and locally produced poultry can be traced to high cost of feed – the locally produced maize and soybeans – and the wide fluctuations in these commodity prices during the year. The government of Nigeria closed all of its land borders to the movement of goods in a

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135 For example, equipment for scaffolding, shuttering, propping or pit-propping of iron and steel attract 15 percent levy, in addition to import duties and VAT, amounting to a total of 27.5 percent import charges. Antibiotics for poultry are subject to 5 percent import duty, but vaccines are exempted from import charges.
136 Sahel (2015)
137 JMSF 2020
138 Sahel, 2015
bid to tackle smuggling. In contrast to Nigeria, there are no poultry import restrictions in Vietnam and the country receives chicken from low-cost producers such as the United States (figure 8.6), but also exports to Japan and China. Chicken exports to these destinations increased rapidly from about -57 percent between 2010 and 2012 to 268 percent between 2013 and 2018, reaching US$ 30.2 million in 2018.

Figure 8. 5. Imports of chicken meat in Nigeria closely tracks exports from Benin

Exports of chicken meat in Benin and imports in Nigeria

Source: FAOSTAT

Figure 8. 6. Chicken meat imports are low in Nigeria because of imports restrictions

Imports of chicken meat in Nigeria and Vietnam

Source: FAOSTAT

The policy of banning chicken imports has contributed to slow growth in demand such that the annual per-capita consumption of chicken meat in Nigeria lags countries with comparable per-capita incomes and is seven times lower than neighboring Ghana, for example. The annual per-capita consumption of chicken meat has barely increased in Nigeria during the past two decades and instead it has fluctuated as follows: 1.4 kg per-capita between 1995 and 2002, 1.7 kg per-capita between 2003 and 2013, and 1.0 kg per-capita between 2014 and 2017. These consumption levels lag behind other middle-income countries with comparable per-capita incomes (figure 8.7 and figure 8.8). For example, the per-capita consumption in Nigeria is respectively seven and three times lower than neighboring Ghana and Cameroon – and twelve times lower than Vietnam. A back of the envelope calculation suggests that the consumption market for chicken would have increased by at least US$ 4.6 billion per annum (equivalent to 2.3 million tons) if Nigeria had the same per-capita consumption as Vietnam and with no import restrictions. There are enormous opportunities to grow the consumption market for chicken meat with targeted interventions to provide better genetics, increase productivity and quality of feeds (maize and soybean), vaccination programs to reduce mortality and efficient waste management to manufacture fertilizers.
Characterization of Broiler Value Chains

The broiler value chains in Nigeria and Vietnam have similar actors, however; most of the chickens are marketed live in Vietnam. The main actors in broiler value chains in Nigeria are breeders and input suppliers, producers/farmers, aggregators, processors/slaughterhouses, retailers, and consumers. On the other hand, the main actors in Vietnam are breeders and input suppliers, producers/farmers, wholesalers, processors/slaughterhouses, retailers, and consumers. In Nigeria, the breeders import grandparent stock from the pure-line breeds in Europe, as well as Day-Old Chicks (DOC). The importation of DOC is not subject to the 2002 ban on imports of poultry. In addition to the DOCs, the other key inputs to poultry production include feed, equipment, and veterinary supplies. Some breeders also provide these inputs. About 80 percent of DOCs in the country are produced and used in the South West region. The feed millers are also mostly located in the in South but rely on maize and soya bean farmers in the North for up to 75 percent of their raw materials. But there are also significant investments in milling and breeding in the North. For example, Olam International has made major investments in integrated inputs supply in Kaduna that includes poultry breeding farm, DOC hatchery and animal feed mill. The company supplies inputs to farmers in the North-West region (especially Kano). Olam International operates another integrated poultry feed mill in Kwara State that supplies to farmers in the North Central region.

Contract arrangements between processors/slaughterhouses and farmers/producers account for less than 5 percent of broiler production in Nigeria and less than 10 percent in Vietnam. Contract farming eliminates all actors between farmers and processors, including aggregators/collectors and wholesalers. The main benefits of contract farming include: (i) traceability of birds and inputs which mitigates the risk of contamination and enables early detection and control of diseases; (ii) enables
intergrated credit arrangements where farmers recieve quallaity inputs such as DOCs, feeds, and vaccines; (iii) facilitates transfer of technology and knowledge to farmers leading to improved productivity. The limited growth in contract farmig means that most transactions in brolier value chains are carried out under spot transactoions and weak forms of vertical coordination such as verbal purchase agreement. The processors practicing contract farming in Nigeria include Amobygn, Tuns farms, Zartec Farms, Ajanla farms, Olam farms, Shonga farms, etc. Similar arrangements are implemented in Vietnam by firms such as CP Group Company of Thailand and Japfa Comfeed Company. Horizontal coordination at the industry level is stronger in Vietnam than Nigeria. Viet Nam has many livestock associations with the mission to support trade and market promotion. In Nigeria, poultry farmers/traders are generally not organized, and it is estimated that only about 20 percent belong to farmers/traders’ association. The Poultry Association of Nigeria (PAN) is an industry-level organization for the poultry sector.

The poultry sector in Nigeria provides opportunities for regional collaboration as feed production (maize and soya bean) occurs mainly in the North to serve poultry production in South. Maize is the main ingredient in poultry feeds and most of the requirements in Nigeria are met through domestic production (figure 8.9). The leading maize producing states – Kaduna, Borno, Taraba, Plateau, and Niger – are all in the Northern region. These states account for nearly 60 percent of total maize production in Nigeria. Majority of feed millers are concentrated in the South-West region. The millers secure supplies of the raw materials through contracts. However, there are concerns among poultry farmers and producer companies that the quality of feed is variable due to poor quality of the main raw materials – maize and sorghum. Considering that feeding costs account for 50-70 percent of the cost of production, there is need to improve the quality of maize of Soya bean through vertical coordination arrangements that go beyond feed millers and maize/sorghum farmers to include the relevant research and extension organizations involved in maize breeding and dissemination to farmers. Furthermore, the movement of these raw materials from North to South is costly primarily due to high transportation cost and poor roads network.

Nigeria and Vietnam differ significantly in terms of the trade policy environment on raw materials for livestock feeds. The ban on maize imports was lifted in 2017 in Nigeria but without allowing foreign exchange permits for maize imports. Nevertheless, the data suggests that maize imports to Nigeria have increased rapidly since 2016 and there has been a decline in local maize production beginning around the same year, perhaps reflecting competition with imported maize. In contrast with Nigeria, the poultry feed mill segment relies on imports for up to 75 percent of the raw materials (mostly maize grains. Since 2010, Vietnam has considerably lowered import tariffs of important feed ingredients. For example, tariffs on maize and soya beans were reduced by 10 percentage points in 2010 from 28 percent and 30 percent respectively to 18 percent and 15 percent, with a further reduction on soya bean tariff to 8 percent (figure 8.10). These measures to increase the access of animal feed millers to imported raw materials have been accompanied by strategic measures to increase competitiveness of the domestic maize and soya bean sector by developing and disseminating improved varieties to increase yields.

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139 Sahel Capital Partners & Advisory, 2015
140 Oladeji, 2011
Costs and Margins of Value Chain Actors

This section compares costs and margins for the actors in broiler value chains in Nigeria and Vietnam. Figure 8.11 and 8.12 provides a summary of the costs, selling prices and margins for each actor along the value chain in Nigeria and Vietnam respectively. The costs at the producer (farm) level for both countries include costs incurred by farmers to purchase various inputs, including DOCs, feed, veterinary (vaccine, drugs, etc.), labor and energy. The profit margins correspond to the difference between the production costs and the sales price at each level of the value chain, which means any other costs not identified are subsumed under the listed costs. The data for Nigeria was collected from farmers in Ogun state, one of the leading states in poultry production. Average size of chicken from the sample was 3.3 kg per bird. The data for Vietnam was collected in Hanoi and the average size of the chicken was about 1.8 kgs.

The cost of production of broiler is lower in Nigeria than Vietnam, across all cost items except the veterinary costs (mainly vaccines and drugs). The total cost of production is at least four times higher in Vietnam – US$ 0.70 per kg in Nigeria compared to US$ 3.14 per kg in Vietnam. The main drivers of the relatively higher costs is feed which is US$ 2.38 per kg of broiler meat in Vietnam and US$ 0.36 per kg of broiler meat in Nigeria, respectively accounting for 76 percent of the costs in Vietnam and 51 percent of the costs in Nigeria (table 8.1). The high cost of feed in Vietnam is related to high dependence

141 JMSF
142 In contrast, the FAOSTAT data indicates that average size has been 1 kg per bid since 1990, raising doubts on its accuracy
143 IPSARD
144 This is based on sample from farmers in Ogun state. Other studies have returned much higher feed costs in Nigeria up to 70 percent of the cost of production – see https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Nigeria%20Animal%20Feed%20Sector%20Snapshot_Lagos_Nigeria_5-20-2019.pdf
on imports of major input (grains) used by feed millers in the formulation of poultry feed (see figure 8.12). In contrast, poultry feed in Nigeria is constituted from local production of the key ingredients such as maize, cassava, sorghum, soybeans, millet, and rice. There are restrictions on imports of these commodities, including outright bans and exclusion from foreign exchange permits awarded by the Central Bank. The second most important component of the cost of production is DOCs, which cost US$ 0.40 per kg of meat in Vietnam (13% of the cost) and US$ 0.14 per kg of meat in Nigeria (20% of the cost). That DOCs are more expensive in Vietnam is rather surprising because of the remarkable private sector investments in the breeding segment. Labor accounts for a relatively small share of the cost of production in both countries and the absolute costs are similar.

Figure 8. 11. Cost build-up of broiler value chain in Nigeria

Source: Cora et. al. 2020; JMSF 2020

Figure 8. 12. Cost build-up of broiler value chain in Vietnam

Source: Cora et. al. 2020; JMSF 2020

Table 8. 1. The cost of production of chicken meat is lower in Nigeria than Vietnam

<table>
<thead>
<tr>
<th></th>
<th>Nigeria</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicks</td>
<td>0.14</td>
<td>0.40</td>
</tr>
<tr>
<td>Feed</td>
<td>0.36</td>
<td>2.38</td>
</tr>
<tr>
<td>Veterinary (vaccine, drugs, etc.)</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>Labor</td>
<td>0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Other costs (fuel, electricity, water, etc)</td>
<td>0.05</td>
<td>0.21</td>
</tr>
<tr>
<td>Total costs</td>
<td>0.70</td>
<td>3.14</td>
</tr>
<tr>
<td>Sales price</td>
<td>0.91</td>
<td>4.10</td>
</tr>
<tr>
<td>Losses from mortality</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Profit</td>
<td>0.17</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Source: Cora et. al. 2020; JMSF 2020
Despite the higher cost of production, broiler producers in Vietnam earn higher margins than in Nigeria and capture a higher share of the total margins in the value chain. The farm-gate price of chicken meat is about four higher in Vietnam (US$ 4.10 per kg) than Nigeria (US$ 0.91 per kg), allowing producers to earn higher margins in Vietnam (US$ 0.92 per kg) than in Nigeria (US$ 0.17 per kg) – see table 8.1. Producers in Vietnam earn nearly 60 percent of the total value chain margins (figure 8.15) while in Nigeria they earn about 12 percent of the margins – with the highest share of the margins in Nigeria value chains accrue to the slaughterhouses at about 27 percent (figure 8.14). However, the producers in typical broiler value chain in both countries tend to work with smaller volumes relative to other actors and therefore their total profit margins are lower.
Conclusions

Although the policy of banning chicken imports effectively protects producers, it might have slowed down growth of the poultry market. Per-capita consumption of chicken meat in Nigeria lags countries with comparable per-capita incomes. In particular, the annual per-capita consumption of chicken meat has barely increased in Nigeria during the past two decades and is estimated at 1.0 kg per-capita in 2014-2017, which is lower than it was in 1995-2003 (1.4 kg per-capita). The per-capita consumption lags behind other middle-income countries with comparable per-capita incomes. It is respectively seven and three times lower than neighboring Ghana and Cameroon − and twelve times lower than Vietnam. A back of the envelope calculation suggests that the consumption market for chicken would have increased by at least US$ 4.6 billion per annum (equivalent to 2.3 million tons) if Nigeria had the same per-capita consumption as Vietnam and with no import restrictions.

The poultry value chains provides significant opportunities for investments and regional collaboration. Feed production occurs mainly in the North to serve poultry production in South. Maize is the main ingredient in poultry feeds and most of the requirements in Nigeria are met through domestic production. The leading maize producing states − Kaduna, Borno, Taraba, Plateau, and Niger − are all in the Northern region. These states account for nearly 60 percent of total maize production in Nigeria. Majority of feed millers are concentrated in the South-West region. However, there are concerns among poultry farmers and producer companies that the quality of feed is variable due to poor quality of the main raw materials − maize and sorghum. Considering that feeding account for 50-70 percent of the cost of production, there is need to improve the quality of feed ingredients through vertical coordination arrangements that go beyond feed millers and maize/sorghum farmers to include the relevant research and extension organizations involved in maize breeding and dissemination to farmers. Taken together, the animal feed sector is more than $2 billion and there is enormous scope for competitive investments to improve quality and quantity of feed, reduce the costs of production in the livestock sector and create jobs. The proportion of the ingredients converted to animal feed is relatively lower compared to Vietnam, for example. In Vietnam, the feed production capacity grew rapidly from 12 million tons in 2008 to 40.0 million tons in 2018, an average growth of 12.8 percent annually. A robust policy and regulatory framework is needed to enable growth of the feed industry. Enabling policies that have helped spur growth in Vietnam include: (i) specification and enforcement of standards to ensure the quality of feeds, including standards for maximum allowable levels of mycotoxins, heavy metals and microorganisms in feed ingredients and compound feeds; and (ii) regular inspection, sampling and testing of feeds by the Ministry of Agriculture and Rural Development and Market Inspection Agency.

Collaboration between private investors and public veterinary health authorities could unlock investments to produce vaccines and drugs. The poultry sector in Nigeria has not recovered from the 2006-2008 outbreak of the High Pathogenic Avian Influenza (HPAI) epidemic, which was followed by another outbreak in 2014. Nigeria was the first country in Africa affected by the H5N1 virus (bird flu) outbreaks in a commercial farm located in Kaduna State in 2006. The outbreak which lasted through 2008 rapidly spread to 25 of the 36 Nigerian states and to the FCT, with about 228,000 confirmed cases. The outbreak recurrent 6 years later in 2014 leading to the culling of 1.4 million birds in 18 states within 6 months. There are important lessons to draw from the experience of how Vietnam spurred investments in vaccines and drugs after the 2004 outbreak. The impact of the epidemic was worse in Vietnam, leading

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145 World Organization for Animal Health (OIE)
146 Poultry Association of Nigeria
to the death/culling of 38.3 million heads, representing about 15 percent of the poultry population (of which 50 percent were chickens)\(^{147}\). In response to the epidemic, private enterprises in Vietnam started experimenting with vaccines in 2005 supported by the Department of Animal Health continually testing vaccine efficacy against emerging strains of virus\(^{148}\). In 2016, the Vietnamese Ministry of Agriculture and Rural Development (MARD) signed Decision #1756/QD-BNN-TY to establish a high-level Steering Committee to promote in-country veterinary vaccine manufacturing for major livestock diseases. The Decision defines and highlights the need for improved domestic production of poultry H5 vaccines as a national priority and has led to establishment of five major veterinary vaccine development institutions in the country.

**Access to energy is a major constraint faced by the poultry industry in Nigeria.** There are enormous investment opportunities in efficient waste management to generate biogas energy. Access to power is critical in poultry production and processing. The electricity grid in Nigeria is limited in reach and rural areas where most production occurs do not have regular access to electricity. The poultry sub-sector largely depends on micro-power generated by poultry farms which is costly compared to electricity. The most common sources of power are solar lamps and generators to provide light and heat. The power challenges can be alleviated through micro-energy projects that convert waste from poultry production into sources of energy. It is estimated that only 46 percent of poultry waste in Nigeria is managed in an environmentally sound and economical manner\(^{149}\). Most of the waste materials\(^{150}\) are burnt, used as compost, dumped in pits and wastelands or flushed into streams and other water bodies – causing widespread air, water and land pollution. The conversion of farm waste into energy is yet to take off in Nigeria. An assessment of the biogas potential from solid waste and livestock excrements in 1999 suggested minimum output of 1.382×10⁹m³ of biogas per year, equivalent to 4.81 million barrels of crude oil\(^{151}\). In addition to the biogas fuel, the and biofertilizers generated from biogas plants have commercial value. It’s a win-win solution that generates clean and cheaper energy, provides for environmentally safe waste management, provides additional income to farmers, creates job opportunities, and decentralizes energy generation and environmental protection. The economic use of poultry waste is more advanced in Vietnam. According to General Statistics Office, Vietnam produced 84.5 million tons of solid waste and 50 million m³ of liquid waste in 2016. Nearly 60 percent was treated, and 20 percent used for biogas, composting, worm farming, and feeding fishes.

\(^{147}\) Anh, 2004\n\(^{148}\) WHO 2014\n\(^{149}\) Okai (2019)\n\(^{150}\) including droppings, dead birds from mortalities, hatchery waste, litter, offal, water from processing waste and bio-solids\n\(^{151}\) Adeniran et. Al. 2014
References


IPSARD (2016), Summary report “Viet Nam’ participation in trade agreements on domestic livestock sector”


Annex 1. Estimating the Size and Structure of the Agribusiness Sector

The Agribusiness sector includes agriculture and all upstream and downstream agriculture-related activities (see figure A2.1). Expanding the agribusiness off-farm components is part of agricultural transformation and is associated with economic development. Higher farm productivity and commercialization creates new opportunities for value-added and job creation. As transformation accelerates, more farm output is processed and traded, and farmers use more modern inputs.

Figure A2.1. Components of the Agribusiness Sector

While the importance of agriculture in the economy declines as countries develop, the agri-food system’s importance declines at a slower rate and remains a major part of high-income countries’ economies (see figure A2.2a). Eventually, the value-added or gross domestic product (GDP) generated beyond the farm exceeds what is generated on the farm (see figure A2.2b) and the focus of food policy gradually shifts from raising farm productivity to also promoting food industries and markets.

Figure A2.2. Agribusiness share of national GDP

Source: IFPRI estimates using supply-use tables from 98 countries covering 96% of global GDP circa 2015.
Note: Off-farm agri-food system includes agro-processing; input supply, trade and transport, food services, and hotels and accommodation. Income per capita is measured by gross national income (GNI), which is GDP plus net foreign transfers. Both GDP and GNI are measured in constant 2011 US dollars.
National Accounts and Supply-Use Tables

Agricultural GDP is captured by national accounts data and includes all value-added generated by crops, livestock, forestry and fishing. National accounts also report GDP for nonagricultural sectors, some of which are related to agriculture. For example, food processing is part of manufacturing GDP and trading and transporting food products is part of services GDP. Some farm inputs are also produced by manufacturing (e.g. fertilizers and feed) or services (e.g. banking and extension).

The exchange of goods and services between sectors is an important part of the economy and is tracked in national accounts using Input-Output Tables (IOT) or, more recently, Supply-Use Tables (SUT). Statistical agencies periodically update (rebase) national accounts to use the most recent available data. Rebasings typically involves building a new SUT with detailed sectors and product categories. We use the information contained in SUTs to measure the size of a country’s agribusiness sector, including on-farm and upstream/downstream components.

Statistical Definition of Agri-Food System GDP and Employment

The definition of AgGDP+ is the sum of the five agribusiness components listed below. The amount of value-added in each component is calculated directly from SUTs.

- **Agriculture**: Includes all GDP generated in the agricultural sector, including all crops, livestock, forestry and fishing [ISIC 011-0322].
- **Agro-processing**: Includes all food and agriculture-related GDP within the manufacturing sector, including the processing of meat, fish, dairy, grains, animal feed, beverages, tobacco, yarn and natural fibers, and wood and timber products [ISIC 1010-1311 and 1610-1629].
- **Input supply**: Includes all GDP generated during the production of inputs used directly by farmers and agro-processors (e.g. fertilizer and banking services). Inputs produced by farmers and processors themselves are excluded to avoid double-counting. Only the portion of GDP generated by local input producers is included in AgGDP+, and this portion is calculated as the share of agriculture and processing’s input demand in total economywide demand. For example, if agriculture uses a third of all petroleum in the economy, then a third of the local petroleum sector’s GDP is considered part of the AFS. If all petroleum is imported, then this input does not contribute to AgGDP+, because the value-added occurs outside the country.
- **Trade and transport services**: Includes all GDP generated by the domestic transporting and trading (retailing and wholesaling) of agri-food products between farms, firms and final points of sale (markets). National accounts data do not separate the trade sector’s GDP into its food and nonfood components, but this is estimated using the SUT’s product-level data on transaction cost margins (i.e. the gap between producer and consumer prices, less any taxes). Transaction costs are the main source of demand for trade services, and so a portion of trade sector GDP can be attributed to the agribusiness sector based on the share of trade margins on agri-food products relative to the margins on all marketed products.
- **Food services**: Includes all GDP generated in the food services sector [ISIC 5610-5630] and a portion of the GDP in the hotels and accommodation sector [ISIC 5510-5590]. Producers of food services (i.e. meals prepared outside the home) are usually standalone operations (e.g., restaurants and street vendors), whereas hotels often run restaurants in addition to providing accommodation. The portion

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152 IOTs and SUTs can be extended to include interactions between industries and institutions (e.g., households, government and rest of the world). The resulting database is called a Social Accounting Matrix (SAM).
153 ISIC codes refer to the International Standard Industrial Classification (Revision 4) (UNDESA 2008).
of hotels and accommodation GDP attributed to agribusiness is based on the share of agri-food inputs in the sector’s total input purchases. This assumes that labor and capital costs (i.e. worker remuneration and operating profits) in the hotel sector are proportional to intermediate input costs, and that the food and nonfood services supplied by hotels are proportional to the cost of food and nonfood inputs. This is likely to underestimate the contribution of agribusiness to the hotels and accommodation sector.

A series of SUTs measured in current prices were constructed for Nigeria using national accounts and other data. Nominal estimates of AgGDP+ are converted to constant prices by adjusting sectoral GDP for inflation using sectoral deflators from national accounts data. Since 2017 is the baseline year, real AgGDP+ estimates are expressed in constant 2017 prices and dollar exchange rate.

The estimation of AgEMP+ follows a similar procedure to AgGDP+ and uses the same SUT data, but with three additional steps to estimate employment in the five components of the AFS:

- **Base year employment by sector:** The number of workers employed during 2017 in each of the SUTs 86 sectors is estimated using data on labor value-added from the SUT and employment data for 14 broad sectors published by the International Labor Organization (ILO). Average wages are calculated for the 14 sectors and applied to their corresponding sectors in the SUT to derive employment for each of the 86 sectors.

- **Historical employment estimates:** Average total GDP per worker is estimated for each of the SUT’s 86 sectors. Changes in real sectoral GDP over time are assumed to lead to proportional changes in sectoral employment (i.e., average GDP per worker is initially assumed to be constant over time). These constant employment-to-GDP ratios are applied to sectoral GDP estimates from IFPRI’s historical time series of SUTs.

- **Corrected employment estimates:** Initial sectoral employment estimates are scaled to match the ILO’s employment numbers. The final AgEMP+ indicator reflects annual changes in employment-to-population and employment-to-GDP ratios; is consistent with official employment statistics; and has the same definition and AFS components as the AgGDP+.

ILO triangulates information from labor force surveys and other data sources in order to derive sectoral employment estimates that are consistent across time and countries. ILO employment data may deviate from official sources, but it permits comparisons across GFSS countries and adopts a global definition of the labor force (e.g., workers must be at least 15 years of age).

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154 ILO employment data is available online at https://www.ilo.org/ilostat.