

The background image is a photograph of a vast rice paddy field. In the foreground, rows of young green rice seedlings are planted in shallow water. The middle ground shows more of the field, with some areas appearing to be under construction or recently planted. In the background, there are trees, including banana trees, and a distant horizon. The sky is a mix of deep blue and orange, indicating a sunset or sunrise. The overall scene is peaceful and agricultural.

agramondis

Research Report:

# Key Insights on the Nigerian Rice Industry

December 2022



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## Abbreviations and Units

ABP	Anchor Borrowers Program
ABS	Anchor Borrower's Scheme
AGRA	Alliance for a Green Revolution in Africa
AMEFAN	Agricultural Machinery and Equipment Fabricators Association of Nigeria
ATASP	Agricultural Transformation Agenda
BMGF	Bill & Melinda Gates Foundation
CSE	Combine Service Enterprise
FAO	Food and Agricultural Organization
FIs	Financial Institutions
FMARD	Federal Ministry of Agriculture and Rural Development
Ha	Hectares
KII	Key Informant Interview
M	Million
M&E	Monitoring and Evaluation
MMT	Million Metric Ton
MT	Metric Ton
NBS	National Bureau of Statistics
NCRI	National Cereals Research Institute
NGN	Nigerian Naira
NGO	Non-Governmental Organization
RECs	Regional Economic Communities
R&D	Research and Development
RIFAN	Rice Farmers Association of Nigeria
SFSA	Syngenta Foundation for Sustainable Agriculture
SON	Standard Organization of Nigeria
SSA	Sub-Saharan Africa
UN	United Nations
USAID	United States Agency for International Development
USD	US Dollar
USDA	United States Department of Agriculture

# Background

Rice is a major staple food in Nigeria and a significant source of income for farmers. However, local production has not been able to meet the increasing demand for rice in the country, leading to a food security issue. To increase local production and boost the competitiveness of Nigerian rice farmers, the Central Bank of Nigeria implemented a policy in 2015 that prohibited the use of foreign exchange to import rice. While domestic rice production has increased since then, it is still insufficient to meet demand due to a poorly developed value chain.

This research aims to improve stakeholders' understanding of the rice sector needs of Nigeria and explore ways to adapt China's successful value chain technologies and practices to increase rice productivity and processing in Nigeria. It also provides insights and recommendations for modernizing agricultural value chains in West Africa.

The study feeds into a streamline of activities to develop a rice value chain strategy for Nigeria and work in close consultation with public and private sector stakeholders such as SFSA, BMGF, and AGRA. The goal is to identify the funding gaps and establish priorities, targets, and timelines for mobilizing resources from domestic and international investors and donors in support of a strengthened rice value chain in Nigeria.

The study is supported by 2,249 farmer surveys conducted across eight states in Nigeria (Cross River, Edo, Ebonyi, Jigawa, Kano, Kebbi, Nasarawa, and Niger), a deep-dive literature review, 211 Key Informant Interviews (KIIs) with stakeholders including government agencies, processors, financial institutions, fabricators, and service providers. The desk research and analysis of primary and secondary data was completed by Agramondis Research & Agricultural Consulting.

## Executive Summary

Nigeria has been a net importer of rice mainly due to insufficient production, quality and quantity losses across the value chain and lack of large-scale value addition. Yet, **Nigeria is the leading rice producer in Africa, with a 70% growth in production in the last decade.** Given the importance of rice as a staple food in Nigeria, boosting its production has been accorded high priority by the government.

**Raising Nigeria's rice industry standard is about addressing inefficiencies in the entire supply chain.** Aside from pre-harvest losses due to various factors (e.g., rodents, pests, theft, weather), rice post-harvest losses vary widely from farm to farm, with losses ranging from 8% up to 55%.

**Nigeria's rice processing techniques are inefficient** resulting in processed rice that is expensive and of a lower quality than rice from other countries like China, Vietnam, and India.

**The rice industry in Nigeria is largely dominated by cottage processors who are more profitable and sustainable as market channels for small-holder farmers.** The cottage processing industry is a sustainable source of off-take for farmers' paddy and thus should be given attention in any discussion to strengthen the Nigeria rice value chain.

**Nigerian rice farmers, especially those farming 2 ha or less face a variety of challenges, including low-profit margins, low prices, limited access to-mechanization, and marketing bottlenecks.** Pricing was the foremost concern of rice farmers as 62% of them do not get favorable price offers for their paddy. Many also struggle to access machinery; 79% of rice farmers find access to mechanization either very difficult or almost impossible.

**Nigeria can reduce rice importation by 9% by fixing the inefficiencies in milling rice and save an estimated USD 180 million in foreign exchange,** which can be reinvested into the rice processing sector to increase the rate of mechanization of existing processors.

**China, the world's largest rice-producing and consuming nation has many lessons to offer Nigeria from its success.** China's rice industry has excelled in its technological advances, policy support, mechanization and organization of farmers and supply chain actors.

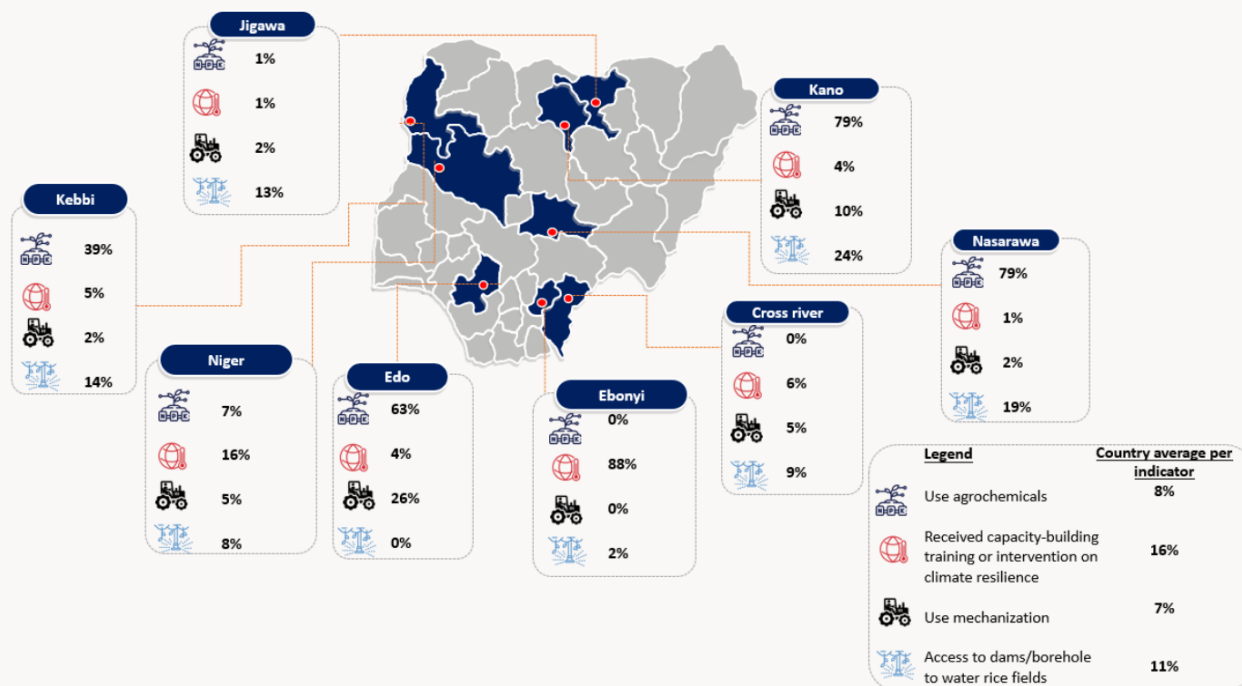
**Key opportunities can be observed throughout the value chain but especially in improving post-harvest and processing components of the value chain.**

# Key Statistics of Rice Farmers in Nigeria





Based on a survey of 2,249 rice farmers


86%  14% 



## DESCRIPTIVE STATISTICS OF RICE FARMERS


 **86%** have a personal cell phone; 24% have smartphones


 **4** average number of people in household that cultivate rice (Range is 1 - 12 people)

 **2.5 MT/ha** average yield (Range is 0.01 - 15 MT/ha)

 Average price of 50kg bag of rice: **\$1.6 to \$25** depending on the period it was sold.

 **43** average age (Range is 18 - 80 years)


 **63%** average household income from rice production

 **6.1 MT** average annual quantity of rice produced per farmer (Range is 0.006 MT to 240 MT)


 **June** is when rice farmers get the most value for their paddy

- They sell a 50kg bag for up to \$48 (NGN 20,129). While they sell for the least amount of money in August — about \$14 (NGN 5,700).
- Average annual sales is \$2,658 (NGN 1.1 million)

 **9** average number of people in household (Range is 2 - 18 people)

 **2.4 ha** average size of rice farm (Range is 0.25 - 80 ha)

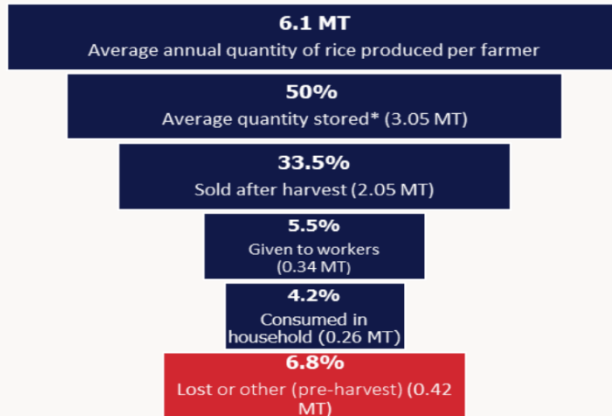
\*Storage is for seed and off-season sales

 **98%** grow rice for both cash and consumption

# Rice Farmer Segmentation

n = 2249

## Average Farmer's Rice Production and Distribution



## Farmer segmentation by farm size

	Subsistence 2 ha or less	Medium Between 3 to 5 ha	Commercial 5 ha or more
Average income (million NGN)	0.6	1.5	2.6
Average amount spent on rice seed (NGN)	18,712	86,188	159,738
% with access to a tractor	50%	80%	83%
Average amount of rice stored (MT)	1.2	1.7	15.4
Most commonly used packaging material for storage	Hermetic bag embedded with polythene	Hermetic bag embedded with polythene	Hermetic bag embedded with polythene

## Farmer segmentation by income from rice

	500K or less	500K to 1M	1M to 3M	3M or more
% of farmers	39%	29%	28%	4%
Average harvested rice volume (MT)	3.2	4.3	7.4	17
Average farm size (ha)	1.4	1.7	3.2	7.3

## Farmer segmentation by harvested rice volume

	2MT or less	2MT to 6MT	6MT to 12MT	12MT to 20MT	20MT or more
% of farmers	16%	57%	19%	5%	3%
Average farm size (ha)	2.1	1.7	3.2	4	10.2

SOURCES: AGRAMONDIS 2022

# Rice Value Chain Segments in Nigeria

## Current Situation Analysis Summary

### Pre-Production

#### Agro-Dealers and Input Suppliers

- The majority of agro-dealers are uncertified, as there is no certification system for agro-dealers in Nigeria
- There are different products on the market with varying degrees of quality
- Agro-dealers and input suppliers double as extension agents in rice producing communities.

#### Seed Companies

- The Nigerian seed system has been weak and underdeveloped in supplying improved varieties.
- The market value for improved seed is poor
- Key opportunities for improvement in the seed system are in addressing access to improved varieties, good quality and certified seed

#### Research Institutes /Tertiary Institutions

- Most are academic and not focused on problem-solving research
- Notable names include The Africa Rice Center, IITA, and NCRI
- Foreign and donor interventions are often more problem-solving-oriented than the existing efforts of the government

### Production

#### Individual Farmers

- Average rice farm size is 2.4 ha
- The average annual quantity of rice harvested per farmer is 6.1 MT. Only 4% is set aside for personal consumption.
- On average, about 50% of rice produced per farmer is stored for the off-season

#### Farmers Associations

- Rice Farmers Association of Nigerian (RIFAN) and the central bank of Nigeria (CBN) work together. For every 10 farmers, 8 of them access financing through RIFAN
- However, local associations often receive too much attention compared to other aspects of the value chain. The government must create a level playing field between production and processing

#### Government Ministries & Agencies

- The ban on the importation of rice increased local production and consumption of locally milled rice by over 100%
- Since 2004, the government has provided subsidies for the purchase of agricultural machinery for farmers at the provincial level
- Lack of government support, especially in improving the seed system and accessing finance, is a big contributor to the fluctuating growth of the rice market

#### Financial Institutions (FIs) and Partners

- FIs consider smallholder agriculture too risky. Key reasons include challenges in determining credible borrowers, incurring significant costs in processing many small loans to smallholder farmers
- FIs will almost never give loans to smallholder farmers without third-party intervention
- The Nigerian Federal Government supported Anchor Borrower's Scheme (ABS) loans are characterized by high default rates

### Processing

#### Cottage Processors (Local Millers)

- Cottage processors outnumber industrial processors
- They process about 20% of rice produced by smallholder farmers
- They have 3X more milling power and output than medium to large rice mills
- Major challenges they face are: unstable electricity, increased cost of fuel, unavailability of local markets for spare parts of imported milling equipment, and lack of access to formal credit from banks

#### Processors (Medium - Large Mills)

- There are about 35 large processors in Nigeria
- They process about 21% of rice produced by smallholder farmers
- While milling at the village level is inefficient and wasteful, access to medium to large scale processors is limited and often very expensive for smallholder farmers

#### Fabricators

- They are local manufacturers of equipment parts
- Major challenges faced include high costs of production, poor access to finance and, high interest rates
- There has been increased awareness about the adoption of locally fabricated agro-equipment. For example, UtterlyYum, a fruit processing company in Nigeria utilized local fabricators for its equipment. In addition, Agricultural Machineries and Equipment Fabricators Association of Nigeria (AMEFAN) nominated 23 apprentices to the annual NCAM youth empowerment and skill acquisition training in 2018.

#### Implementing Partners

- Implementing partners could be development organizations, NGOs, and private agribusinesses that have a wealth of experience in supporting the rice value chain in Africa.
- Examples include Technoserve, Precision Agriculture for Development, Extension Africa.

### Commerce

#### Service Providers/Aggregators

- Aggregators are the biggest off takers, collecting rice from 64% of rice farmers surveyed
- The absence of specialized service providers in the value chain impacts production
- Some waste and the remaining is stored for the off-season

#### Traders (Paddy and Finished Product)

- These are characterized by market actors who sell rice in informal open-air markets and neighborhood shops
- They are ubiquitous in every market in the country
- They are mainly independent, although some are connected to a larger company
- They are one of the biggest off takers of rice from rice farmers
- Lack of capital is a major concern for them, especially as consumers begin to request more credit and default

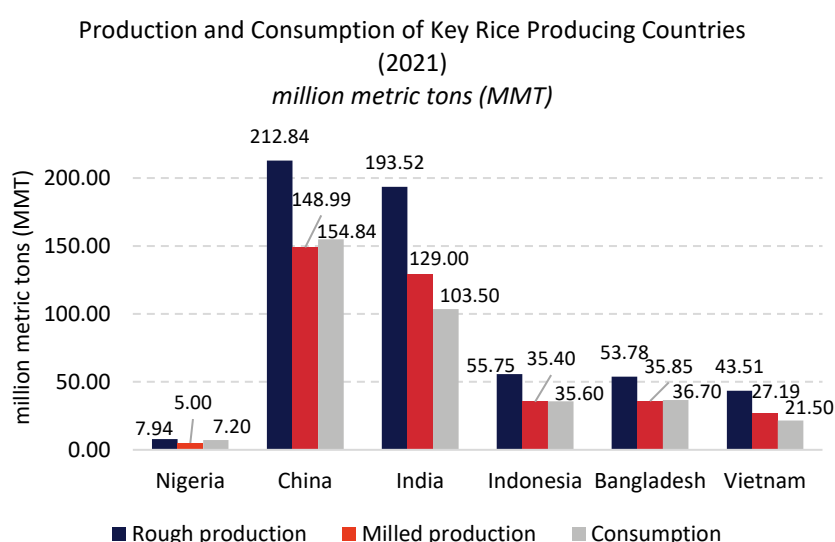
# 1. Global Rice Industry



## Key Statistics

1. Rice is the 2<sup>nd</sup> most important staple crop worldwide, behind maize.
2. Asia accounts for 90% of global output; China is a leading producer with 30% of global rice production.
3. Irrigated rice systems make up 54% of global rice harvested area yet leads to 75% of global rice production.
4. Nigeria has a low yield of 2.5 MT/ha, compared to other leading rice production countries (4.1-7.1 MT/ha).

**Rice is the staple food of more than half of the world's population; it is the second largest staple crop globally, behind maize.** Global production and consumption have grown over the years with most of the growth attributed to the increasing population and economic growth in Asia and Africa.



**China is the world's largest rice-producing and consuming nation** responsible for approximately 30% of the world's total production. As Nigeria's population grows, total rice consumption is expected to rise to approximately 11 MT by 2030.<sup>1</sup> See Figure 1 for an overview of rough paddy production, milled production and consumption volumes of key rice producing countries.

**Two key factors affecting the success of a country's rice value chain are irrigation and mechanization.** Irrigated rice

Figure 1: Production and Consumption of Key Rice Producing Countries  
Source: USDA 2022

systems represent 54% of the world's harvested area and provide 75% of the world's rice production. Nigeria has one of the lowest mechanization rates in the world at 0.3 horsepower per hectare (hp/ha) while China's mechanization rate is 8 hp/ha. One aspect shared by Nigeria and other Asian countries is the inefficient and unproductive utilization of machinery. This is partly due to low technical knowledge of operating machines and the fragmentation of rice fields as small-scale farmers dominate both markets.<sup>2</sup>

<sup>1</sup> OECD-FAO Agricultural Outlook 2021-2030

<sup>2</sup> Yunchao, T., Liang, G., Lufeng, L., Junfeng, G., Ya, X., Chao, C., Hao, G. and Huaibo, S. (2022). Agriculture 2022, 12(2), 287; <https://doi.org/10.3390/agriculture12020287>



## 2. Nigerian Rice Industry

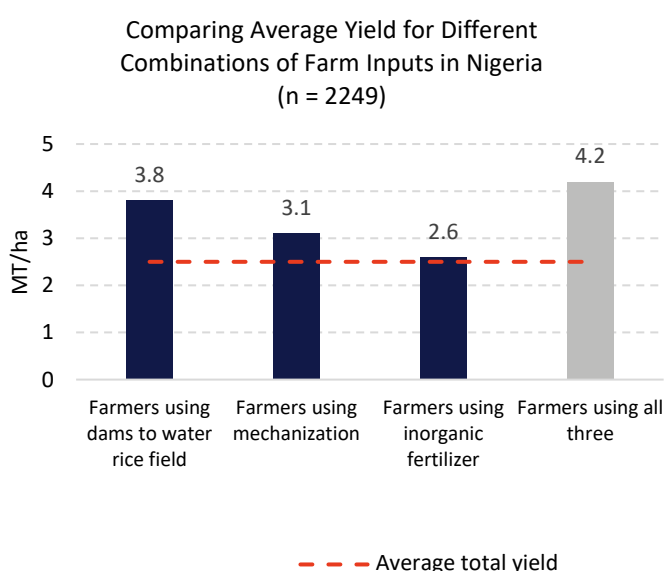


### Key Takeaways

1. Nigeria is the largest producer of rice in Africa with rough rice production of 7.94 million MT in 2021.
2. The ban on the importation of rice has increased local production and consumption of locally milled rice by over 100%.
3. Nigeria is gradually closing the deficit in rice production; harvest area and good production practices are on the rise, including an increase in irrigated production.
4. Only 63% of rice produced is milled; while production practices are improving, the post-harvest supply chain is heavily fragmented with low technology integration.

### 2.1 Rice Production in Nigeria

**Nigeria is the largest producer of rice in Africa with 70% production growth in the last decade.** Rough rice production was 7.94 million MT in 2021 and is projected to reach 8.7 million MT in 2022. Milled rice production was an estimated 5 million MT in 2021 and is forecasted to be 5.5 million MT in 2022.



**Although cultivation is increasing, rice yields in Nigeria remain around 2.5 MT/ha, less than half the average yield in Asia** (Range in Asia is 4.1 - 7.1 MT/ha). 61% of rice farmers in Nigeria have a yield of 2 MT/ha or less. One reason for this low yield is poor soil health; only 0.7% of rice farmers in Nigeria have conducted a soil analysis in the past three years, meaning they do not know their soil profile.<sup>3</sup> Low access to agrochemicals also contributes to the low yield. However, there is significant potential to raise productivity. By adopting mechanization, using inorganic fertilizers, and having access to a dam as a main source of water for rice fields, rice farmers can improve average yield by 68% (from 2.5 MT/ha to 4.2 MT/ha). See Figure 2.

Figure 2: Comparing Average Yield for Different Combinations of Farm Inputs in Nigeria  
Source: Farmer Survey 2022

**Nigeria's rice production is largely non-irrigated and grown by smallholder farmers, but that is changing.** Although irrigation allows for better control of production variables, rainfall remains the main source of water for 51% of rice farmers in Nigeria; 23% use rivers or streams to water crops (Figure 3). With increasing access to irrigation techniques during the dry season, some rice farmers (about 5%) are now experimenting with planting rice twice in a season and moving away from a singular rice season, specifically in the South-east (Cross river and Ebonyi) and Nasarawa.<sup>4,5</sup>

<sup>3</sup> Derftdan Farmer Survey (2022)

<sup>4</sup> USDA and GAIN (2022). Grain and Feed Annual.

[https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain%20and%20Feed%20Annual\\_Lagos\\_Nigeria\\_NI2022-0005.pdf](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Grain%20and%20Feed%20Annual_Lagos_Nigeria_NI2022-0005.pdf)

<sup>5</sup> Farmer Survey (2022)

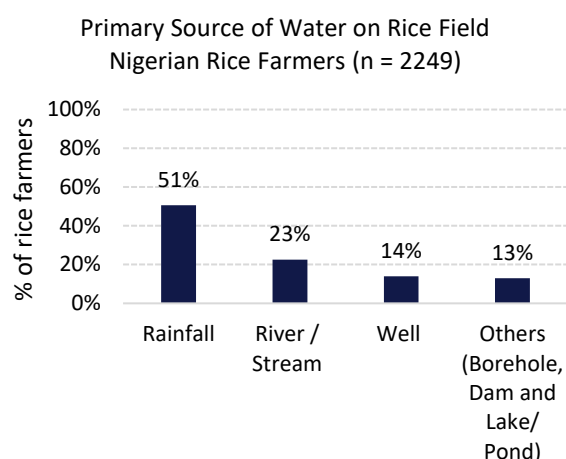


Figure 3: Main Source of Water on Rice Field Reported by Nigerian Rice Farmers  
Source: Farmer Survey 2022

**Nigerian farmers experience tremendous difficulties accessing mechanization.** Of the rice farmers surveyed, 79% said that it is either difficult or very difficult for them to access mechanization in their community. In addition, Nigerian farmers face a variety of pre-harvest challenges that lead to losses. These include issues dealing with rodents, weather conditions (such as floods and droughts), crop theft, diseases, and more. 20% of the farmers surveyed reported experiencing pre-harvest losses.

**Nigeria is gradually closing the deficit in rice production,** with critical opportunities remaining in the post-harvest and processing segments. Rice is the third-most consumed staple food in Nigeria, with a per-capita consumption between 34 kg/year – 50 kg/year, and its demand has been growing.<sup>6</sup> Given

the importance in the country, the government has put priority on boosting its production. The vast land available for rice production in Nigeria makes it a key opportunity country for the global expansion of rice production.<sup>7</sup>

**Nigerian farmers are yet to fully adopt the buying of new and improved seeds.** Most of them save grains from their harvest which they replant as seeds. Of the rice farmers surveyed, 72% source rice seeds from their farms. Only 8% buy from private seed companies and less than 1% source seeds from research institutes.

<sup>6</sup> KPMG (2019). Rice Industry Review. <https://assets.kpmg/content/dam/kpmg/ng/pdf/audit/rice-industry-review.pdf>

<sup>7</sup> Danbaba, N., Idakwo, P. Y., Kassum, A. L., Bristone, C., Bakare, S. O., Aliyu, U., Kolo, I. N., Abo, M. E., Mohammed, A., Abdulkadir, A. N., Nkama, I., Badau, M. H., Kabaraini, M. A., Shehu, H., Abosede, A. O., & Danbaba, M. K. (2019). Rice postharvest technology in Nigeria: An overview of current status, constraints and potentials for sustainable development. *OALib*, 06(08), 1–23. <https://doi.org/10.4236/oalib.1105509>. [https://file.scirp.org/pdf/OALibJ\\_2019081215544369.pdf](https://file.scirp.org/pdf/OALibJ_2019081215544369.pdf)

### 3. Supply Chain Overview

**The rice supply chain in Nigeria is long and fragmented with many actors operating in silos.** The value chain is marked by many smallholder farmers, paddy traders, village and clustered parboilers and millers, and wholesale traders selling open-bag rice with little regard for quality and safety standards. Also, the limited coordination in the value chain across post-harvest and processing undermines the implementation of grades and standards for rice quality.<sup>8</sup>

**Aggregators and rice traders are the biggest off-takers of rice paddy.** On average, rice farmers sell 38% of their paddy to traders and aggregators. Medium to larger processors receive their paddy from 21% of rice farmers and cottage processors from 20% of rice farmers. Consequently, aggregators and traders are the biggest off takers, collecting rice from 64% of rice farmers surveyed. 20% of rice farmers connect with paddy rice buyers by transporting rice to their buyers' warehouses, and 42% only sell rice directly to consumers on market days (Figure 4).

**It seems the extra investments in expenses made by medium-sized rice farmers (with farm size between 3 ha and 5 ha) does not lead to a proportional increase in income.** While the average annual income per ha made by a farmer from selling rice could vary from NGN 256,000 to NGN 422,000 depending on the farm size, most farmers with farm size between 3 ha and 5 ha have less margins compared to subsistence (2 ha or less) and commercial farmers (5 ha or more). It could be that the additional expenses for a farm size between 3 ha and 5 ha is not optimal enough to translate to higher incomes.

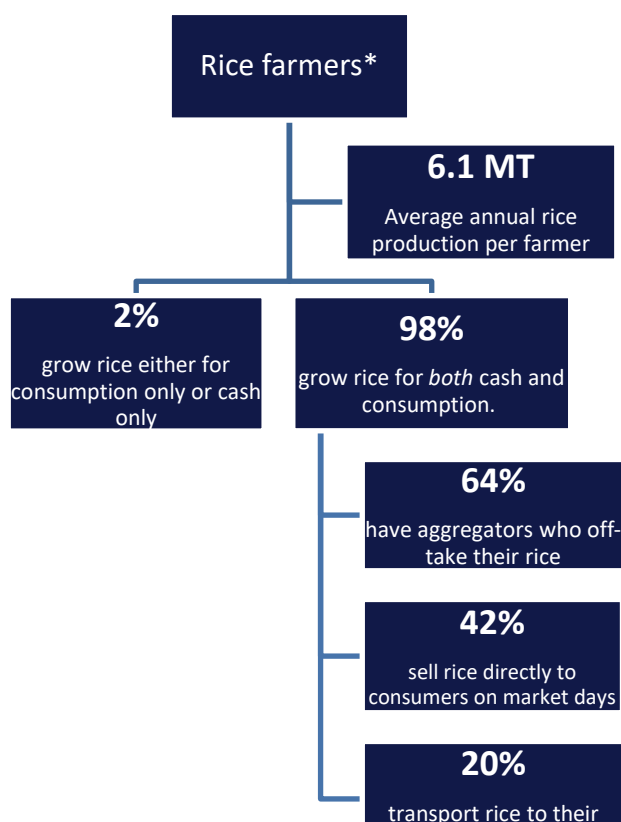


Figure 4: How Rice Farmers Connect with Buyers

Source: Farmer Survey 2022.

\*Percentages may add up to more than 100% as some farmers take a mix of approaches.

**Value addition through processing and storage for off-season sales are two key approaches to boost profitability in rice.** Only 3 of the 22 groups in the FGDs conducted processed their rice into milled or parboiled rice before selling. In addition, **farmers who store a portion of their rice for sale later during the off-season make slightly more income than those that sell all their paddy immediately upon harvesting.** Off-season sellers enjoy better prices as a kilogram of paddy could average around NGN 328 during the off-season while prices are around NGN 291 per kg during the in-season. Farmers do not often have many options but to sell immediately after harvesting due to the need to have some cash to support their livelihood and to prepare for farming for the next season. Also, a lack of effective storage facilities contributes to their limited options.

**Cottage processors can unlock up to 21% more processing capacity compared with medium to large processors by adopting improved rice milling methods.** 2 in every 3 cottage processors interviewed use traditional rice milling methods such as hand pounding in a mortar with a pestle. This method is wasteful and limited by the availability of labor. While

<sup>8</sup> Okpiaifo, G., Durand-Morat, A., West, G. H., Nalley, L. L., Nayga, R. M. & Wailes, E. J. (2020). Consumers' preferences for sustainable rice practices in Nigeria. <https://doi.org/10.1016/j.gfs.2019.100345>



medium to large processors faces challenges relating to securing enough supply, cottage processors do not. By switching to using improved rice processing methods such as the NCRI parboiler, cottage processors can unlock more processing capacity.

### 3.1 Government's Role in Recent Rice Sector Developments

**The ban on the importation of rice has increased local production and consumption of locally milled rice by over 100%.** In 2015, the federal government banned the importation of rice by restricting importers' access to foreign exchange and placed high tariffs on imports, with the goal of boosting production and consumption of domestic rice. Despite this, Nigeria remains the third largest importer of rice in the world, with over 2 million metric tons of rice smuggled into the country annually. The ban has increased local production and consumption of domestically milled rice by over 100%. However, the preference for imported rice and a deficit in local production has created a market gap of about 2.2 million metric tons in 2021, with an estimated 2.5 million metric tons in 2022. The ban has been successful in increasing local production but has not been able to prevent illegally imported rice from entering the country.

Other notable government programs which targeted areas for improvement across the rice value chain with support from developmental organizations are summarized as follows:

#### *Credit and input*

- **USAID Maximizing Agricultural Revenue and Key Enterprises in Targeted Sites II (MARKETS II)** was a 5-year agricultural project jointly funded by USAID and the Nigerian Government with the goal of facilitating improved access to credit and inputs for rice farmers in Nigeria.
- **The Anchor Borrowers Program (ABP)**, implemented in 2015 by President Muhammadu Buhari, was designed to create a linkage between smallholder farmers and agro-processors.

#### *Production*

- **The World Bank FADAMA** series was a tripartite program with different focus areas. FADAMA I was designed to offer basic irrigation support to farmers. FADAMA II followed up on its predecessor's success by introducing a community-driven development model and helped institutionalize local stakeholder engagement in community decision-making. Finally, FADAMA III helped improve infrastructure to make the transport of goods easier.

#### *Capacity building*

- **The Competitive Africa Rice Initiative (CARI)** co-funded by the Bill and Melinda Gates Foundation, was formed to educate smallholders on ways to become self-efficient and implement climate-sustainable farming practices.

### 3.2 External Factors Impacting the Nigerian Rice Industry

The two most important external factors impacting Nigeria in recent times were COVID-19 and more recently, the Russia-Ukraine war.

**The COVID-19 pandemic negatively impacted the entire rice value chain in Nigeria in 2019/2020; Nigeria is slowly recovering from disrupted access to hired labor, inputs, and distribution.** The pandemic had a severe impact on rice production in Nigeria due to economic lockdowns and movement restrictions that affected the 2019/2020 harvesting season and the 2020/2021 land preparations and planting season. These restrictions led to a shortage of hired labour for farming, high post-harvest losses, and difficulty accessing farm inputs.

**The Russia-Ukraine war is raising the prices of fertilizers and other farming inputs globally.** Prices of fertilizer have increased by 30% since the beginning of 2022, making them less accessible and affordable for farmers. This is causing concern for farmers' production and for seed companies, who are being hit by the high cost of inputs like fertilizer.

## 4. Rice Post-harvest and Processing in Nigeria



### Key Takeaways

1. Nigeria's rice sector is projected to grow by 21% in 2025 from USD 5.2 billion to USD 6.3 billion.
2. Nigeria can save an estimated USD 180 million in foreign exchange by fixing the inefficiencies in the rice processing sector.
3. For the post-harvest/processing segment of rice to improve, value chain actors need to have access to finance, switch to large-scale mechanized processing, and adopt sustainable practices.
4. Knowledge and techniques regarding post-harvest processing are lacking in Nigeria, thus reducing the overall quality of Nigerian rice.

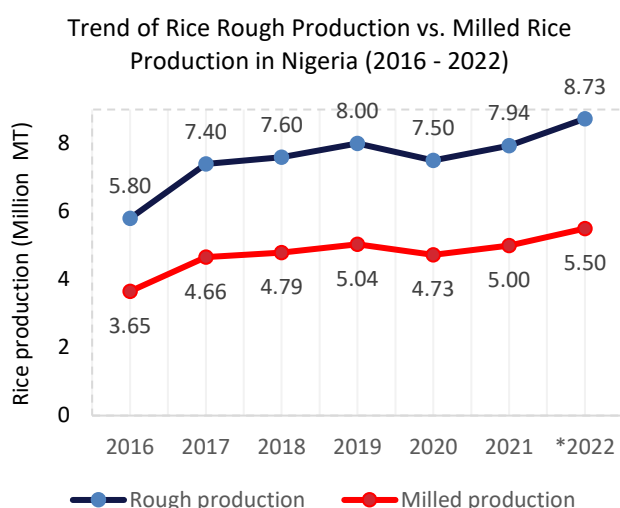
### 4.1 Outlook of Nigerian Rice Post-harvest and Processing

**Nigeria's rice sector is projected to grow by 21% in 2025 from USD 5.2 billion to USD 6.3 billion.**<sup>9</sup> Rising population, increase in demand for rice and overall growth in the economy are contributing factors. The economy is expected to grow by 2.9% in 2022 if further depletion in foreign reserves is avoided and crude oil prices are stable.<sup>10</sup> To increase the likelihood of the projected growth in the economy and the rice sector, Nigeria can conserve foreign reserves by mitigating inefficiencies in the rice processing sector (Figure 5).

**The increased adoption of sustainable practices, mechanization, and access to finance are key enablers of increased rice production and processing.** The adoption of sustainable practices, mechanization, and access to finance are key to increase rice production and processing. However, small-scale processing facilities for milling and threshing face challenges such as high capital requirements, low turnover, unavailability of power, and labour shortages. Co-investment opportunities and assistance covering the high upfront cost of buying equipment would help them overcome these challenges and improve the rice processing sector in terms of technical know-how and total revenue.

<sup>9</sup> Guardian (2019). <https://www.pressreader.com/nigeria/the-guardian-nigeria/20191208/282235192534849>

<sup>10</sup> African Development Bank (2022). Nigeria Economic Outlook. <https://www.afdb.org/en/countries-west-africa-nigeria/nigeria-economic-outlook>



- There is an upward trend in the amount of paddy produced (rough rice) and the amount of milled rice in Nigeria over the past 5 years.
- According to International Rice Research Institute (IRRI), 68–72% of the rough rice produced will be milled rice depending on the efficiency of the milling process and the variety of rice.
- Nigeria typically achieves 63% as milled rice signifying that up to 9% of the paddy is lost during processing due to inefficiency.
- As Nigeria spends upwards of USD 2 billion on rice importation annually, closing this inefficiency gap can save an estimated USD 180 million in foreign exchange thus conserving national foreign reserves.
- In addition, the fund could be reinvested back into the rice processing sector to increase the capacity of existing processors and further improve operations.

Figure 5: Trend of Rice Rough Production vs. Milled Rice Production in Nigeria (2016 - 2022)

Source: IRRI 2022. \*2022 = forecast

## 4.2 Overview of Harvesting and Processing in Nigeria

**The average price of milled rice in Nigeria is higher than in other rice-producing countries like India, Thailand, and Vietnam.** According to processors during the KIIs, the average cost of local milled rice varieties could be twice as much as that of imported milled rice varieties (Figure 6).

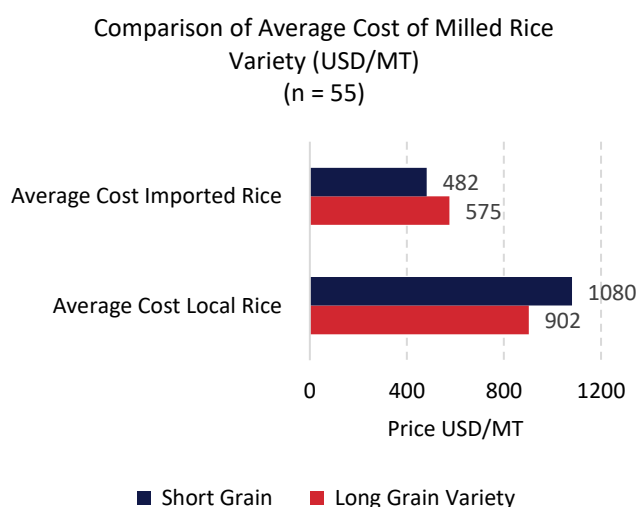


Figure 6: Comparison of Average Cost of Milled Rice Varieties in Nigeria

Source: Rice Stakeholders KII, Agramondis 2022

differently. To ensure all year-round production, processors will need to have access to paddy. Out of the 55 processors interviewed during the KIIs, 22 sourced paddy from contract farmers, 22 sourced from regular farmers, 15 sourced from traders, and the remaining sourced from open markets, aggregators, their farms, and neighboring countries.

**In Nigeria, while renting reapers and threshers for processing rice can increase production cost per hectare by 12.6%, it ultimately leads to a 17% increase in revenue.<sup>11</sup>** Most Nigerian farmers harvest their rice manually, using sickles and knives. The country average for the use of mechanization is 6.6%; it is highest in Edo (24%) but non-existent in Ebonyi.

**The rice milling industry in Nigeria comprises more cottage rice processors than industrial processors.** Out of the 55 rice processors interviewed during the KII, 38 are cottage rice processors.

**Sourcing rice paddy all year round is possible but often difficult.** Rice processors often source paddy

<sup>11</sup> dr.ir. J.M. (Han) Soethoudt, dr.ir. J. (Jan) Broeze, H.B. (Heike) Axmann MSc. 2021. The impact of mechanization in smallholder rice production in Nigeria



**Storage is an important aspect of the post-harvest and processing segment in Nigeria.** Across all the stakeholders interviewed during the KIIs, improving storage facilities and technology was mentioned as the most important aspect of rice post-harvest and processing supply chain to be improved in Nigeria.

### 4.3 Channels of Rice Distribution

**Rice post-harvest and processing in Nigeria is characterized by many traditional farmers and small-scale rice mills scattered throughout the country, with a handful of professionally integrated supply chains supported by international buyers.** In Nigeria, there are essentially five different channels that supply rice to Nigerian consumers across the value chain (Figure 7).

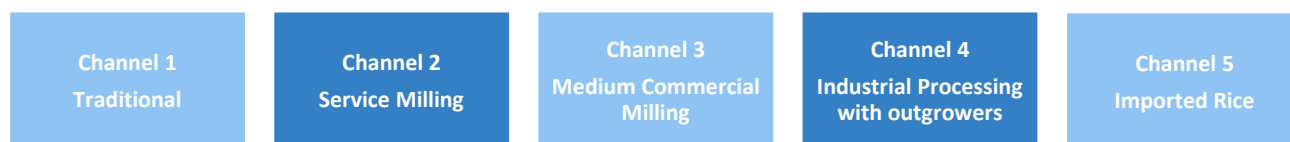



Figure 7: Channels of Rice Supply to Customers in Nigeria  
Source: Agramondis 2022

### 4.4 Key Challenges: Rice Post-harvest and Processing in Nigeria

Key Takeaways

1. Significant post-harvest losses reduce overall rice production in Nigeria and lowers rice quality.
2. Low yields, caused by various production challenges, hurt the consumption, processing, and production of rice.
3. Lack of effective storage facilities, impractical method of estimating post-harvest loss, traditional processing methods, and other related factors affect the development of the value chain.

In addition to challenges during production and harvesting, stakeholders and key actors across the rice value chain encounter challenges during the processing of rice. Figure 8 highlights six of these challenges.



Figure 8: Six Key Challenges across the Nigerian Rice Post-Harvest Value Chain  
Sources: Agramondis Desk Research, 2022; Danbaba *et al* 2019

## 5. Comparative Analysis: Nigeria vs. China

### Key Takeaways

1. China is more efficient than Nigeria in both yield (7.1 vs 2.5 MT/ha) and management of post-harvest losses (11.39% vs 3.65%).
2. China's efficiency is owed to its high mechanization rate of 8 hp/ha in comparison to Nigeria at 0.3 hp/ha.
3. Lack of technology and government support limits the growth of the rice market in Nigeria. Inefficient processing techniques, low mechanization rates, and non-existent government subsidy programs for agricultural technology impair the Nigerian rice market when compared to the Chinese rice market.
4. By adopting mechanization in the production and processing of rice in Nigeria, labor hours can be cut by 84% and revenue can increase by at least 17%.
5. Renting of reapers and threshers for processing rice can increase production cost per hectare by 12.6% in Nigeria.

The following section compares Nigeria and China across the spectrum of challenges that the Nigerian rice value chain faces.

### 5.1 Irrigation

**Although Nigeria is Africa's largest rice producer, Nigerian rice paddies' low proportion of irrigated rice hurts its output when compared to the typically irrigated Chinese paddies.** The efficiency of Chinese rice production alongside its post-harvesting segments gives credence to the country as being the world's largest producer of rice (Table 1).

Table 1: Rice Statistics of China vs. Nigeria

Statistic	China	Nigeria
Agriculture gross production value (USD million)	1,116,974	30,998
Paddy production value (USD million)	128,000	981
Production volume (milled in million tons)	148.99	5.00
Yield (MT/ha)	7.1	2.1
Mechanization rate (Hp/ha)	8	0.3
*Post-harvest losses (%)	3.65	11.39

\*Estimated losses during rice post-harvest level (threshing, cleaning, paddy drying, transporting, parboiling, milling, and other postharvest processing activities)

Sources : Agramondis Desk Research 2022; USDA 2022; Liu, *et al*; Statista; PwC; Danbaba *et al*. 2019

## 5.2 Processing

**Nigeria's rice post-harvest and processing techniques are largely inefficient.** This has resulted in processed rice that is too expensive and of lower quality in comparison to rice from other countries like China, Vietnam, and India. The inefficient harvesting and storage techniques of rice paddy by small-scale farmers affect the quality of milled rice. Due to the poor quality of locally produced rice, most consumers prefer imported rice from other countries, such as Thailand and China to indigenous rice in Nigeria.<sup>12</sup> The main reason for this preference for imported rice is that most Nigerian rice processors lack adequate technology to meet international standards, resulting in locally produced rice containing stones and other impurities.<sup>13</sup>

## 5.3 Mechanization and Government Investment

**Nigeria's mechanization has remained low at 0.3 hp/ha, relative to 2.6 hp/ha in India and 8 hp/ha in China.** The number of agricultural tractors in Nigeria (22,000) is much lower than in China (1 million) and India (2.5 million), due to lack of resources and technical skills among small-scale farmers. The Chinese government offers subsidies to farmers for the purchase of machinery that aid production, harvesting, and post-harvesting processes, which contributes to the development of the rice sector. In addition to the \$10,000 subsidy through the Combine Service Enterprise (CSE) cluster, the Chinese government also subsidizes warehouses to store machines and even offers group messaging cell phone services for members who travel in a group.<sup>14</sup> In Nigeria, there are policies aimed at increasing domestic agricultural production and ensuring self-sufficiency in rice and other staple crops production as part of the Agricultural Transformation Agenda Support Program-Phase 1 (ATASP-1) policy. However, they lack the corresponding effort to advance technology adoption. While improvement has been seen in the usage of hybrid seeds, not much improvement has been observed in the post-harvest segment, especially for small and medium-scale rice farmers, and cottage processors.

**Business competitiveness increases as operation scales, especially through mechanization.** Larger scale operations tend to increase competitiveness and profitability in the agriculture industry, especially in relation

<sup>12</sup> Idris, A., Rasaki, K., Hodefe, O. J., & Hakeem, B. (2013): Consumption pattern of Ofada rice among civil servants in Abeokuta Metropolis of Ogun State, Nigeria. *Journal of Biology, Agriculture and Healthcare*, 3(6), 106-112. <https://core.ac.uk/download/pdf/234658861.pdf>

<sup>13</sup> Adisa B.O., Famakinwa M., & Adeloye K.A. (2020). Adoption of Rice Post-Harvest Technologies Among Smallholder Farmers In Osun State, Nigeria. *Serbian Journal of Agricultural Sciences*, 69(1-2), 20-26. <https://sciendo.com/downloadpdf/journals/contagri/69/1-2/article-p20.pdf>

<sup>14</sup> Yang, J., Huang, Z., Zhang, X., & Reardon, T. (2013). The rapid rise of cross-regional agricultural mechanization services in China. *American Journal of Agricultural Economics*, 95(5), 1245-1251. <https://doi.org/10.1093/ajae/aat027>



to mechanization and access to resources such as credit and inputs.<sup>15</sup> The business opportunity for processors is significant in China; there are more than 5,000 mills. China is also home to the world's largest milling company: Wudeli Flour Group. This capacity gives a high business competitive factor and profitability margin in rice production against Nigeria where there are about 58 to 64 milling facilities with a limited technical supply of labor.

**Another key aspect of comparison is the investment in research and development (R&D), which aided many Asian countries to establish strong monitoring and evaluation systems.** China has a strong monitoring and evaluation system in place which have allowed the government to develop targeted policy initiatives to continuously improve the rice sector.

## 5.4 Trade Regulations

**The impact of trade regulations on rice production in Nigeria and China is concentrated on achieving self-sufficiency.** In Nigeria, trade regulations such as increased tariff on imported rice and closure of the land borders were introduced with the expectation that domestic rice production would expand and reduce local rice prices and importation. However, prices have remained high and illegal smuggling occurs, largely because current local production does not meet the needs of the population.

**There is a significant impact of trade regulations on the price of rice in both countries.** China's trade regulation on the market support price system has helped maintain stable domestic rice prices. In Nigeria, the price of processed rice is inevitably increased due to factors such as devaluation of the Naira against the dollar, tariffs on rice importation, possible bans on rice importation, and illegal distribution of rice cross borders.

## 5.5 Rice Seed Varieties

China is the first country in the world to successfully produce hybrid rice, which is a type of rice that is bred from two different types of plants - indica and japonica. This type of rice is known to have a high yield potential and wide adaptability. China's Ministry of Agriculture and Rural Affairs reported that improved rice varieties, like hybrid rice, contributed more than 45% to the increase in grain production in China.<sup>16</sup>

**Although rice varieties are improving, Nigerian farmers are heavily dependent on only a few rice seeds.** Improved seed varieties include GAWAL R1 and FARO 44. GAWAL R1 is a high-yielding variety that is tolerant to blast disease and grown in lowland rainfed and irrigated agro-ecological zones, while FARO 44 is known for its high yield and good milling quality.<sup>17</sup> However, despite these improved rice varieties, factors such as reliance on rain-fed cultivation and weak agronomic practices have limited Nigeria's rice production.

**Seed innovation, especially crop variety approval standards, has played a role in ensuring sustainable rice production in China.** Nigeria can improve its guidelines for the registration and release of new crop varieties, as well as its rice subsidy policy to encourage smallholder farmers to adopt new varieties. This will increase their willingness to grow grain, convert the potential productivity of new varieties into actual productivity, and ensure the increase and stability of rice production in Nigeria.

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<sup>15</sup> Ewuzie, C. Ifediora, O. & Ifediora, C. & Anetoh, J. (2020). Profitability of Actors in Rice Value Chain In Nigeria: A Comparative Analysis. *International Journal of Innovative Research and Advanced Studies*, 7(7), 59-66.

[https://www.researchgate.net/publication/343361174\\_Profitability\\_Of\\_Actors\\_In\\_Rice\\_Value\\_Chain\\_In\\_Nigeria\\_A\\_Comparative\\_Analysis](https://www.researchgate.net/publication/343361174_Profitability_Of_Actors_In_Rice_Value_Chain_In_Nigeria_A_Comparative_Analysis)

<sup>16</sup> USDA and GAIN (2020). New to China Market Product Report – Rice.

[https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=New%20to%20China%20Market%20Product%20Report%20-%20Rice\\_Guangzhou%20ATO\\_China%20-%20Peoples%20Republic%20of\\_06-05-2020](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=New%20to%20China%20Market%20Product%20Report%20-%20Rice_Guangzhou%20ATO_China%20-%20Peoples%20Republic%20of_06-05-2020)

<sup>17</sup> Syngenta and Sahel Consulting (2021). Reorienting public agriculture R&D for achieving sustainable, nutritious and climate resilient food systems in Nigeria. [https://www.syngentafoundation.org/sites/g/files/zhg576/f/2021/11/25/reorienting\\_agri\\_rd\\_for\\_sustainability\\_in\\_nigeria\\_final.pdf](https://www.syngentafoundation.org/sites/g/files/zhg576/f/2021/11/25/reorienting_agri_rd_for_sustainability_in_nigeria_final.pdf)

## 5.6 Characteristics of the Post-harvest and Processing Segments

Excluding government initiatives that ensure rice value chain actors have enough disposable income, the post-harvest and processing segments of China and Nigeria have widely different characteristics. Chinese farmers improve rice quality by drying, storing, and milling rice to ensure it maintains its taste, aroma, and milling quality. Stored rice is preferred to freshly harvested rice because of its improved taste, aroma and increased milling quality. Table 2 compares the various factors that determine the rice output of Nigeria and China.

Table 2: Rice Post-Harvest / Processing Characteristics Analysis: Nigeria vs China

Characteristics of Post-Harvest / Processing Segment	China	Nigeria
1. Technology	As of 2019, farm mechanization exceeds 70% (8 hp/HA). The development of agricultural science and technology has significantly improved China's ability to transition to modern agriculture systems. In addition, the use of advanced technology such as sensors to monitor local temperature in granaries has improved the insecticidal rate and reduced the cost of inputs.	Mechanization rate is low in Nigeria at an estimated 7% (0.3 hp/HA). National rice milling capacity is 3 MMT from over 68 integrated mills across the country. However, the high cost of power for milling operation remains a major challenge.
2. Players	Smallholder farmers living in rural provinces play a huge role in China's rice output while the state-owned company, Sinograin plays an active role in ensuring food security.	Equitable distribution of costs and benefits is hard to establish among rice market actors in Nigeria. Rice farmers have the least net return (income) in the value chain partly due to their small scale of operations. Processors and traders have a significantly higher net return and lower benefit-cost ratio.
3. Storage	The national grain storage capacity was reported to be more than 650 million tons in 2021. The country plans to increase its grain stockpiling program with 10.85 million tons of additional storage capacity.	The national grain storage capacity is currently about 300,000 tons but is expected to reach 800,000 tons when all silo complexes under construction are operational. The various grain reserves established in the country have not been functioning efficiently due to poor design and management. In 2014, the government initiated a public-private partnership (PPP) program to concession the existing 33 grain silo complexes across the country.
4. Subsidy	The central government provides grain farmers with a variety of agricultural subsidies to support summer rice harvest (and autumn sowing production).	The CBN Anchor Borrowers' Program (ABP) improved the production capacity of rice farmers across the country and attracted more youths to the rice value chain.
5. Policy	Major rice and wheat producing areas have access to the Minimum Purchase Price Policy which ensures rice farmers sell their paddies at a competitive price to the government when the market price drops.	The Rice Assured Advocacy Forum (RAAF), an initiative under the Rice Policy Advocacy Initiative of Nigeria (RIPAIN), aims to harmonize the national rice value chain actors in Nigeria to advocate for better policies towards the development of the rice sector.
6. Standards	There is a well-documented national standard for processing rice that describes the quality requirement for different grades of rice. In 2018, China's State Administration for Market Regulation (SAMR) updated the 2009 national standard for rice. The new national standard applies to both domestically produced and imported rice, narrowing grading specifications for each class of rice. In addition, the method of estimating post-harvest loss is different than most countries'. Losses are often estimated as a percentage of the amount remaining from the previous stage of postharvest operation.	While the Standards Organization of Nigeria (SON) had standards for brown, white and parboiled rice since 1997, specific grading standards have not been established. This is considered to have a negative effect on establishing a price structure in line with rice quality.

## 5.7 Key Learnings for Nigeria

What Nigeria can learn from China's rice post-harvest and processing:

1. Invest in rice research and development, especially in terms of seed and equipment.
2. Establish strong monitoring and evaluation systems (e.g., time-series statistics on irrigated areas, number of tractors, fertilizer use) to inform future policies.
3. Promote purchases of many small and general-purpose machines for shared, cluster use; ignite usage through subsidies.
4. Continue strong import protection policies.
5. Intervene in the market to help organize and facilitate market flow, especially in terms of transport, machinery, and industry best practices.

## 6. Opportunities in the Nigerian Rice Value Chain



### Key Takeaways

1. Availability and accessibility of regulated quality input, and technical and financial support for farmers will ensure high and quality production of rice.
2. To attain high-quality productivity by leveraging opportunities, value chain actors and stakeholders including the government should work towards mitigating key challenges.
3. There are investment priorities and opportunities in every production and post-harvesting process to upscale rice productivity.
4. There should be a product pipeline for replenishing old and low-performing rice breeds in Nigeria. One of the gaps in the rice value chain is the lack of enough high genetic rice breeds into the market as many of the existing breeds are old and may be experiencing genetic erosion

With a conservative per capita consumption of 34 kg/year in Nigeria and a population of about 211 million, the annual market value for rice in the consumer market is USD 614.4 million at a price of USD 0.86 per kg and 10% potential.<sup>18,19</sup> This presents a huge opportunity for investment in the rice sector. The quality of production, harvesting and post-harvesting processes of rice in Nigeria is dependent on mitigating the gaps that exist in the rice value chain. Use of seed and agrochemical, farm size, availability and cost of labor and capital input are significant gaps in the production frontier.<sup>20</sup> These gaps are key factors that affect all processes from the point of input supply and production to marketing, distribution, and consumption of rice in the value chain.

Figure 9 shows a summary of key opportunities across the rice value chain and the sections after it further elaborates on the current situation in Nigeria in these key areas, the gaps, strategies to mitigate and opportunities for the sector.

<sup>18</sup> World bank (2021). Population, total – Nigeria. <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG>

<sup>19</sup> KPMG 2019. Rice Industry Review. <https://assets.kpmg/content/dam/kpmg/ng/pdf/audit/rice-industry-review.pdf>

<sup>20</sup> Obianefo, C. A., Nwigwe, C. A., Meludu, T. N., & Anyasie, I. C. (2020). Technical efficiency of rice farmers in Anambra State value chain development programme. *Journal of Development and Agricultural Economics*, 12(2), 67-74. <https://academicjournals.org/journal/JDAE/article-full-text-pdf/2A28CFF63551>

## Summary of Key Opportunities for the Public and Private Sector in the Nigerian Rice Value Chain



### Seed Systems

#### PUBLIC

- Pass regulations on plant variety protection and variety release process to standardize seed quality.
- Improve seed certification programs of seed companies
- Increase regional collaborations for seed development via improved seed research by leveraging funding from development organization.
- Strengthen public and private extension mechanisms for seed dissemination by linking seed companies to the Farmers Hub platform via Network managers.

#### PRIVATE

- The investment demand for the propagation and distribution of seeds and planting material is around USD 10.3 million annually.
- At least, 3,489 additional formal seed businesses are required to meet the demand for quality seeds in Nigeria.
- Explore input finance programs that can leverage entities such as micro-finance banks that have pre-existing relationships with farmers for seed financing.



### Irrigation and Water Control Investment

#### PUBLIC

- Address the high cost of labor, inputs, and irrigation equipment by **promoting local fabrication and repair**.
- Increase knowledge and awareness on irrigation farming techniques.
- Build more water bodies across rice production areas to increase irrigation and bring about resilience
- Invest in low cost technologies for irrigation

#### PRIVATE

- The total investment demand for irrigation infrastructure presents a market opportunity of USD 180 million.
- Similar to a tractor-hire model, **an irrigation equipment hire model can potentially serve the market**



### Access to Equipment and Maintenance

#### PUBLIC

- Create programs to improve skills necessary to provide maintenance services, as there is high demand for maintenance service
- Upgrade the existing equipment of service providers to at least meet regional standards
- Establish Farmer's service centers which are needed to bring inputs and tools closer to farmers
- Address credit facility limitations to increase the adoption of agricultural technology and equipment.

#### PRIVATE

- The market size is estimated at USD 9.5 million
- Situating milling operations in special economic zones can attract investors and give them confidence that their investment is safe



### Marketing

#### PUBLIC

- Marketing and pricing is dependent on quality thus, **improve milling quality by setting specific grading standards**.
- Regularly update the quality requirement for different grades of rice to ensure millers keep innovating on product quality

#### PRIVATE

- The annual market opportunity in trading rice is estimated at USD 614.4 million
- Position the rice value chain for private investment through targeted marketing endeavors. For example, African Food Changemakers (formerly Nourishing Africa) is changing the narrative of African delicacies through targeted campaigns that showcase their value and richness.



### Access to Quality Inputs

#### PUBLIC

- Address supply chain deficiencies via improved distributor relationship (e.g., importer to local agrochemical dealer)
- Enhance the availability of distributor working capital to meet demand at peak periods by aggregating various delivery options and consolidating the market.

#### PRIVATE

- Nigeria's yield per ha has not kept up with global increases. Similarly, investments (Procurement and Subsidy) in Nigeria's fertilizer industry have had no correlation with changes in yield. This is a key gap to bridge with investment into the local manufacturing of fertilizer
- Further, introduce index crop insurance to address climate change effects such as drought and flooding. E.g., PULA microinsurance

Figure 9: Summary of Key Opportunities for the Public and Private Sector in the Nigerian Rice Value Chain

Sources: Agramondis Analysis based on [KPMG \(2019\)](#), [Soethoudt, J. M., Broeze, J., Axmann, H. B. \(2021\)](#), [Collaborative Seed Program \(2020\)](#), IFC (2022). Climate Smart Agriculture Market Studies (unpublished).

## 6.1 Investment Climate in Nigeria

Nigeria's recent improvements in the World Bank's Doing Business (DB) score of 3.5 places it among the top 10 economies whose ease of doing business increased the most in 2018/2019.<sup>21</sup> This suggests a positive outlook for the agribusiness sector and is due to regulatory changes that have created a more business-friendly environment. Examples of these regulatory reforms include the implementation of policies such as the Agricultural Promotion Policy (APP) and the National Agricultural Technology and Innovation Policy (NATIP), which promote climate-smart agriculture, rural infrastructure, export standardization, data and information management, quality agricultural inputs access, and support for women and youth in agriculture.

Table 3 provides a holistic view of the investment climate in Nigeria based on World Bank Doing Business Indicators.

Table 3: Doing Business Indicators

Indicators	Description
Starting a business	To provide an enabling environment for establishing agribusiness firms, Nigeria has made it easier by reducing the time needed to register a company through the development of online platforms like a one-stop shop. Furthermore, the procedure requiring on-site inspections of business premises registration is no longer a prerequisite for business registration. <sup>22</sup> The registration of agribusiness is important as stipulated by the Companies and Allied Matters Act, 2019. The Act led to the establishment of the Corporate Affairs Commission, a regulatory agency that also oversees the registration and regulation of agribusiness entities in Nigeria. Registration of agribusinesses is important as access to certain government incentives (e.g., tax holidays) in the agricultural sector is contingent on this registration.
Getting electricity	Despite Nigeria's efforts to make access to power easier by enabling qualified engineers to verify new connections, 85 million Nigerians do not have access to grid electricity. Nigeria's ease of getting electricity ranks 171 out of 190 countries. Access to electricity is considered as one of the obstacles by the private sector. <sup>23</sup>
Obtaining credit/financing	Obtaining credit can be grouped into five (5) major categories. They are the Commercial bank and micro-finance banks (e.g., Lift Above Poverty Organization – LAPO), Public finance schemes (e.g. the Central Bank of Nigeria's Anchor Borrowers Programme and the Commercial Agricultural Credit Scheme), Value chain finance through supply aggregators, Informal investment schemes and remittances <sup>24</sup> (popularly known as <i>ajo</i> in Yoruba, <i>esusu</i> in Igbo and <i>adashe</i> in the north), and cooperatives and associations. The availability of these financing options can be leveraged by starters of agribusiness. Popular sources of debt financing include Heritage Bank and the Nigeria Incentive-based Risk Sharing System for Agricultural Lending (NIRSAL). <sup>25</sup> For loans, the interest given by a bank to an agribusiness firm engaged in primary trade is 100% tax-free if the loan has a moratorium of at least 12 months and the interest rate is not more than the base lending rate at the time the loan was provided. <sup>26</sup>

<sup>21</sup> World Bank (2020) Doing Business: Comparing regulation in 190 Economies. <https://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf>

<sup>22</sup> World Bank (2020) Doing Business: Comparing regulation in 190 Economies. <https://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf>

<sup>23</sup> World Bank (2021). Nigeria to Improve Electricity Access and Services to Citizens. <https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens>

<sup>24</sup> Steamers S., Bagu B., Adams S. (2022). Addressing the \$200 billion demand for finance for Agriculture and Agribusiness in Nigeria. <https://www.rvo.nl/sites/default/files/2022-05/Finance-for-Agriculture-and-Agribusiness-in-Nigeria.pdf>

<sup>25</sup> USAID and GAIN (2017). Access to Start-up and Middle-level Equity Finance for Nigerian Agribusinesses: Postharvest Loss Alliance for Nutrition (PLAN) Learning Brief. <https://www.gainhealth.org/sites/default/files/publications/documents/gain-usaid-access-to-start-up-and-middle-level-equity-finance-for-nigerian-agribusinesses-2017.pdf>

<sup>26</sup> PWC (2022). Nigeria Corporate - Tax credits and incentives. <https://taxsummaries.pwc.com/nigeria/corporate/tax-credits-and-incentives>



Indicators	Description
Paying taxes	<p>The Finance Act of 2019 changes specifies the main agricultural tax concessions for agribusinesses. Thus, companies involved in agricultural production will benefit from a 5-year tax holiday, which can be extended for an extra maximum of 3 years if agricultural output performs satisfactorily.<sup>27</sup> Also, small agribusiness firms with a turnover of less than NGN 25 million and that have been in existence for less than 4 calendar years in operation are exempt from the minimum tax.<sup>28</sup> These have been put in place to reawaken and attract investors and ultimately promote the growth of agribusiness in Nigeria.</p> <p>Based on the tax incentives, a maximum of 5% of the Export Expansion Grant (EEG) rate is levied on agricultural exporters to promote the export of value-added/processed goods. The Export Credit Certificate (ECC) is an incentive provided by the EEG system that may be used to pay all federal taxes, including value-added tax (VAT), withholding tax, (WHT), and corporate income tax (CIT).<sup>29</sup></p>
Trading across borders	<p>The time it takes to export agricultural commodities has reduced with the upgrading of the electronic system and the launching of the e-payment of fees. This development is likely to encourage agribusiness firms to key into exporting their commodities. Akin to this is the provision of the requirement for the export of agricultural commodities on the website of the Nigerian Export Promotion Council (NEPC), which offers an e-registration option for potential exporters and the guideline for the export of agricultural commodities.<sup>30</sup> The NEPC also promotes the export of agricultural commodities by providing training/sensitization to critical stakeholders and players in high-priority value chains as seen in the sensitization/training to stakeholders in Aba, Abia State.<sup>31</sup></p>

## 6.2 Access to Quality Inputs

### Seed Systems



#### Key Takeaways

1. Crop breeding systems and harmonized seed agreements are critical to empowering a vibrant seed.
2. The Nigerian Seed system is weak and underdeveloped. Farmers lack access to quality seeds and the market value for improved seed varieties is unsustainable.

**Quality seed is critical to productive, resilient, and sustainable cropping systems.** An effective seed system in commodities such as rice is essential for food and nutritional security, especially considering that improved seed can account for up to 50% of the potential increase in crop yields. In Sub-Saharan Africa (SSA), only 10-20% of the seeds are obtained from formal sources, while the remaining 80-90% is provided informally.

**Countries' crop breeding systems and institutional and organizational arrangements are critical to providing conditions that enable a vibrant seed industry and vigorous private sector activity.** Regional Economic Communities (RECs) in Africa have developed similar harmonized seed agreements to improve seed trade and reduce costs by avoiding repetitive national testing. However, these agreements have been implemented slowly and have not been supported by corresponding national and regional laws. The regulatory process is also inconsistent and lacks transparency, discouraging attempts to certify seeds. Additionally, there is no legal framework in place for plant variety protection, and collaboration and knowledge of national and regional rules related to seed are low among regulators.

<sup>27</sup> BDO (2020). Finance Act 2019 changes. <https://www.bdo.global/en-gb/microsites/tax-newsletters/corporate-tax-news/issue-54-march-2020/nigeria-finance-act-2019-changes>

<sup>28</sup> BDO (2020). Finance Act 2019 changes. <https://www.bdo.global/en-gb/microsites/tax-newsletters/corporate-tax-news/issue-54-march-2020/nigeria-finance-act-2019-changes>

<sup>29</sup> PWC (2022). Nigeria Corporate - Tax credits and incentives. <https://taxsummaries.pwc.com/nigeria/corporate/tax-credits-and-incentives>

<sup>30</sup> NEPC (n.d.) <https://nepc.gov.ng/>

<sup>31</sup> Vanguard (2021). NEPC sensitises farmers, others on export business. <https://www.vanguardngr.com/2021/11/nepc-sensitises-farmers-others-on-export-business/>

**The Nigerian seed system has been weak and underdeveloped in supplying improved varieties.** Weak infrastructure has played a role in the high costs of disseminating information on varieties. In addition, the Nigerian seed system is relatively poor in terms of regulations and the development cost of new varieties compared to other countries.

**Farmers lack access to improved varieties, good quality and certified seeds.** Seeds are typically distributed through the Agricultural Development Program (ADP), which is a state-level agricultural extension agency. **The market value for improved seed is poor.** Certified seed is the progeny of foundation seed, and it is grown by selected farmers to maintain sufficient varietal purity. Production is subject to field and seed inspections before approval from the certifying agency.

### Conclusion: Key opportunities for the seed system in Nigeria

Opportunity	Strategy	Action plan
Strengthen seed system	Develop a strong seed system to regulate the quality, price, and supply of seeds to farmers.	Regulate formal and informal seed producers to ensure the production and supply of quality seeds. Provide extension services to increase farmers' productivity.  Introduce routine certification programs for seed companies.
Address access to improved varieties, good quality and certified seed	Ensure availability and accessibility of improved varieties for farmers by encouraging the production and distribution of certified seeds.  Support the development of breeding programs.	<ol style="list-style-type: none"> <li>1. Encourage more local production/supply of improved seed varieties by providing training opportunities for farmers and youths in local communities.</li> <li>2. Educate farmers on seed usage during specific ecological conditions to adapt to climate change and resist disease and pest.</li> <li>3. Provide funding for research and technical support in the development of improved seeds.</li> <li>4. Further encourage the inclusion of private institutes and organizations.</li> </ol>

### Other Inputs



#### Key Takeaways

1. Lack of coordination, incentives, and technical advisory lead to inefficient uses of inputs.
2. High quality inputs in Nigeria are used improperly due to limited access and lack of technical knowledge regarding input usage.

The high cost and inaccessibility of inputs, unavailability of inorganic fertilizers due to the Russian-Ukraine war, lack of subsidies, and lack of technical knowledge on the use of inputs are the gaps between farmers and input suppliers that contribute to low, unproductive yield. Figure 10 shows the gap analysis of farmers' access to quality inputs.

The fragmentation and lack of coordination between inputs supply, primary agriculture, and downstream off-farm agribusinesses are the foremost challenges constraining the growth of agribusiness value chains in Nigeria.

Current Situation	Root Causes	Possible Solutions
<ul style="list-style-type: none"> <li>• Inefficient use of high-quality input due to limited access and lack of technical advisory on input usage.</li> </ul>	<ul style="list-style-type: none"> <li>• Fragmentation and lack of coordination between inputs supply, primary agriculture, and downstream off-farm agribusinesses.</li> <li>• Lack of incentives in production and distribution, and smart subsidies in public fertilizer supply program.</li> <li>• Inadequate technical advisory services on input usage.</li> <li>• Inefficient use of fertilizers without improved seeds.</li> </ul>	<ul style="list-style-type: none"> <li>• Improved access to seed and fertilizer can greatly improve food security and farm productivity in Nigeria.</li> <li>• Availability of high-quality and modern input will increase farmers' profit.</li> </ul>

Figure 10: Gap Analysis of Access to Quality Input  
Source: Agramondis Desk Research, 2022

**The lack of incentives in production and distribution, and smart subsidies in public fertilizer supply programs lead to inefficiency in the use of inorganic fertilizers.** Smart subsidies can be provided to farmers who need to learn about the proper use of fertilizers or those who could use them but are limited by working capital constraints. These subsidies can be accompanied by effective extension and service delivery so that farmers can learn about such things as nutrient deficiencies in their plots, nutrient requirements for different crops, crop water requirements, and critical irrigation periods.

**Farmers can also benefit from access to organic fertilizer systems.** One example from China is the integrated rice-fish aquaculture system. The fish provides fertilizer to rice, regulates micro-climatic conditions, softens the soil, and eats larvae and weeds in the flooded fields while rice provides shade and food for fish.

**Inadequate technical advisory services on input usage.** Access to extension is limited because less than 10% of farmers in Nigeria receive technical advice on new seeds, pest control, and fertilizers.

**Most farmers in Nigeria use fertilizers inefficiently and without improved seeds,** primarily because of inadequate supply of these inputs and poor design of input subsidy programs.

#### Conclusion: Key opportunities for access to quality inputs

Opportunity	Strategy	Action plan
Increase technical advisory services on input usage.	Increase technical support.	Support technical advisory on input usage to farmers and extension agents.
Increase usage of fertilizers alongside improved seeds.	Design input finance programs that can leverage and assist entities such as micro-finance banks that have pre-existing relationships with farmers. In addition, ensure appropriate technical expertise is provided to the supporting entities.	Start open demonstration plots within localities to teach farmers good agricultural practices and techniques.

## 6.3 Commerce and marketing

Major constraints to rice marketing in Nigeria across all post-harvesting activities include poor rice quality, inadequate supply, lack of storage facility, market price fluctuations, low capital bases, a low credit recovery rate, and high cost of transportation.

### Key opportunities for marketing

Opportunity	Strategy	Action plan
Improve market price control	Reduce production costs	Aggregate farmers in clusters and develop out-grower model to engender shared resources thereby reducing the cost of production and limiting risks. This will influence the output/market price.
Increase product quality	Improve handling and transport processes to decrease pebbles and other impurities.	Facilitate improved farmer access to post-harvest processing technology. This can be achieved via:  (1) Joint intervention programs with development organizations that intend to increase mechanization rates in rice producing regions (2) Another way to achieve this is by positioning the rice value chain for private investment through targeted marketing endeavors. For example, African Food Changemakers (formerly Nourishing Africa) is changing the narrative of African delicacies such as Jollof rice and Acha (fonio salad) through targeted campaigns that showcase their value and richness. <sup>32</sup> These activities have the potential to drive investment flow into the rice sector and increase the quality of milled rice, reduce post-harvest losses and contamination during and after processing.
Improve national aggregation and storage capacity for paddy and finished rice.	Provide government-subsidized aggregation facilities in LGAs within major rice-producing states like Taraba, Kano, Cross River, etc.	Introduce local solutions for storage facilities such as locally fabricated mini silos.  Provide effective and quality storage bags and train rice farmers and best-practice storage activities.
Adopt better rice branding and marketing strategies for local rice through information campaigns.	Push a national agenda for self-sufficiency and the need to buy made-in-Nigeria products particularly to cushion the effects of currency devaluation.	First, ensure the production and processing of local rice are cost-competitive compared to imported rice. Then, launch a rebranding campaign.
Redesign credit facilities for optimal recovery.	Use the seven years of data about loan recovery to redesign loan product.	Continuously update assumptions to better identify potential loan defaulters.  Educate farmers on the difference between a loan and a grant.
Increase foreign participation in trucking and logistics services	Lower barrier to entry for the trucking and logistics market to increase foreign participation in the market  Improve trade relations with developed nations such as Australia and Denmark that have succeeded in using transportation to grow their economy	Abolish restrictions on cabotage, backhauling, and triangular transport. For example, while cabotage can have positive effects in markets where the interest of the domestic services need to be protected, it could increase competition and foreign participation in Nigeria, reduce prices and improve the quality of transport services in the agriculture sector.  Actively collaborate with countries that have succeeded in using transportation to grow their economy with the goal of securing foreign direct investments and partnerships.

<sup>32</sup>African Food Changemakers (2022). Goalkeepers 2022 on "Farm to Folk: Adapting to Feed the World."  
[https://www.linkedin.com/posts/africanfoodchangemakers\\_goalkeepers2022-activity-6979349396735844352-Tfzo?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/africanfoodchangemakers_goalkeepers2022-activity-6979349396735844352-Tfzo?utm_source=share&utm_medium=member_desktop)

## 6.4 Irrigation and Water Control Investment



### Key Takeaways

1. Lack of knowledge, inconsistent legal precedents, and high cost of inputs hinder attempts to irrigate Nigerian rice land.
2. Very little Nigerian rice land is irrigated, hurting efficiency and threatening food security.
3. Alternative sources of water e.g. groundwater, rainwater harvesting in earthen dams, and river diversion into rice fields are often ignored in favor of developing expensive irrigation systems.
4. However, more farmers are starting to cultivate rice twice a year thus integrating irrigation into their farming.

**Rice land in Nigeria is under-irrigated.** There is potentially about 4.2 million ha of cultivable rice land in Nigeria and only about 720,000 ha are currently installed with some form of irrigation facilities. Further, just about 60% of these facilities have full water control features which include a water head or dam while others have partial or seasonal water control systems.<sup>33</sup> Irrigation ensures good water control and two crops/annum with a yield potential of 5 tons to 6 tons per hectare. Figure 11 shows the gap in irrigation and water investment.

Current Situation	Root Causes	Possible Solutions
<ul style="list-style-type: none"><li>• Food security is threatened by increasing food demand and declining water availability.</li><li>• A small percentage of rice is grown under controlled, irrigated systems which leaves production at risk to weather fluctuations, lower yields and only one production cycle.</li></ul>	<ul style="list-style-type: none"><li>• Climate change</li><li>• Farmers lack knowledge and technical know how of irrigation, equipment setup and management.</li><li>• Too much focus on the development of expensive fully irrigated areas.</li></ul>	<ul style="list-style-type: none"><li>• Education and awareness: Educate farmers on climate smart practices so they can produce all year round. Also educate them on irrigation setup and maintenance practices.</li><li>• Explore other supplementary water supply sources.</li></ul>

Figure 11: Gap Analysis of Irrigation  
Source: Agramondis Desk Research, 2022

**There is too much focus on the development of large and expensive irrigating systems.** Although Nigeria has abundant land and water resources, too much focus on the development of expensive, fully irrigated areas while ignoring other sources of the supplementary water supply has been a major challenge. However, the prospects of achieving rice self-sufficiency through irrigation farming are hampered by:

1. Lack of knowledge/awareness on Irrigation farming techniques or lack of interest by smallholder farmers.
2. Weather conditions: Irrigation sites and dams in Nigeria and neighboring countries are poorly managed and extreme weather conditions especially drought and floods make irrigation farming prone to disaster.
3. High cost of labor, inputs, irrigation equipment, and other operating costs.

<sup>33</sup> Federal Republic of Nigeria. Federal Ministry of Agriculture and Rural Development (FMARD). National Rice Development Strategy II. 2020 – 2030. [https://riceforafrica.net/wp-content/uploads/2022/02/nigeria\\_nrds2-1.pdf](https://riceforafrica.net/wp-content/uploads/2022/02/nigeria_nrds2-1.pdf)



4. Inconsistent and unimplemented policies and inappropriate legal framework.

### Conclusion: Key opportunities for irrigation and water control investments

Opportunity	Strategy	Action plan
Address the high cost of labor, inputs, irrigation equipment and other operating costs.	Stakeholders and farmers should be encouraged to implement and install low costs irrigation systems. These include other sources of supplementary water supply like groundwater, rainwater harvesting in earthen dams, and river diversion into rice fields.	<ol style="list-style-type: none"> <li>1. Train farmers and extension agents on low-cost systems.</li> <li>2. Provide relevant materials, and resources needed.</li> </ol>
Increase knowledge/awareness on irrigation farming techniques or lack of interest by smallholder farmers.	Provide technical and financial assistance to farmers.	Increase the ratio of extension workers to farmers.

## 6.5 Access to Equipment and Maintenance



### Key Takeaways

1. Nigerian farmers lack access to agricultural equipment.
2. 79% of farmers reported difficulties accessing mechanization in their communities.
3. Lack of credit, low technical skills, and lack of access to spare parts make it difficult for Nigerian farmers to mechanize.
4. Lack of access to foreign exchange for the purchase of machinery from overseas and lack of skilled technicians for repair.

### *Demand: Rice Farmers and Farmer Associations*

**Access to farm resources plays a vital role in the adoption of any agricultural technology**, which depends on the availability and efficient use of farm resources such as land, labor, knowledge, capital (credit) and farm inputs. In Africa, 80% of arable land is cultivated by human power, with only 5% by tractors. Only 7% of rice production is mechanized while the remaining activities are facilitated by draft animals and manual processes, accounting for 15% and 78% respectively.

**Nigerian farmers lack access to vital forms of agricultural technology.** Nigeria's mechanization rate is low at 0.3 hp/hectare compared to India's 2.6 hp/ha, Vietnam's 2.2hp/ha and China's 8hp/ha. 79% of farmers find it either difficult or very difficult to access mechanization in their community. Figure 12 shows the gap analysis for farmers' access to equipment and maintenance.

Current Situation	Root Causes	Possible Solutions
<ul style="list-style-type: none"> <li>•The cost of acquisition, set up and maintenance of agricultural equipments is very high for smallscale farmers.</li> </ul>	<ul style="list-style-type: none"> <li>•Lack of adequate credit facilities.</li> <li>•Low technical skills.</li> <li>•Lack of technical management experience.</li> <li>•Lack of access machine/equipment spare parts.</li> </ul>	<ul style="list-style-type: none"> <li>•Farmer cooperatives can aid with equipment purchasing as it would help spread up-front cost across participating farmers.</li> <li>•Improve access to financing.</li> <li>•Local machine can be developed to avoid spare part scarcity.</li> <li>•Increase sharing/renting initiatives.</li> </ul>

Figure 12: Gap Analysis of Access to Equipment and Maintenance  
Source: Agramondis Desk Research, 2022

**The lack of adequate credit facilities limits the adoption of agricultural technology and equipment.** Smallholder farmers, who account for 80% of the agricultural production in Nigeria, have low income and limited access to credit facilities. Hence, the high acquisition and maintenance cost of agricultural machinery has limited farmers, including rice farmers' capacity for investment in agricultural machinery.

**Access to machinery and equipment parts remains a challenge.** Three out of the four stakeholders involved in rice processing shared that their milling equipment is imported with the only common local equipment previously used by them being parboilers and dryers.

**The low technical skills of farmers have constrained the adoption of mechanization.** Without training, smallholder farmers do not have the technical capabilities to operate machinery and equipment.

**There is a lack of experience at the mill level in managing new technologies.** Investments in industrial milling are sometimes undertaken by actors who lack experience in managing the new technologies. Technological change requires millers to develop skills to master equipment and infrastructure, which involves hiring staff and properly training them.

**One important benefit of improving access to equipment is increasing the population of youth involved in Nigerian rice farming.** Currently, rice farming is dominated by the older generation. The average age of the rice farmers interviewed was approximately 44 years old.<sup>34</sup> Increasing the amount of youth in farming will likely create more jobs, improve the food security situation, and increase the domestic yield of Nigerian rice.

#### Conclusion: Key opportunities for access to equipment and maintenance

Opportunity	Strategy	Action plan
Address credit facility limitations to increase the adoption of agricultural technology and equipment.	<p>Encourage farmers to form clusters or cooperatives to aid with equipment purchasing.</p> <p>Local machines can be developed to avoid spare part scarcity.</p> <p>Increase sharing/renting initiatives.</p>	<ol style="list-style-type: none"> <li>1. Encourage participation from private organizations.</li> <li>2. Provide subsidies and credit facilities to farmer cooperatives.</li> <li>3. Finance and promote local fabrication of machines by private and government bodies.</li> </ol>
Creating awareness about youth inclusion.	Increase mechanization, access to infrastructure, and agricultural education.	<ol style="list-style-type: none"> <li>1. Subsidize modern farm equipment, such as tractors, for purchase by interested youth farmers.</li> </ol>

<sup>34</sup> Derftdan Farmer Survey (2022)

		<ol style="list-style-type: none"> <li>2. Provide farmer inputs for students interested and willing to go into agriculture after college.</li> <li>3. Institute fun educational programs in schools. These can involve providing seeds to students and tasking them with growing the seed and "selling" it back to the school for money.</li> </ol>
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## *Supply: Fabricators*

The insights here are based on expert discussions with seven local fabricators and twelve service providers in Nigeria.

**Access to finance is a challenge. It was described as “very difficult”** by all the fabricators, especially for facility acquisition or improvements, equipment financing, IT infrastructure, and working capital for business expansion. Only 2 out of the 12 fabricators interviewed pre-finance their clients by providing input credit to farmers. Also, only 1 out of 12 provide equipment services and the stakeholder mentioned that poor access to finance and high interest rates have prevented their organization from accessing and owning equipment.

The three top challenges limiting innovation among local fabricators are a **lack of integrated computer manufacturing** (design, model, simulation and production), a **lack of regulatory structure environment** (environmental, import/export compliance), and **low skill level among fabricators**.

**Three of the fabricators develop rice production and processing machines from scratch.** All of them, however, import their fabricating equipment/tools with 4 out of 7 convinced that the repairs made, and spare parts developed using the equipment compare favorably with imported ones. In addition, they all locally source the materials and other components like engines needed to repair other machines used for fabrication.

**Fabricators have a role to play in the post-harvest and processing rice value chain in Nigeria.** By fabricating local silos that are affordable to farmers for rice storage and automating farming systems with locally developed equipment for harvesting and threshing, post-harvest losses will reduce, and processing capacity will increase across the country.

**Service Providers also have a role to play in the post-harvest and processing rice value chain in Nigeria.** Service providers can play major roles across the rice value chain from planting to processing by providing seeds, fertilizer, equipment lease among other input and advisory services. To ensure this, proper attention needs to be paid to this sector with proper financing measures and policies put in place to assist stakeholders. Advisory services on good agricultural practices and input provision are the two top services provided by all the service providers to support their clients in addressing/ reducing rice harvest and post-harvest loss.

## 6.6 Storage system

**Lack of storage quantity and quality is a major concern for Nigerian Rice Farmers.** Across all stakeholders interviewed, improving storage facilities was mentioned as the chief suggestion for improving rice post-harvest in Nigeria.

**Total storage capacity in Nigeria is inadequate for Nigerian rice self-sustainability goals.** The NBS estimates that silos in Nigeria have a combined storage capacity of 1.3 million MT which is spread around 33 locations. However, the storage necessary for self-sustainability is 11-12 million MT. This invariably means that 9 times the present storage capacity is required to achieve Nigeria's ideal storage capacity. Figure 13 depicts a gap analysis of the storage situation in Nigeria.

Current Situation	Root Causes	Possible Solutions
<ul style="list-style-type: none"> <li>•There are not enough storage facilities for rice in Nigeria.</li> <li>•The storage facilities that are used are often of poor quality, allowing mold or insects to reduce rice quality.</li> </ul>	<ul style="list-style-type: none"> <li>•Lack of credit to build or improve storage facilities.</li> <li>•Lack of guidance on what storage facilities will ensure rice quality and reduce post-harvest loss the most.</li> <li>•Lack of farmer education on best storage practices.</li> </ul>	<ul style="list-style-type: none"> <li>•Introduce local solutions for storage facilities. This can be done by partnering with local fabricators to produce mini-silos.</li> <li>•Provide hands-on training and effective storage bags to farmers and storage facilities.</li> <li>•Subsidize large metal silos.</li> </ul>

Figure 13: Gap Analysis of Storage Systems in Nigeria  
Source: Agramondis Desk Research, 2022

### Conclusion: Key opportunities for Storage Systems in Nigeria

Opportunity	Strategy	Action plan
Address low quantity of storage facilities in Nigeria.	Both public and private sectors should increase investment in the construction of local and commercial facilities.	<ol style="list-style-type: none"> <li>1. Finance and promote local fabrication of storage systems by private and government bodies.</li> <li>2. Seek investment from China, which has a robust grain storage system.</li> </ol>
Address low quality of storage facilities in Nigeria.	Construct storage facilities that are the most optimal for reducing post-harvest loss.  Educate farmers and storers on storage best practices.	<ol style="list-style-type: none"> <li>1. Focus construction of large commercial storage facilities like metal silos. These have proven valuable in the past to reduce post-harvest loss.</li> <li>2. Provide effective and high-quality storage bags to farmers and storers.</li> <li>3. Partner with NGOs to educate local farmers about storage.</li> </ol>

## 6.7 Processing



### Key Takeaways

1. Rice milling in Nigeria is a 'cottage industry' with more cottage processors than industrial processors across the country.
2. The choice of techniques and equipment used during processing is a major determinant of output and quality.
3. Cottage processors are faced with financial challenges that inform their choice of equipment while industrial processors face the challenge of inconsistency in grain quality and insufficient paddy.

**Nigeria's rice processing techniques are inefficient.** The quality of local rice is a major concern for the future of the Nigerian rice sector and paddy processing into rice is considered the most critical point for quality determination.

**There is a need to upgrade the capacity and technology of processors.** Rice milling in Nigeria is a 'cottage industry' as there is a prevalence of small scale or cottage processing mills compared to large or industrial mills across the county.

**Consistent quality and quantity of rice are important to ensure effective processing.** Rice processors especially industrial processors encounter challenges with getting consistent quality and quantity of rice all year round. Figure 14 depicts a gap analysis of rice processing in Nigeria.

Current Situation	Root Causes	Possible Solutions
<ul style="list-style-type: none"> <li>•The quality of local rice is poor</li> </ul>	<ul style="list-style-type: none"> <li>•Nigerian rice processors, especially the small scale or cottage processors, do not have adequate processing capacity.</li> </ul>	<ul style="list-style-type: none"> <li>•Support cottage processors with input supply and credit. Also, fabricators and service providers should be supported through investments and access to loan to enable them provide machines and equipment at low cost.</li> </ul>

Figure 14: Gap Analysis of Processing  
Source: Agramondis Desk Research, 2022

#### Strategies to mitigate processing challenges:

1. Stakeholders such as the federal and state agriculture ministries, local governments, and the private sector, should invest in modern high-quality rice processing equipment. This equipment should be subsidized, situated close to rice processors with good road access to prevent post-harvest loss and ensure that processors aren't burdened by the extra cost of transport and rice processing fees.
2. Float paddy aggregation centers.
3. Processors should pay increased attention to pre-milling and post-milling operations including winnowing paddy, drying, destoning, parboiling and eventually packaging as this will greatly improve the appearance and cleanliness of the rice delivered to the market.

#### Conclusion: Key opportunities for cottage and industrial processors

Opportunity	Strategy	Action plan
Increase quality through improved processing techniques.	Ensure modern and efficient rice processing equipment are affordable and made available to more processors.	1. Improve ease of access to loans by creating groups or cooperatives within communities and enable group purchase of equipment.



## 6.8 Others



### Key Takeaways

1. Consumer rice preferences depend on a variety of factors including availability, disposable income, taste, quality, uniformity of size and shape.
2. Lack of funding for agricultural research hurts farmers' access to information and reduces the competitiveness of the Nigerian rice market.
3. Community mobilization can strengthen human resources and improve local decision making.
4. Farmer based organizations have the potential to promote development, but they must partner with the community to truly improve agricultural outcomes.

## 6.9 Recommendation to Strengthen the Rice Value Chain in Nigeria

Improving the competitiveness of the Nigeria rice value chain can contribute to economic growth and address developmental challenges. To do this, actions need to be taken to increase the private sector's and other stakeholders' participation in the value chain, including creating a sector-specific rice policy and advocacy platform that brings together government and private stakeholders, such as farmers, processors, consumers, and monitoring and evaluation experts.

Examples of such platforms include the National Rice Development Council (NRDC) and the Sustainable Rice Platform (SRP). The NRDC is being established by the Nigerian Senate in 2022, and the SRP, developed through a collaboration among the Federal Ministry of Agriculture and Rural Development, the Competitive African Rice Initiative, and supported by UN Environment and the International Rice Research Institute in 2021, aims to promote resource efficiency and sustainability in rice production and throughout the supply chain.

## 6.10 Conclusion

**Nigeria is one of the fastest growing and highest-opportunity rice markets in the world.** Nigeria is the top rice producer in Africa, largely thanks to its growing population, substantial amount of arable land, government support for production practices, and use of hybrid seeds. Still, rice yields in Nigeria are about half of the average yields in Asia and demand for rice consistently exceeds supply. The main reason for this is that the input, post-harvest, and processing sectors lag behind the rest of the Nigerian rice market.

**Key opportunities are observed in improving post-harvest and processing components of the value chain.** The current post-harvest and processing segment is scattered and largely unintegrated. Rice post-harvest and processing are behind in capacity, productivity, technology adaptation, and especially the prevention of post-harvest loss. If Nigeria was to implement best-practice reforms to this section of the value chain, it could significantly ramp up rice production, both for domestic consumption and export.

**Investment opportunities lie all along the supply chain, from farmers and seed companies to processing mills and fabricators.** Investments will greatly benefit all actors, promoting access to finance, capacity building, and technical support.

**Specific opportunities include ensuring access to quality inputs, improving the rice marketing process, irrigating Nigerian rice land, and increasing mechanization.** Other opportunities lie in leveraging community mobilization, improving R&D, and partnering with farmer organizations. To address these problems efficiently and effectively, Nigeria could draw inspiration from the world's foremost rice-producing nation: China.

**Key policies on rice standards, especially specific grading standards need to be established by SON** or a relevant body to improve the quality and the price structure of rice in the country. In addition, actionable

policies should be put in place to gear national budget allocation toward investment in research and development (R&D) for bolstering seed innovation and developing seed varieties that are adaptable to the local climate of Nigeria and can withstand droughts, floods, and inconsistent temperatures.

**Supporting trade and commerce will help build resiliency into the rice value chain.** Providing adequate structural support across warehousing, transportation, advertising, finance, and insurance services to relevant actors across the rice value chain will ensure resilience. An improvement in the quality and reduction in the price of processed local rice will encourage consumption. Stakeholders including the government and private organizations can play vital roles in reducing the production and processing costs for farmers and processors ultimately reducing the final price at which local rice is sold to customers.

**The Nigerian rice industry is dominated by cottage processors who with the right support and enabling environment, have the potential to unlock more value from Nigeria's rice value chain.** In addition, cottage processors are sustainable market channels for small-holder farmers. The cottage processing industry is a sustainable source of off-take for farmers' paddy and thus should be given attention in any discussion to strengthen the rice value chain in Nigeria.

**Nigeria can learn a lot from China's rice industry success.** China is the world's largest rice producer and consumer. Chinese success can be attributed to technology-enabled post-harvest operations, government-subsidized mechanization, and farmer-led supply chains to mobilize household resources. By adopting similar approaches, Nigeria can use China's track record of rice-related achievements to accelerate its own rice market.

## About Agramondis

Agramondis is a consultancy firm specializing in agriculture, agribusiness, development, and research. Our mission is to contribute to solving the world's toughest agricultural challenges: ensuring food security and healthy diets, sustainable intensification, reducing greenhouse gas emissions, and adapting to climate change.

At Agramondis, we provide the expertise and intelligence needed to succeed in farming, agribusiness, agri-finance and development. With our offices in Nigeria, Kenya, the UK and Germany, we provide services in three principal areas:

1. Data and research, including M&E
2. Technical expertise in agronomy, rural development, food industry and agri-finance
3. Strategy and sustainability.

Most of our clients come from the development, food and farming and investment sectors. We are a values-led company and act by a set of simple values:

- Intelligence: We're disruptive thinkers, problem solvers and believers in human ingenuity and experiential learning.
- Integrity: We are honest, transparent, authentic, and independent in our advice.
- Care: We care for the success of our clients, the happiness of our people, the thriving of our communities and the health of our planet.

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