

RICE IN THE NIGERIAN ECONOMY AND AGRICULTURAL POLICIES

Kwabena Gyimah-Brempong, Michael Johnson, and Hiroyuki Takeshima

Over the past few decades, rice has become one of the leading food staples in Nigeria, surpassing cassava in food expenditures. Throughout this period, consumption has increased faster than production, resulting in a growing dependency on imports. By 2014, about half of the rice consumed in Nigeria was imported. As the most populous country in Africa south of the Sahara (SSA), Nigeria has quickly become the leading importer of rice on the continent and, more recently, in the world.

This growing dependence on rice imports is a major concern of Nigeria's government, and since the early 1980s numerous programs have been implemented to encourage domestic rice production and achieve rice self-sufficiency (or at least to reduce the growth in imports). In particular, rice featured prominently in the Agricultural Transformation Agenda (ATA), which had guided the Federal Ministry of Agriculture and Rural Development (FMARD) in Nigeria under the administration of President Goodluck Jonathan as the central agenda of the country's agricultural policy.¹ The ATA included major investments and programs related to rice production, processing, and marketing. Trade policies (import tariffs and even import bans) have also been used in an attempt to slow the growth in imports, with import tariffs on milled rice increasing to 110 percent beginning in 2013.

In spite of these policies, the Nigerian rice sector has yet to be transformed into a more productive one that can compete with foreign imports. This situation is not unique to Nigeria and applies to the rest of SSA, where the sector's slow growth has puzzled many international donors and research communities (Otsuka and Larson 2012). As one of the largest producers and consumers of rice in SSA, Nigeria has been at the center of this puzzle.

The principal objective of this book is to review and assess the potential for Nigeria to transform its domestic rice sector to become competitive with

¹ This book was written when Nigeria was under President Jonathan's administration. Throughout the book, rice policies or the policy framework mentioned are those that had been implemented during this administration, unless otherwise specified.

imports. We assess the policy alternatives for bringing about this transformation and also briefly discuss the opportunity costs of achieving such competitiveness. In particular, three key strategies that have recently been adopted by the government are examined in more detail with regard to their potential long-run welfare implications for transforming the rice economy and making domestic brands competitive with imports:

1. Introducing public-sector interventions to stimulate paddy production through the dissemination and adoption of better seeds and other modern inputs.
2. Improving the postharvest processing and milling sectors to promote premium and high-quality local brands of rice.
3. Introducing import tariffs to help protect the domestic rice sector.

This chapter assists readers to gain a better understanding of how Nigeria arrived at its recent policy framework for agriculture and the rice sector in particular. The chapter first describes the evolution of rice imports and the growing imbalance between production and consumption. It then presents a brief overview of Nigeria's economy and recent history, the basic structure of the agricultural sector, and a summary of recent key rice policies. Finally, the chapter describes the key set of questions asked in this book and how each chapter addresses them from different perspectives on the rice sector in Nigeria.

Nigeria's Rice Trade in a Global Context

Nigeria has become the world's biggest importer of rice within the last ten years. As Table 1.1 shows, Nigeria's share of global rice imports has risen from 7 percent in the early years of the 21st century to 8.2 percent over the most recent five years for which data are available (2008–2012). Among the top rice importers, Nigeria is followed closely by the Philippines, Iran, Indonesia, and the European Union. The bulk of rice imports to Nigeria come from Thailand, Vietnam, and India, who together supply about 60 percent of the rice traded in global markets.

The reliance on global rice markets raises serious concerns for policy with regard to ensuring food security and maintaining a healthy balance of the country's foreign-exchange reserves. This is especially true when faced with a dramatic rise in prices, as occurred during the recent 2008 food crisis. For rice in particular, prices rose by about 255 percent between 2007 and 2008, even higher than in the last major food crisis in 1974, when they increased by 200 percent (Headey and Fan 2008).

TABLE 1.1 Top ten major rice importers and exporters in the world, 2000–2012 (percent)

Top 10 major importers (share of global imports)				Top 10 major exporters (share of global exports)			
2000–2004		2008–2012		2000–2004		2008–2012	
Indonesia	8.8	Nigeria	8.2	Thailand	30.1	Thailand	27.3
Nigeria	7.0	Philippines	6.7	Vietnam	14.0	Vietnam	19.3
EU	5.3	Iran	5.6	India	13.6	India	13.7
Philippines	5.1	Indonesia	4.8	United States	11.9	Pakistan	10.3
Saudi Arabia	5.0	EU	4.8	China	7.9	United States	10.1
Iraq	4.4	Iraq	4.0	Pakistan	7.7	Uruguay	2.6
Iran	4.2	Saudi Arabia	3.9	Uruguay	2.7	Brazil	2.4
Brazil	3.5	Malaysia	3.6	Egypt	2.4	Cambodia	2.1
Senegal	3.5	Côte d'Ivoire	3.4	Burma	1.8	Burma	2.1
South Africa	3.1	Senegal	3.0	Australia	1.4	China	1.9

Source: United States Department of Agriculture international database (USDA 2013).

As in 1974, the experience of the 2008 food crisis led many governments of net importing countries in the developing world to reduce their vulnerability to price shocks by striving for self-sufficiency in rice production. Nigeria is no exception. In the aftermath of the most recent crisis and rising consumer preference for imported rice, the Nigerian government has set a goal of making the country self-sufficient in rice production. The perception among Nigerian policymakers is that the increasing trend of rice imports is fiscally and politically unsustainable, as it threatens the country's food security by displacing local production, draining scarce foreign-exchange reserves, and making the country a hostage to any volatility of supply in global markets (Adesina 2012).

Despite this, domestic demand for rice has continued to grow at an even faster pace in Nigeria and elsewhere in Africa since the global food crisis of 2008. As Table 1.2 shows, rice consumption in Nigeria increased by about 8.4 percent per year in the most recent period (2010 to 2012) compared to 5.3 percent for the rest of SSA. Lower global rice prices, increased household incomes, and continuing growth in urban populations may explain this most recent upturn in the trend in rice imports.

Another factor explaining the increased demand has been a preference for imported rice among urban consumers due to its higher quality with respect to swelling capacity, taste, and grain shape and cleanliness (Bamidele, Abayomi, and Esther 2010; Lançon et al. 2003b). Local rice, on the other hand, is often broken, not polished, and contains stones and other debris. Finally, the

TABLE 1.2 Average annual volume and growth rates of milled rice supply in Nigeria and the rest of West Africa and Africa south of the Sahara (SSA), 1980–2013

	Volume, annual average (million metric tons)				Growth rates, annual average (%)			
	1980– 1989	1990– 1999	2000– 2009	2010– 2012	1980– 1989	1990– 1999	2000– 2009	2010– 2012
<i>Consumption</i>								
Nigeria	1.2	2.3	3.6	5.0	3.1	2.8	4.6	8.4
Rest of West Africa	1.8	2.5	4.6	7.4	3.0	4.3	5.9	10.1
Rest of SSA	3.7	4.6	7.2	9.7	2.4	2.2	4.2	5.3
<i>Production</i>								
Nigeria	0.7	1.8	2.1	2.6	10.9	0.7	3.4	2.0
Rest of West Africa	1.5	1.9	2.8	5.0	3.4	2.6	5.4	5.4
Rest of SSA	2.0	2.5	3.3	4.7	2.3	1.6	4.6	-1.1
<i>Imports</i>								
Nigeria	0.6	0.4	1.6	2.6	2.3	15.0	3.9	19.8
Rest of West Africa	0.8	1.1	2.3	3.3	2.6	4.3	3.8	13.7
Rest of SSA	1.3	1.7	3.3	4.5	2.5	5.1	4.3	13.6

Source: United States Department of Agriculture international database (USDA 2013).

removal of input subsidies, price supports, and protective import barriers in the aftermath of structural adjustment programs of the 1980s and 1990s also played a key role by exposing the lack of competitiveness of local rice production in terms of technologies, costs, and milling efficiencies relative to imports (Moseley, Carney, and Becker 2010).

As the demand has accelerated, no country in the region has been able to match this through domestic production. In Nigeria, imports have increased the fastest, at 20 percent per year on average during the last three years for which data are available, 2010–2012 (Table 1.2).² Local production has not grown as fast. In Nigeria, local rice production grew by only about 2 percent per year over the last three years. This is much lower than the average 5.4 percent in the rest of the countries in West Africa.³

2 While it is possible that some imports to Nigeria may be reexported to neighboring countries such as Niger, Chad, and Cameroon, this is difficult to confirm given scanty data on informal cross-border trade. But we expect these shares to be small given the sheer size of the Nigerian market relative to these other countries. We note that there is a difference between market demand and consumption, as the latter includes both market demand and subsistence production for own-consumption.

3 In this book, West Africa comprises Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

In an effort to reverse the current trend of rising imports, the Nigerian government recently introduced a number of key policies and investment strategies. These include the provision of improved seeds, subsidized fertilizer, mechanization services, and incentives for private-sector investments in irrigation. At the macro level, rice import tariffs were increased in order to discourage imports and encourage domestic production. Improvements in paddy production, rice processing, and marketing have also been encouraged with the support of public-sector reforms and investments.

The recent policy reforms have included deregulating seed and fertilizer markets and establishing private-sector marketing corporations to help coordinate supply and demand and set grades and standards for many agricultural commodities. Physical investments have also been made to establish staple crop processing zones (SCPZs) that have been intended to encourage the clustering of food-processing industries, including rice milling, in proximity to raw materials and end markets.

A Brief Overview of Nigeria's Economy and History

The Nigerian economy is the largest in Africa, having recently overtaken South Africa after rebasing its gross domestic product (GDP) in 2014. It makes up two-thirds of all economic activity in West Africa and one-fifth in SSA. In 2012, Nigeria's GDP was \$180.9 billion in constant 2005 US dollars (Table 1.3). The country also has the largest population in the region. For every two people living in West Africa or for every five people in SSA, one is a Nigerian.

In recent years, the country has continued to experience steady and positive economic growth and is becoming one of the fastest growing economies in the region. As Table 1.3 shows, GDP growth rates have averaged about 7 percent or more per year, and per capita growth has been about 4 percent over the last decade, faster overall than the average per capita GDP growth for West Africa or SSA (Table 1.4).

The irony for Nigeria is that despite the positive economic growth, it remains—due to its sheer size and high poverty rate—home to most of the poor and hungry living in West Africa. It has one of the highest incidences of poverty, with 62 percent of the population living on less than \$1.25 (purchasing power parity [PPP]) a day in 2010. In contrast, Mali, which has a lower per capita GDP, reported a poverty rate of 50.4 percent in 2010. In Ghana, the poverty rate was less than half the rate in Nigeria during the same year (Table 1.4).

In addition to poverty, the prevalence of hunger is also high. The proportion of underweight children of less than five years of age in Nigeria fell only

TABLE 1.3 Selected socioeconomic indicators for Nigeria, 1995–2012

	1995	2000	2005	2010	2012	Annual growth rates (%)			
						1995–2000	2000–2005	2005–2010	2010–2012
<i>Select economic indicators</i>									
GDP (constant 2005 billion US\$)	57.8	67.9	112.2	159.0	180.9	2.9	11.8	7.0	6.7
GDP per capita (constant 2005 US\$)	533.4	552.2	804.2	995.7	1,071.5	0.4	9.0	4.2	3.7
Agriculture GDP (constant 2005 billion US\$)	15.1	18.5	36.4	49.8	54.7	4.3	15.8	6.5	4.8
Share of agriculture in GDP (%)	26.1	27.3	32.4	31.3	30.3	1.3	3.6	−0.5	−1.7
Share of manufactures in GDP (%)	3.5	3.0	2.8	3.0	3.0	−3.2	−2.6	1.5	0.8
Share of industry in GDP (%) ^a	47.9	47.4	41.3	35.4	32.8	−1.3	−3.4	−5.9	−3.8
Share of services in GDP (%)	22.5	22.2	23.5	30.3	33.9	0.2	0.3	5.4	5.7
Imports of goods and services (% of GDP)	42.2	32.0	31.0	29.9	35.6	−0.4	−0.2	0.6	9.2
Petroleum exports (constant 2005 billion US\$)	13.0	25.9	48.1	67.9	84.8	6.9	16.1	5.0	11.8
Official exchange rate (naira/\$)	21.9	101.7	131.3	150.3	156.8	40.9	5.5	3.1	2.1
Consumer price index (2005 = 100)	27.4	48.2	100.0	161.4	178.9	11.0	15.2	9.9	11.5
Electric power consumption (billion kWh)	15.9	14.7	23.5	26.1	27.0	−1.3	10.9	−0.1	1.7
<i>Select social indicators</i>									
Population (millions)	108.4	122.9	139.6	159.7	168.8	2.5	2.6	2.7	2.8
Urban population (millions)	42.1	52.0	63.9	78.3	84.8	4.3	4.2	4.2	4.1
Urbanization rate (% of population)	38.8	42.4	45.8	49.0	50.2	1.7	1.6	1.4	1.2
Poverty headcount at \$1.25 a day, PPP (%)	68.7	NA	61.8	62.0	NA	−0.8	−0.8	1.5	NA
Hunger Index (%) ^b	22.6	17.9	16.3	15.0	NA	−4.6	−1.9	−1.6	NA
Underweight children under five (%) ^c	35.1	24.7	26.5	24.2	NA	−6.8	1.4	−1.8	NA

Source: World Development Indicators of the World Bank (2014).

Notes: GDP = Gross domestic product; NA = not available; PPP = purchasing power parity. ^aAbout 90 percent of the value of industry is from the petroleum sector. ^bA composite index calculated by the International Food Policy Research Institute (IFPRI) using three measures: the prevalence of undernourished children, prevalence of adult undernutrition, and child mortality rate. See von Grebmer et al. (2013) for more details on this index. ^cFor prevalence of undernourished children, this is 1993–1997, 1998–2002, 2003–2007, and 2008–2012.

TABLE 1.4 West Africa selected indicators, 2012

	Population		GDP per capita		Agricultural GDP	Poverty headcount ratio (at \$1.25 a day, PPP) ^a		Prevalence of underweight in children under five years ^b	
	2012 (millions)	Growth, 2002–2012 (%)	2012 value (2005 US\$)	Growth, 2002–2012 (%)	Growth, 2002–2012 (%)	2001 (%)	2010 (%)	2000 (%)	2010 (%)
Côte d'Ivoire	19.8	2.2	942.2	-0.1	1.8	23.3	23.8	18.2	15.4
Ghana	25.4	2.2	559.2	4.5	3.8	39.1	28.6	20.3	13.4
Mali	14.9	3.1	464.4	1.7	6.2	61.2	50.4	30.1	18.9
Nigeria	168.8	2.8	861.3	5.9	6.4	63.1	68.0	24.7	24.2
Senegal	13.7	3.0	771.6	1.1	4.0	44.2	29.6	20.3	14.4
West Africa	318.5	2.8	811.4	4.5	5.4	NA	NA	NA	NA
SSA	913.1	2.7	903.3	2.7	4.7	NA	NA	NA	NA

Source: World Bank (2014).

Note: GDP = gross domestic product; NA = not available; PPP = purchasing power parity; SSA = Africa south of the Sahara. ^a(1) For 2001, the ratios for Côte d'Ivoire are for 2002, for Ghana 1998, and for Nigeria 2004; (2) For 2010, the ratios for Côte d'Ivoire are for 2008, for Ghana 2006, and for Senegal 2011. ^bFrom von Grebmer et al. (2013), various years: for 2000, average between 1998 and 2002; for 2010, average between 2008 and 2012.

marginally between 2000 and 2010, from 24.7 percent to 24.2, respectively. The comparable rates for Mali and Ghana dropped sharply during the same period (Table 1.4).

The structure of the Nigerian economy, its institutions and macroeconomy, and sociopolitical history can all partially explain the dichotomy between positive economic growth with no change in the incidences of poverty and hunger. Relatively low investment in and poor performance of agriculture may have led to such a dichotomy. The sector not only contributes the most to GDP, it employs over two-thirds of the working population in Nigeria, and therefore it is of critical importance for food security, rural incomes, and poverty reduction.

Research has shown that many African countries that rely heavily on agriculture for their GDP have experienced more equitable growth and poverty reduction whenever overall economic growth was agriculture led (Diao et al. 2010). In the case of Nigeria, a study using macroeconomic modeling underlines this finding by showing how potentially larger gains in incomes and poverty reduction are likely when fiscal policies are targeted at stimulating growth in the agricultural sector (Akanbi and Du Toit 2011). Until recently, however, Nigeria's economy relied heavily on petroleum production and exports to generate growth.

Based on the most recent estimates from the World Bank's World Development Indicators (WDI) database, the agricultural sector appears to have grown quite rapidly since the beginning of the 21st century. As shown in Table 1.4, the sector grew at an average annual rate of 6.4 percent between 2002 and 2012.⁴ However, the growth has been driven mainly by an expansion in area planted to staple crops, as yields have changed little over the same period.⁵

Moreover, growth in the agricultural sector has not been a pro-poor one—it has had little effect on the welfare of a majority of the poor in Nigeria because the agricultural subsector(s) driving the growth may have weaker linkages with the households and locations most affected by poverty, such as those that are net purchasers of food (Diao et al. 2010). Additionally,

4 Recent estimates by the National Bureau of Statistics (NBS), which is the principal agency overseeing the national statistics of Nigeria, report a 4.5 and 5.1 percent growth in constant 1990 naira terms during the second and third quarters of 2013, respectively (Nigeria, NBS 2013b). Thus, the growth has somewhat slowed down in 2013.

5 For rice, for example, average yields have actually declined over time in Nigeria from a high of 2.1 metric tons (MT)/ha in the 1980s to 1.5 MT/ha after the turn of the century (based on FAO 2014).

insufficient investments have been made into basic infrastructure and social services (such as education and health) in rural areas in tandem with the growth in the agriculture sector (see Dim and Ezenekwe 2013). Evidently the many years of neglect of agriculture, basic infrastructure, institutions, and services in the past have taken a toll. The neglect is visible in the state of disrepair, unreliability, and inefficiencies of basic infrastructure that exists in many parts of the country.

A key factor that has challenged Nigeria's ability to manage its agricultural development agenda, including rice, is its status as a major petroleum exporter. Inevitably, therefore, the negative effects of the so-called Dutch Disease syndrome—a condition in which a boom in export earning does not translate into broad-based growth in the rest of the economy—come into play. Also referred to as a “resource curse,” this affects countries that export a single resource commodity that leads to rising foreign-exchange earnings, either due to a price boom in global markets or a substantial increase in export volumes due to global demand.

The accompanying increase in export revenue and foreign-exchange reserves leads to an appreciation of the domestic currency and makes food imports (in addition to other goods and services) cheaper (Oyejide 1986). In the process, it undermines the competitiveness of domestic production of both tradeables and non-tradeables such as food staples. The situation can be made worse if increases in government revenue generated from the export earnings are not effectively transferred to other sectors of the economy. This is a reality that Nigeria has had to grapple with throughout its history since the discovery of large petroleum reserves.

Nigeria's resource curse occurred more as a result of poor governance and inherently weak institutions that existed in managing the petroleum sector and government revenues generated from it (Robinson, Torvik, and Verdier 2006; Sala-i-Martin and Subramanian 2013). Nigeria has struggled throughout its history in forming strong democratic institutions and transparent processes for governing its petroleum sector. The country is made up of several ethnic and religious groups, each with its own distinctive language, culture, and history. The country's diversity often makes it difficult to have a unified state; in this context, coordinated governance becomes more challenging.

Additionally, while the country's three-tier federal system of governance (i.e., a national, state, and local level) was intended to allow for greater autonomy and to avoid conflict across its various social groups and regions, it has instead encouraged rent-seeking behavior and politically motivated behavior

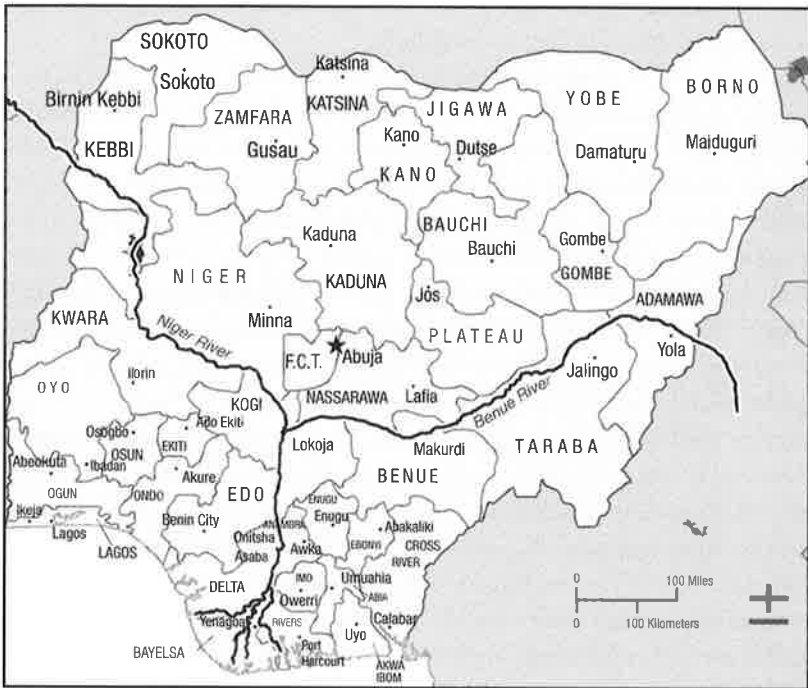
over the control of government revenues and resources at the national level. This is because over 90 percent of the government's revenue is generated at the top tier from petroleum exports. As a result, local and state authorities have to rely heavily on the federal government for much of their capital expenditure needs. Without sufficient transparency and accountability in place, such a vertical fiscal imbalance introduces a higher risk for rent seeking and other politically motivated behavior in the allocation of revenues, especially during a petroleum boom (Gboyega and Shukla 2011; Diao et al. 2010; Robinson, Torvik, and Verdier 2006).

The combination of a large and diverse population, varying degrees of resource endowments, and generally poor transparency and accountability of governing institutions has contributed to a difficult and turbulent political history for Nigeria. Table A.1 in Appendix A provides a very brief chronology of this history. Fortunately, a more stable macroeconomic environment has been created over the past decade, and major reform efforts to improve public financial management, infrastructure and services, and transparency and accountability in the petroleum sector have been introduced (Gboyega and Shukla 2011). The efforts seem to be paying off, with signs of low inflation, a steady supply of foreign-exchange reserves, and stable exchange rates (Table 1.3). Demand for rice, however, has continued to grow, fueled by economic growth.

Importance of Agriculture and Evolution of Rice Policies

The discussion above shows that agriculture plays a dominant role in Nigeria's economy. The role of agriculture as a key source of employment, food security, and rural incomes is primarily due to the richly endowed and diverse agroecological landscape in Nigeria straddled by two of Africa's major rivers, the Niger and Benue (Figure 1.1). Freshwater resources are relatively abundant in Nigeria due to these two major rivers and other large bodies of water. Large swaths of land serve as river basins along these two rivers, locally referred to as *fadamas*, which are particularly suitable for rice production. Periodically, however, water access can be affected by droughts and/or floods (Kuku-Shittu et al. 2013).

Nigeria's agricultural landscape can be broadly broken down into three major agroecological zones: humid, subhumid, and semiarid. The most commonly grown agricultural crops in the humid zone of the south are tree crops (e.g., cocoa, oil palm, plantain, and rubber); root crops (yam, cassava, and

FIGURE 1.1 Political and physical map of Nigeria

Source: Downloaded from the Commonwealth Secretariat (<http://secretariat.thecommonwealth.org>) on December 16, 2013.

Note: FCT = Federal Capital Territory. Nigeria is divided into six geopolitical zones: the North Central zone consists of Benue, FCT, Kogi, Kwara, Nasawara, Niger, and Plateau states; the North East zone consists of Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe states; the North West zone consists of Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zamfara states; the South East zone consists of Abia, Anambra, Ebonyi, Enugu, and Imo states; the South South consists of Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers states; and the South West zone consists of Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo states.

cocoyam), and cereals (maize and some rice). As a rain forest area, timber is also an important commodity. The subhumid zone is just north of the humid forest zone in the south and covers much of the middle belt of Nigeria. It is characterized by more open forests and savanna grasslands. Crop production is significant and includes root crops (e.g., yam and cassava) and cereals (e.g., maize, rice, and sorghum). The semiarid zone occupies the northern part of Nigeria. Typical crops grown in this zone include rice, vegetables, millet, sorghum, cowpeas, groundnuts, and cotton. Livestock and gum arabic are also produced.

Food-crop production is the dominant activity in terms of value within agriculture. Cassava and yam contribute about a third of the total value of output, cereals 26 percent, and other food crops (such as plantains, melons,

fruits, and vegetables) contribute another 26 percent.⁶ Among cereals, rice has become a leading crop in value terms since the 1970s, surpassing other major cereals such as maize, millet, and sorghum.

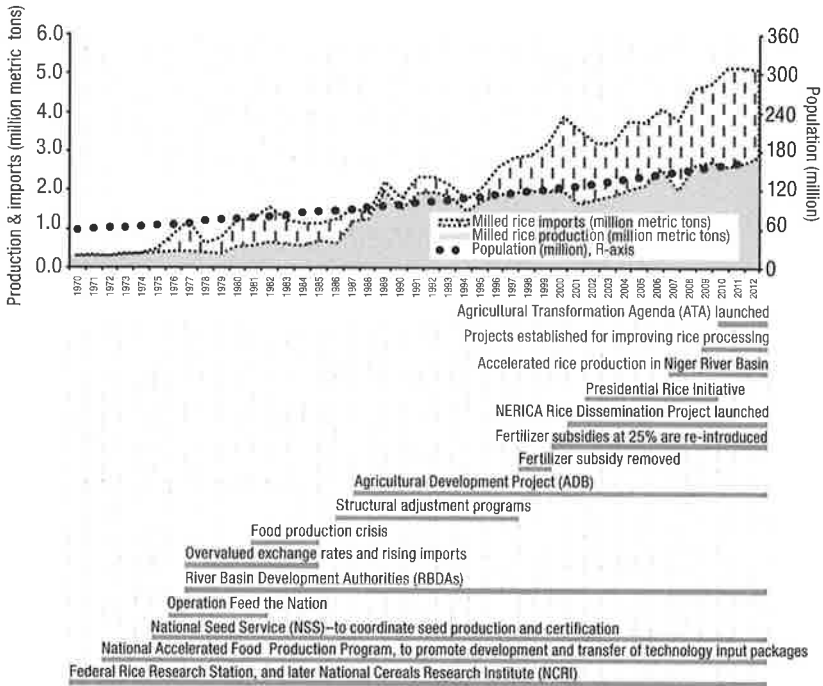
The importance of agriculture—and rice in particular—has been recognized by the Nigerian government as central to food security in the country, especially since 1970. This is true whether the regime in power at the time was a military or civilian one. However, each successive regime rarely took a systematic approach in planning for agricultural development, preferring to focus instead on commodity-specific initiatives that were targeted at increasing output for food security purposes and to promote rural employment (Manyong et al. 2005). Figure 1.2 summarizes some of the initiatives introduced throughout the country's history and relative to trends in rice supply (production and rice imports) and demand (represented here by population growth).

Before the 1970s, as in the rest of Africa, the primary policy focus for agriculture was on the promotion of export crops, especially palm oil, groundnuts, cocoa, and cotton. Research institutes for these commodities were established soon after independence (Ehigiamusoe 2012). Nigeria was the world's leading exporter of palm oil, accounting for 45.2 percent of the world market in 1961.⁷ Cocoa and groundnut exports were also significant, with 16.6 and 11.1 percent of global exports, respectively, in the same year. Export commodity boards inherited from the colonial era provided essential support for extension and the provision of modern inputs, in addition to crop procurement.

After the petroleum oil price surge in the middle of the 1970s, export shares of these crops began to erode. In 2012, Nigeria's share of world exports was 1.9 percent for palm oil, 8.7 percent for cocoa, and 7.4 percent for groundnuts. Prior to the windfall gains from petroleum exports, agricultural products accounted for up to 90 percent of export revenues. Nigeria was self-sufficient in food production, with a small surplus for exports to the West African subregion. However, the food production index in Nigeria decreased from 100 in 1960 to 88 in 1975 and to 67 in 1980. This was despite increased policy attention to food crops in the 1970s, especially in the aftermath of severe droughts in the Sahel from 1972 to 1974. That was the first period during which Nigeria imported a large quantity of rice (Ojo and Adebayo 2012).

6 Diao et al. (2010), based on national- and state-level data on agricultural production, agricultural yield, and market prices, which all come from FMARD.

7 Statistical database of the Food and Agriculture Organization of the United Nations (<http://www.faostat.fao.org/>), accessed December 21, 2013.

FIGURE 1.2 Trends in production, imports, population, and evolution of rice policies and agricultural investments

Source: United States Department of Agriculture international database (USDA–ERS 2012) for production and imports; FAOSTAT (FAO 2014) for population; and various documents for import tariffs and investment strategies (e.g., Emodi and Madukwe 2008; Daramola 2005; Akpokodje, Lançon, and Erenstein 2001).

The shift toward food crops in the 1970s included the establishment of the National Cereals Research Institute (NCRI) to oversee the research on major cereal crops, regional marketing boards for food crops, the National Seed Service (NSS) to coordinate seed production and certification, and the launching of the National Food Production Program. The marketing boards were set up to expand farmers' access to modern inputs, guarantee crop procurement, and stabilize prices through buffer stock schemes (Ehigiamusoe 2012).⁸

A number of grand plans to revolutionize the agricultural sector followed, including Operation Feed the Nation (OFN) under the Obasanjo regime in 1976, later renamed the Green Revolution Initiative under Shagari's civilian

⁸ These were later abolished as part of the structural adjustment programs in 1985.

government from 1979 to 1983 (Ojo and Adebayo 2012). The share of government expenditure going to agriculture and rural development was always very small (about 5 percent) relative to other sectors (Akande 2005). Nevertheless, a number of large investments were implemented, including the establishment of the River Basin Development Authorities in 1977 to improve irrigation development and water control and establishment of the Abakaliki Rice Project in 1978 for rice production and processing. Both are still in operation today.

Much of the focus of investments was on large-scale irrigation and mechanization—involving a mix of state-run and private-sector enterprises—rather than smallholder production systems. A land use decree in 1978 helped to ensure land ownership for large-scale operations (Akande 2005). However, none of the state-run enterprises proved profitable. The few private-sector enterprises simply benefited from government subsidies and market interventions but contributed little to total output. As a result, an agricultural revolution as envisioned under the OFN and Green Revolution Initiative did not take place.

Rice imports were relatively unregulated throughout the 1970s. Import tariffs ranged between 10 and 67 percent. By the latter part of the 1970s, imports of rice and other food commodities had begun to rise sharply due to rising global petroleum prices and higher export earnings, while domestic food production had begun to decline. Rice import growth was stimulated by structural changes, including an overvalued exchange rate, inflation and wage increases, and accelerated rural-to-urban migration.

A crisis emerged in the early 1980s, as petroleum prices declined and the country faced food shortages as a result of low levels of domestic food production, balance of payments problems, and fast-depleting foreign-exchange reserves. The government tried to curb imports through more restrictive import licensing requirements. This was followed by a complete ban on rice imports in 1986, complemented by structural adjustment programs described below (Ojo and Adebayo 2012; Akpokodje, Lançon, and Erenstein 2001). The ban on rice imports was not lifted until 1995.

Following the macroeconomic and food crisis in the early 1980s, as in many other countries in the region, Nigeria introduced structural adjustment programs (SAPs) in 1985. The government shifted its focus to increasing the productivity and output of food-crop production within smallholder agriculture through the provision of extension services and modern inputs through the Agricultural Development Project (ADP), which is the institution established in the 1970s to oversee agricultural and rural development projects in

each state.⁹ As part of these efforts, smallholder rice production schemes were introduced in the *fadama* areas to promote the adoption of simple, low-cost, improved irrigation technology through credit arrangements in order to boost production (Akpokodje, Lançon, and Erenstein 2001; Nkonya et al. 2008).¹⁰

After the end of military rule in 1999, which marked the beginning of the current Fourth Republic (Table A.1 in Appendix A), newly elected president Obasanjo launched a National Economic Empowerment and Development Strategy (NEEDS), with broad economic development goals such as poverty eradication, employment generation, and wealth creation (Iwuchukwu and Igbokwe 2012). For agriculture, NEEDS included targets of 6 percent annual growth in agricultural GDP, increased earnings from agricultural exports, and a 95 percent self-sufficiency ratio in food production. A number of commodity-specific presidential initiatives were also developed with these goals in mind, including ones for rice, cassava, vegetable oil, tree crops, livestock, and aquaculture products.

The aims of the Presidential Initiative on Rice were to achieve national self-sufficiency in rice production by 2005 and the ability to export by 2007 (Phillip et al. 2009). To pursue these goals, the initiative focused on improving access to technology packages at a 50 percent subsidized rate (rice box, or R-Box, technologies), which emphasized minimum tillage and key inputs such as seed and agrochemicals. To ensure higher-quality domestic rice brands, the government also granted concessions to large-scale milling companies to import brown rice with a 50 percent import tariff rather than the 100 percent on milled rice whenever there was insufficient local paddy rice to supply the mill (Daramola 2005). During this time, the NCRI and the former West Africa Rice Development Association (currently known as the Africa Rice Center) also assisted with the multiplication of breeder and foundation seeds, while the NSS worked with seed companies and ADPs to ensure production and dissemination of quality-certified seeds. Additionally, the construction of rice mills was proposed in ten locations (Adejumo-Ayibiowu 2010).

Other rice projects were also launched soon after the turn of the century. One major breakthrough was the release and dissemination of Multinational New Rice for Africa upland varieties. By 2005, the second phase of the National Fadama Development Project funded by the World Bank was introduced and

9 The ADPs are still active today in various states across the country.

10 This was officially referred to as the first National Fadama Development Project (or Fadama I), funded by the World Bank, and it lasted until 1999. A second phase was introduced in 2005, and currently the third phase is being implemented.

referred to as Fadama II. It involved 26 states and proved more successful in boosting production and incomes than the first phase by addressing many of the shortcomings of Fadama I. In particular, there was a shift away from a top-down and supply-driven public-sector approach to a community-driven approach (Nkonya et al. 2008). Such achievements are critical for future development efforts considering that only a small portion of the country's total *fadama* potential has been tapped (Djurfeldt, Aryeetey, and Isinika 2011).

As rice imports continued to rise throughout the post-2000 period, tariffs were raised from about 50 percent in the latter half of the 1990s to 85 percent in 2001 and to 110 percent by 2005. Following the removal of the tariff in 2008 in response to high world prices in that year, tariffs were reimposed and increased to 110 percent again by 2013. Despite the domestic price incentives created by these tariffs, there has been no significant supply response at the national level. Public investments to improve yields, such as irrigation systems in river basins, development and dissemination of high-yielding seed varieties, and improved access to fertilizer have been insufficient. Similarly, efforts to improve product quality through the promotion of modern milling technologies have generally been unsuccessful, despite being critical for the competitive position of domestically produced rice (Demont et al. 2013).

Recent Rice Policy Framework

The general objective of the Nigerian government's policy framework has recently been to transform the agricultural and rural sector in order to promote overall economic growth, poverty reduction, increased rural employment and incomes, and national food security. Under the Agricultural Transformation Agenda (ATA), the framework called for a number of policy, institutional, and financing instruments to drive sector growth through the improvement of agricultural performance all along a value chain, from on-farm production to value-added processing and marketing activities.

Key among the initiatives was the Growth Enhancement Support (GES) program, which provided targeted input subsidies for fertilizer and seeds made available through electronic vouchers in partnership with private-sector input dealers. Other investment programs included the establishment of SCPZs to promote industrial clusters for food-processing activities; the setting up of marketing corporations to strengthen ties between agro-industry, markets, and farmers; the establishment of innovative agricultural financing mechanisms that enable risk sharing between government and the banking industry; and coinvestments through state governments and private-sector partnerships.

For the rice sector specifically, as part of the ATA strategy, FMARD put forward a plan whose goal was to transform the rice sector and achieve self-sufficiency. Referred to as the Rice Value Chain Transformation Plan (FMARD 2012), the principal goal was to improve productivity and output significantly. The government expected to accomplish this by doing the following:

- Increasing the competitiveness of local rice all along the value chain. At the production level, this involved greater mechanization, intensification of paddy rice production in rainfed lowland and irrigated rice ecologies, increased use of fertilizer, and improved rice varieties. At the processing and marketing level, farmers and millers were encouraged to create formally registered groups to facilitate access to improved technologies, markets, and mills.
- Expanding accessibility to inputs such as fertilizers and agrochemicals (through initiatives such as the GES program).
- Promoting modern practices and management along the commodity chain to raise the quality of rice (e.g., use of quality seeds, threshing, drying, and milling).
- Creating an enabling policy and market environment to encourage growth in the sector.
- Introducing innovative agricultural financing mechanisms to improve the accessibility to credit all along the value chain.

These policies were to be implemented while protection for the domestic rice sector was provided through continuing application of import tariffs.

Objectives and Approach of the Book

The principal objective of this book is to assess the policy challenges and opportunities for transforming and expanding the Nigerian rice economy. Transformation is critical for achieving sustainable growth, especially given the role that rice plays in food security and poverty reduction. Despite a long history of rice production, the Nigerian government's intervention in the rice sector, and the rapidly growing demand for rice, the sector has not been transformed from its premodern and low-productivity status. It still has a relatively low level of private-sector participation and faces costly market inefficiencies. While the recent government's strategy, including the ATA under President Jonathan's administration, has been promising, has had certain innovative

elements, and has appeared to be backed by a strong political will, it remains unclear whether it will succeed in transforming the rice economy.

The ability of the rice economy to grow and be transformed into a more vibrant and competitive one requires a medium-to-long-term perspective, considering that many of the underlying constraints facing the sector are basic and fundamental to the overall development of the agricultural sector and are therefore less likely to be altered by short-term policies. Understanding the kinds of challenges and the various policy options needed both in the short and long run requires a holistic approach that analyzes each of the principal components of the rice economy: demand, production, processing, and trade.

In the process, a number of relevant policy questions can be directly addressed: How is rice consumption growth in Nigeria associated with structural changes in the economy, such as income growth and urbanization? Is there biophysical and economic potential for domestic rice production to transform and expand over the short to medium term? Is there potential to improve the quality and competitiveness of local rice in domestic markets? What is the most efficient way to take advantage of this potential for both production and processing? Are there differential abilities and efficiencies among existing mill types (small to large) for improving quality and meeting demand? Are there lessons that can be drawn from elsewhere in West Africa and Asia? What are some of the constraints in historically protective rice trade policies in Nigeria? What are the welfare implications and opportunity costs of alternative strategies for growing and transforming the rice economy?

The book has been organized around these key questions. Chapter 2 reviews and discusses rice consumption and demand in Nigeria. This is followed in Chapter 3 by a descriptive overview of the current state of rice production systems and economics in Nigeria. Chapter 4 provides an assessment of the potential to induce a supply response in paddy production given these current conditions, as well as indicating what will be needed to grow and transform the sector in the future. These chapters are intended to set the context of the policy challenges Nigeria faces in order to stimulate growth in local paddy production. In Chapters 5 and 6, we shift attention to the postharvest rice milling and marketing sector by examining its current structure, conduct, and performance, as well as associated policy challenges and opportunities for modernizing the sector.

Chapter 7 analyzes rice import policies in terms of their effectiveness and tradeoffs with regard to affecting the volume of imports, domestic prices, and tariff revenues in the Nigerian context. Finally, in Chapter 8, we combine the analyses and conclusions from Chapters 2 through 7 on demand, production,

processing, and trade to discuss the economywide implications of policy options raised in each of these chapters for transforming and increasing the competitiveness of the domestic rice sector. Chapter 9 summarizes the key findings and presents conclusions on the challenges and opportunities facing policymakers in transforming the rice economy in Nigeria.

Our analysis seeks to answer three major questions regarding policies that influence the Nigerian rice economy. The first is how to go about increasing productivity: one approach is to promote the use of fertilizer, improved seeds, mechanization, and irrigation. The second focuses on how to go about improving the efficiency of postharvest processing and marketing activities, such as through the modernization of the rice milling industry. And the third is how to more effectively manage trade policies, such as import tariffs, as well as price policies in general, in order to support the transformation process.

Aside from its core objective of informing development strategy by assessing the policy challenges and opportunities for transforming and growing the Nigerian rice economy, the book is also intended to be of practical use for policy analysts, students, and researchers alike, especially those who are interested in the various econometric and modeling approaches used. These include the application of econometric tools to estimate demand elasticities in Chapter 2; the application of simple farm budgeting tools and econometric approaches for estimating supply response elasticities in Chapter 4; development and use of mathematical programming methods to assess the optimal mix of large-scale and medium- or small-scale millers and location of rice milling operations in Chapter 6; the use of simple price and import tariff analysis approaches in Chapter 7; and finally, the use of an economywide multimarket model in Chapter 8 for assessing the tradeoffs of various policy alternatives on the overall rice sector and national economy.