ECOSYSTEM STUDY OF THE DIGITAL AGRICULTURE LANDSCAPE IN NIGERIA

AUGUST 2021

MERCY CORPS | AGRIFIN | Dalberg | BILL & MELINDA GATES foundation

OUTLINE

- **Introduction**
- Executive summary
- Overview of agriculture in Nigeria
- Enabling environment
- Smallholder needs and capabilities
- Solutions landscape
- Opportunity areas
- Annex

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ABOUT AGRIFIN

Mercy Corps' AgriFin programming (MCAF) represents USD 35 million in innovation funding from the Mastercard Foundation, Bill and Melinda Gates Foundation and the Swiss Development Corporation to support development, testing and scale of digitally-enabled services for smallholder farmers.

- Our objective is to develop sustainable services that increase farmer income and productivity by 50%, with 50% outreach to women
- MCAF works as an innovation partner with private sector scale partners and such as banks, mobile network operators, agribusinesses, as well as technology innovators and governments committed to serving smallholders at scale
- We help our partners develop, test and scale bundles of digitally-enabled financial and non-financial services supporting partnership development between market actors that leverage their strengths
- We combine MCAF team expertise with strategic subsidy to jointly implement iterative, fail-fast engagements with partners on a cost-share basis, sharing public learnings to drive market ecosystem growth
- Since 2015, we have completed more than 200 engagements with over 120 partners across Africa
- With the onset of the Desert Locust in East Africa, the Skoll Foundation funded AgriFin's first emergency response work leveraging digital tools
- **With this support, AgriFin now reaches more than 8 million smallholders**

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Context and objectives of the study

Context

- Smallholder farmer households account for over 90% of Nigeria's national output. However, farmer income and **productivity remains low** due to a **lack of access to and limited utilization** of agriculture solutions such as quality inputs, training, mechanization services, access to markets, and access to credit
- AgriFin is keen to facilitate the provision of services to farmers through digital means, to improve their productivity, incomes, and livelihoods in Nigeria

Objectives & Approach

- This study seeks to provide an understanding of the digital agricultural ecosystem in Nigeria. It is intended to achieve four broad objectives:
  1. Provide an **overview of agriculture in Nigeria**
  2. Understand Nigeria's **enabling environment**
  3. Capture the **needs and behaviors of smallholder farmers**
  4. Map the **landscape of financial/non-financial digital agricultural solutions**
  5. Identify **opportunity areas for AgriFin intervention**

Research Overview

- Dalberg used a combination of research methods, including:
  - **31 virtual interviews** with stakeholders across Nigeria's agricultural ecosystem
  - **Desk-based research** and analyzed available data
  - Analysis of existing data sets such as The Human Account, and CGAP surveys
- This study did not include extensive direct outreach with smallholder farmers

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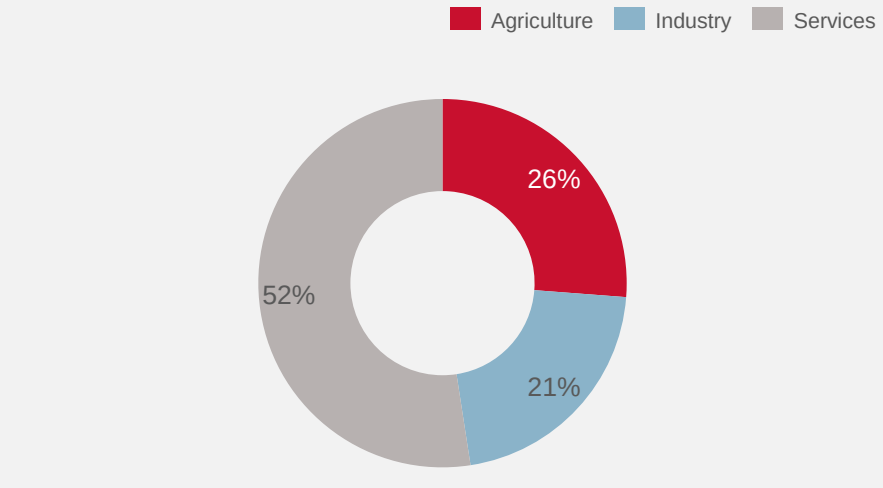
Dalberg's scope of work has covered research and analysis of farmer needs, the solutions landscape and broader ecosystem in Nigeria

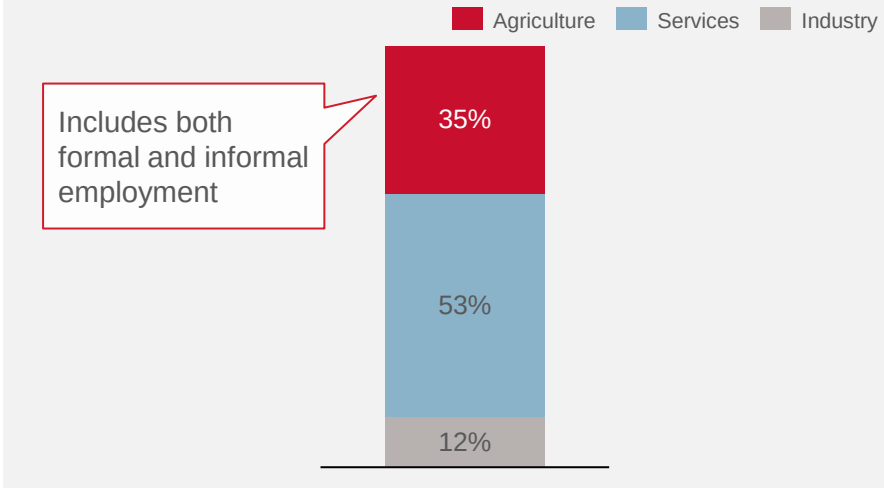
1 **Overview of agriculture in Nigeria**	Provide a comparative overview of agriculture in Nigeria, key stakeholders that form the agricultural ecosystem, and value chains that may lend themselves to digital interventions
2 **Enabling environment**	Understand the enabling environment in terms of legal, regulatory and policy issues, financial and capital needs and market / outreach inputs
3 **Smallholder farmers' needs and capabilities**	Capture the needs, perceptions, aspirations and behavior of the farming community (including allied activities) in the context of technology and digital channels
4 **Solutions landscape**	Map the landscape of technology play in Nigeria with specific reference to agriculture covering various aspects from input to farming to harvest/post-harvest on one hand, and supply of adequate formal financing solutions (by various entities) including provided by fintechs for agriculture on the other
5 **Recommendations for potential digital interventions**	Provide a perspective of potential intervention areas for AgriFin in Nigeria, looking across identified value chains, and ecosystem needs

Agriculture is a significant contributor to Nigeria's economy and a key sector to government's diversification strategy away from oil

Agriculture contribution to GDP (2020)
Percentage contributed (%)



Breakdown of total employment by sector (2019)
Percentage employed (%)



- **The sector contributes 26.21% of GDP and employed 35% of the population in 2019.** Agriculture is segmented into four sectors based on total output – Crop production (87.6%), livestock (8.1%), fishing (3.2%), and forestry (1.1%)
- **The sector is key to government's diversification away from oil**. Agriculture contributes 25% of all non-oil government revenues, driven primarily by cash crops such as cocoa, oil palm cotton and groundnuts

Sources: 1. NBS, "Nigeria Gross Domestic Product Report: Q4 & Full Year 2020", 2020. 2.Ibid. 3. World Bank and ILO Data, " Employment by Sector: Nigeria", 2019.4 . PWC, "Current State of Nigeria Agriculture and Agribusiness Sector", 2020. FAO, "Small Family Farms Country Factsheet, Nigeria", 2018. Note: The average income of farmers is in constant 2009 dollars

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Nigeria's agricultural trade deficit remains large despite significant domestic production

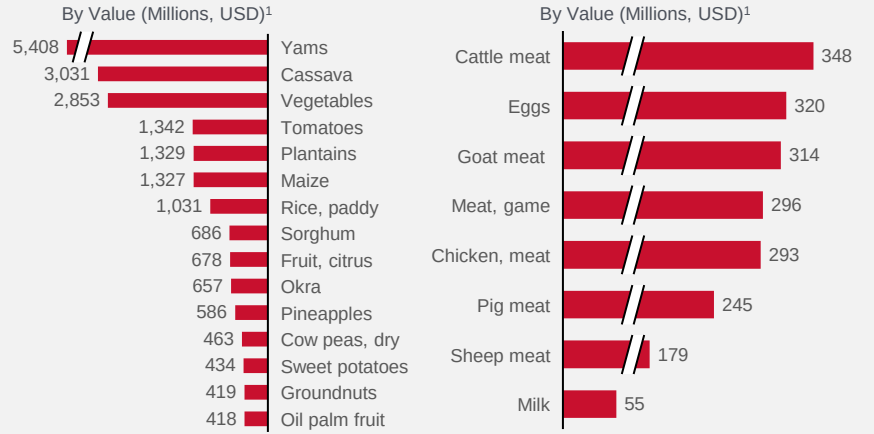
Domestic production

- **Crop production accounts for 87.6 % of the total agricultural production in Nigeria** with ~30 million household involved in cultivation of at least one crop. The major crops cultivated include cassava, maize and yam which account for over 50% of total produce
- **Livestock accounts for 11.3% of the total agricultural output.** 47% of Nigerian households own or raise livestock.

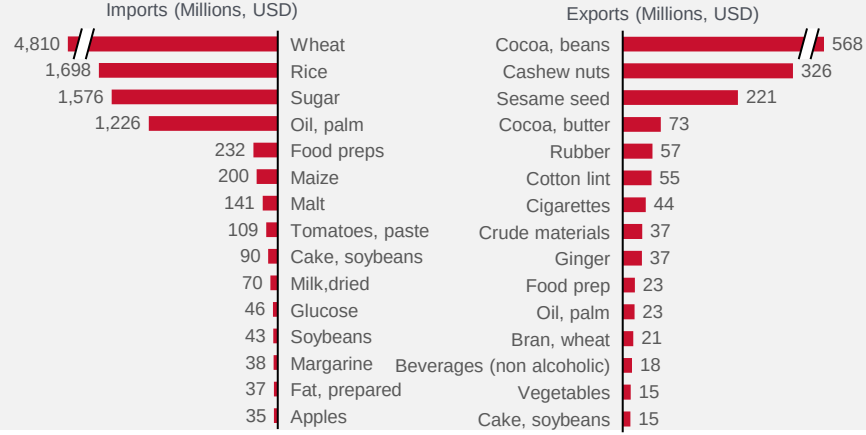
Trade

- **Nigeria imports a significant amount of foodstuff to supplement the domestic production of staple food crops.** Nigeria's cumulative agricultural imports stood at $8.1 billion, four times higher than the agricultural export of $1.9 billion, between 2016-2019
- **Nigeria exports unprocessed crop produce like cocoa beans, and sesame seed.** Indicative of a nascent local processing sector

Crop and livestock production in 2018

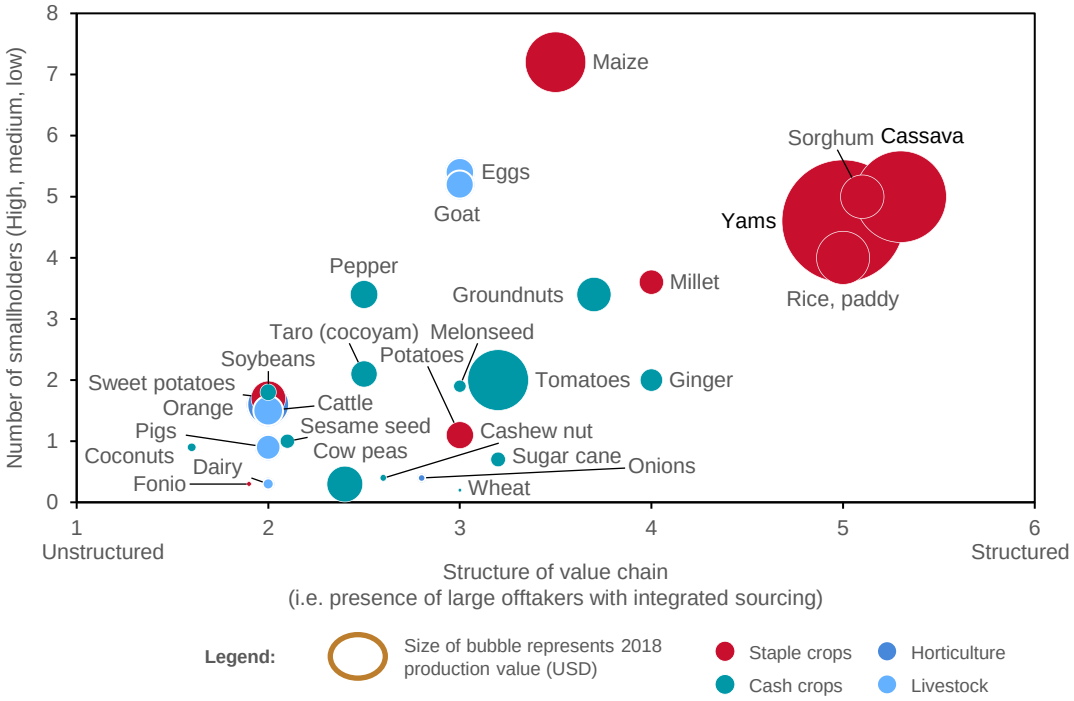


Crop imports and exports in 2018



Sources: FAOSTAT,2018; FAO, Nigeria at a Glance, 2019; PWC, Current State of Nigeria Agriculture and Agribusiness Sector, 2020; Helgi Library, Number of Household in Nigeria; Statista, Agriculture in Nigeria - statistics and facts, 2020 Notes: Vegetables include bamboo shoots, beets, chards, capers, cardoons, celery, chervil, cress, fennel, horseradish, marjoram, sweet, oyster plant, parsley, parsnips, radish, rhubarb, rutabagas, swedes, savory, scorzonera, sorrel, soybean sprouts tarragon, and watercress 2. Fruit citruses include bergamot, citron, chinotto, kumquat. Some minor varieties are used primarily in the preparation of perfumes and soft drinks

Smallholders primarily operate in cassava, maize and yam value chains, with varying degrees of fragmentation



- **Smallholder farmers grow a mix of crops.** Two thirds of the surveyed smallholder farmers grow upwards of four crops, and **predominantly farm staple crops** such as maize, cassava and yam
- **Smallholder farmers operate in highly fragmented value chains** with several farmer groups, aggregators, processors, and off-takers. There is an opportunity to leverage digital solutions to streamline and integrate the operations of actors across the value chains
- **While many VCs are fragmented, medium to large agribusiness play significant roles and can be aggregation points to reach many SHFs.** However, winning their buy-in to use digital services is a high hurdle

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Dalberg analysis; Stakeholder Interviews
Notes: The structure of VCs differs based on the presence of formalized procurement, such as farmers organizations (cooperatives, local markets and off-taking agreements with agribusinesses), which can create a greater ease of implementation for digital interventions (although stakeholders in more structured VCs can also offer more resistance to change and require a higher proof of impact from digitization

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Significant challenges exist across these value chains with some being more pronounced in less structured value chains

Input	Production	Post-production	Processing	Distribution
• **Poor accessibility to improved seedlings and agrochemicals.** Fertilizer and improved seeds are applied to only 35% and 10% of plots, respectively. Fertilizer usage is low i.e.,13 kg/ha compared to 20kg/ha in Ethiopia • **Land ownership.** Only 10% of male-managed and 4% of female-managed plots have land titles • **Climatic variation.** Low yields due to prolonged droughts especially in the Northern regions	• **Frequent pest and disease attacks.** Two thirds of the surveyed farmers had dealt with pest/diseases within the last three years • **Poor irrigation systems.** Only 7% of potential irrigation land compared to 10% in Sudan • **Low utilization of mechanized tools.** 65% of SHFs cultivate using the hand hoe, 25% use draught animal power and only 10% have access to tractors	• **Poor post-harvest handling.** Farmers are ill-equipped to handle their harvest leading to losses. 15%-25% for grains are lost due to this compared to 12% in Kenya • **Limited access to storage facilities.** Over 50% of the smallholder farmers store their produce at home and another third use barns	• **Frequent power outages.** About 59% of Nigerians compared to 48% in Ethiopia, access to electricity. However, frequent power outages has led to reliance on more costly off-grid sources or diesel-powered generators • **Inadequate skilled personnel.** Most of the farmers rely on family labour with no specialized training	• **High transport costs due to poor road network and limited proximity to commercial markets.** SHFs travel up to 14km to access tarmac roads. The main northern region / maize production area is >700km (11 hours drive) from Lagos, the main commercial market • **Price pressure from cheap imported agricultural produce.** In 2018, Nigeria had a food and drink import bill of over $4 billion, which is four times that of Kenya

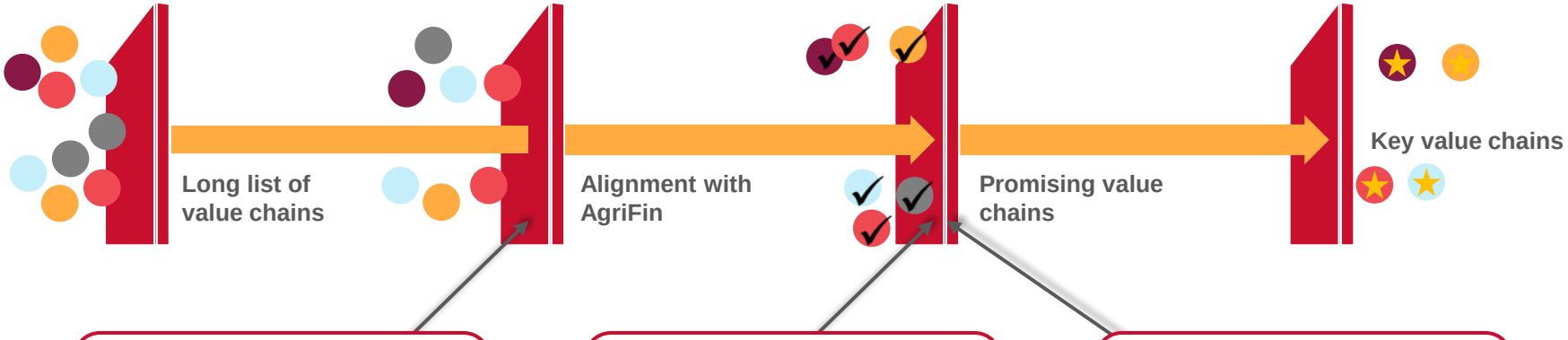
"Across the value chain, there is a knowledge gap that calls for the painstaking work of training and sensitization by service providers" ***Ag-tech solution provider***

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; PWC, Transforming Nigeria's Agricultural Value Chain,2018; Why Nigeria has restricted food imports, 2019; The Conversation, Key challenges for Kenya in big push to reduce post-harvest losses, 2018; Business daily, Kenya's food imports cross Sh100bn mark for first time, 2018

Dalberg assessed a long list of value chains for intervention based on ease of engagement, commercial and development impact potential

Identification of the key value chains in Nigeria

1. AgriFin (AF) ease of engagement with value chain actors
2. Scale potential of the value chain
3. Impact potential of the value chain



1. AF ease of engagement

Demonstrate readiness to engage with Smallholder farmers (SHFs) and development actors

2. Scale potential

Demonstrate high scale potential in terms of SHFs participation, presence of multiple type of actors in the value chain, and market demand

3. Impact potential

Demonstrate high focus on climate and gender

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Selected value chains offer strong potential for digital agricultural services; they address food security and commercialization needs

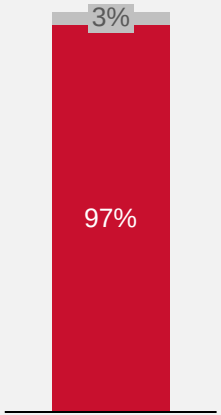
	Cassava	Ginger	Sorghum	Rice	Maize
Description	**Cassava is Nigeria's largest VC, and a staple crop** primarily produced in Southeast states	**A premium horticultural crop.** Nigeria is the third largest producer of ginger globally	**Sorghum is another staple crop** for Nigeria. Northwest and Northeast zones account for 80% of production	**Rice is one of the major staple foods** mainly grown in the northwestern and north central regions of the country	**Maize is one of the country's staple crops** that is cultivated majorly in the Northern states
Production ('19)[1]	**59.1 million tonnes produced;** 2175 tonnes exported (0.004%)	**6.9 million tonnes produced;** 30922 exported (4.5%)	**6.6 million tonnes produced;** 1170 tonnes exported (0.02%)	**5.6 million tonnes of rice produced,** only 32 tonnes exported	**11 million tonnes produced;** 1407 tonnes exported (0.01%)
SHFs	**Over 1.8 million farmers are engaged in production** and generate 90% of total volume	**300,000 farmers engaged in production on farms between 0.3 to 0.5 ha.** Most primary processing is done by women	**1.5 million sorghum farmers are smallholder farmers**	**1.1 million rice farmers are smallholder farmers** accounting for 80% of all rice farmers	**Over 1.5 million maize farmers cultivate land between 1 and 6 Ha** (considered smallholder farmers)
Structure	Large number of small to medium sized off-takers	Most of the ginger is bought by independent commodity traders	Most of the sorghum is produced for subsistence use	Three quarters of the off-takers are cottage millers	Most marketed maize goes through traders and aggregators

Sources: Value Chain Analysis Nigeria Ginger, 2020; Dalberg analysis: Stakeholder interviews Note: Production figures obtained from FAOSTAT data

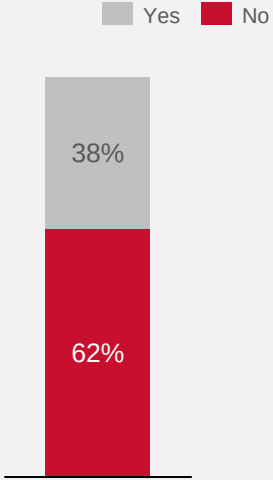
Smallholders have limited access to formal financial services, and scarcely use them when available

Farmers have limited access to formal financial services – access to physical touch points is equally limited

Adult population access to credit, 2020
% of sampled population

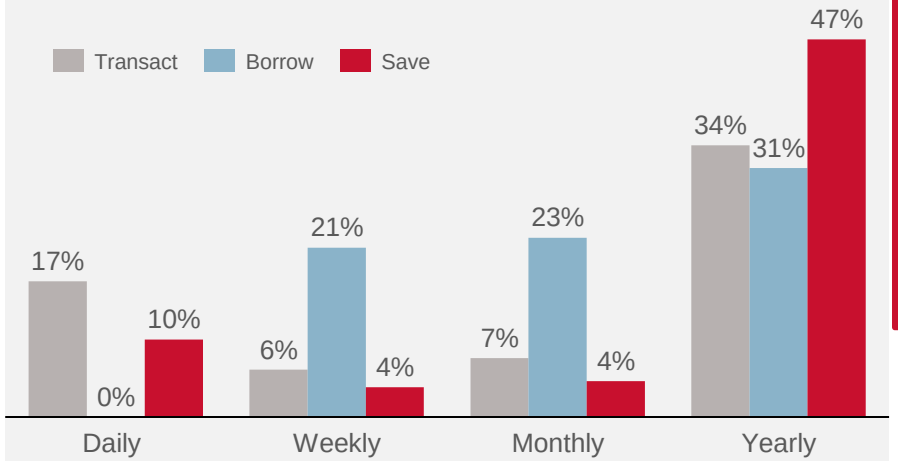


Access to financial point in rural areas, 2020
% of sampled population



However, uptake of these services is poor. Almost half of SHFs surveyed only use a formal bank account once a year

Frequency of transactions, borrowing and savings with banks
% of respondents

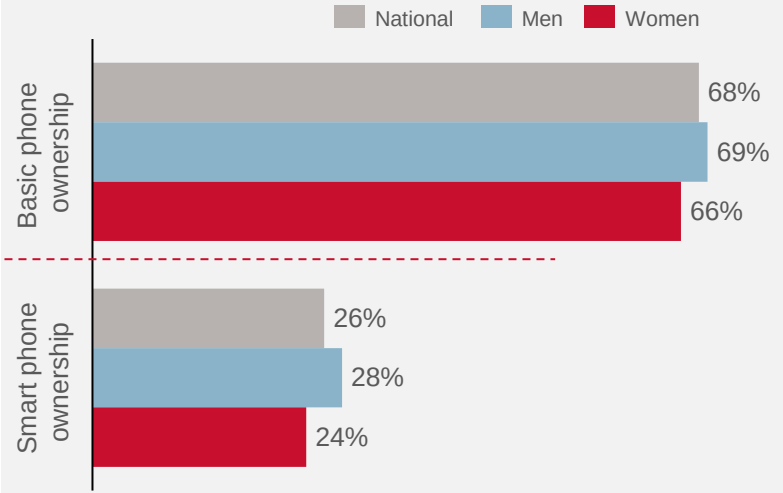


Sources: Human Account Dataset, 2018; EFInA Access to Financial Services in Nigeria 2020 Survey

Access to digital services is also low; though high basic phone ownership presents opportunities for digital agriculture

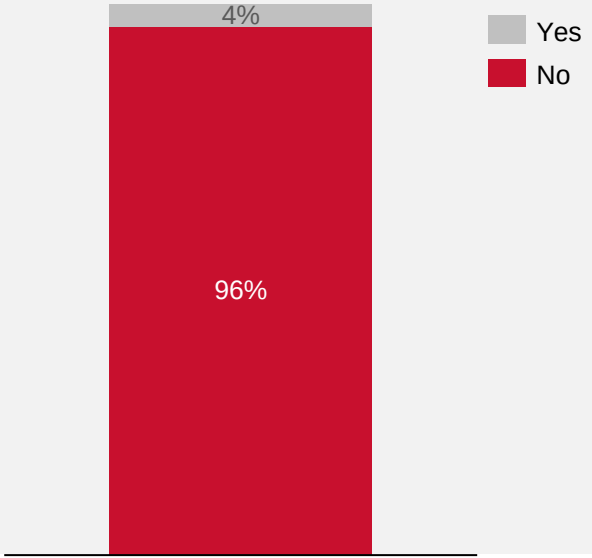
Smallholder farmers have high basic phone ownership offering potential IVR and USSD entry points

Phone ownership among smallholder farmers
% of respondents



Access to digital services is also limited…

Mobile money account ownership
n=704



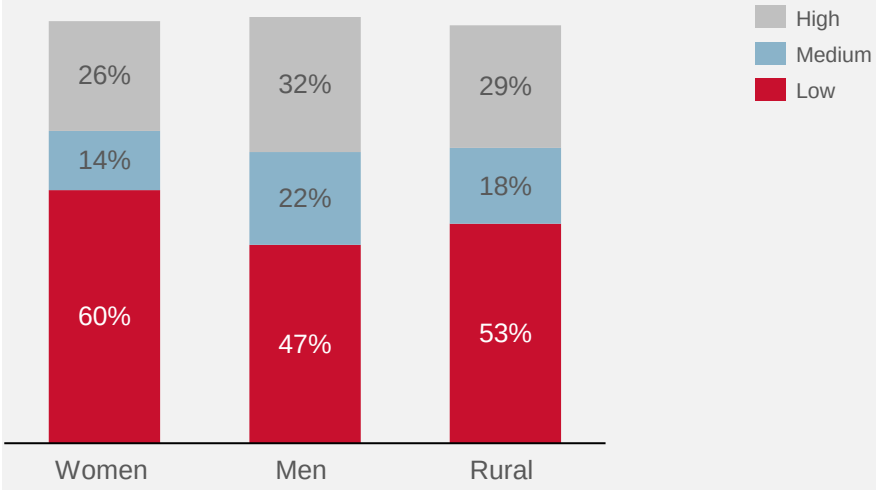
Sources: Human Account Dataset, 2018; EFInA Access to Financial Services in Nigeria 2020 Survey

Poor uptake is driven by low digital and financial literacy

Smallholders lack the capabilities to access digital solutions, and Nigeria's in general lack financial capabilities – only 1 in 5 Nigerians are rated high

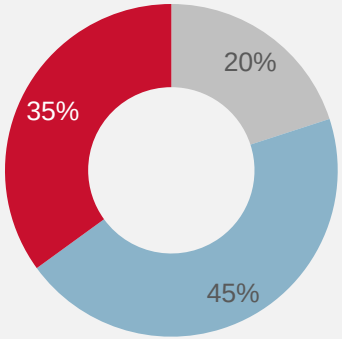
Digital literacy levels

% of respondents by digital literacy quintile



Overall financial capability[1]

% of population

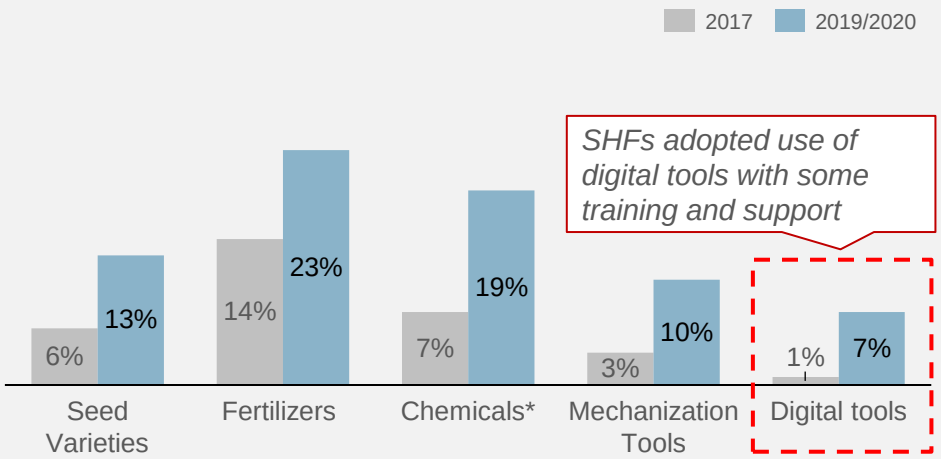


Source: The Human Account Data, Nigeria; Dalberg analysis

Notes: Financial capability is an average of the financial planning, financial control, knowledge, skills and making financial choices dimensions.

Smallholders are progressively willing to adopt the digital tools when offered the right support

Farmers adopting different technologies
*% of farmers that changed approach over period; 2017-2020; n=127**



"There is a willingness to adopt new technology despite low levels of literacy- Even for those who have been farming for years, they are open to new practices " ***Ag-tech provider***

- **Smallholder farmers are progressively willing to adopt digital solutions.** Most farmers have some basic knowledge of using phones. The survey showed 77% of the farmers have used a mobile phone before; 81% of have a voter's card, which allows access to financial services. Hello Tractor, an ag-tech company linking tractor owners to farmers, has over the last five years enlisted over 2000 tractors on its platform and served over 40,000 smallholder farmers. Babban Gona, over the last year supported over 100, 000 farmers to access inputs, agronomic training, and post-harvest services
- **However, there is a need for training and support to accelerate the adoption of new practices and techniques including the use of digital solutions.** Majority of the smallholder still lack access to information, with 69% of the farmers surveyed by CGAP rely on friends and family for advice on their agricultural activities, with the local leading farmer and the leadership as the secondary source of information

Source: GeoPoll Farmers Survey, March 2021; AGRA, SHF Survey, 2020; CGAP, National Surveys of Smallholder Households,2019; Stakeholder interviews
Note: Chemicals include pest, insect, and herb

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Smallholders operate within the context of an emerging digital economy, though macroeconomic conditions are unstable

Nigeria has made advancements to deepen its digital infrastructure through improving network coverage, though gaps still exist

Strong mobile and connectivity

- Relatively high mobile penetration (88 SIMs per 100 inhabitants[1]) and moderate internet coverage (90% 2G, 76% 3G) with 7th highest GSMA Infrastructure score in SSA

High systems interoperability

- Nigeria has robust interoperable infrastructure for digital payments, through the Nigeria-Inter-Bank Settlement System (NIBSS)

Advancements to deepen agent touch points

- Payment Service Bank (PSB) licenses to MNOs, though market leaders, yet to receive license
- Creation of a Shared Agent Network Expansion Facilities (SANEF) to reach the target of 500,000 mobile money agents by the end of the 2020

Cybersecurity gaps

- Nigeria lacks a Privacy and Data Protection Act
- Implementation of the Cybercrimes and Cybersecurity Act in 2015 revealed gaps in enforcement

Economic and socio-economic conditions are deteriorating, though tech investments is a highlight

Poor economic performance

- Nigeria's economy has struggled, GDP has declined 21% since 2014
- Rising inflation (from 9% in 2014 to 17% in 2020) has increased the cost of business operations
- Year-long border closures, also increased agribusiness costs given difficulty in securing supplies

Security challenges

- 3,600 lives lost in farmer-cattle herder crises across Nigeria's Middle Belt

Exciting start-up investment landscape

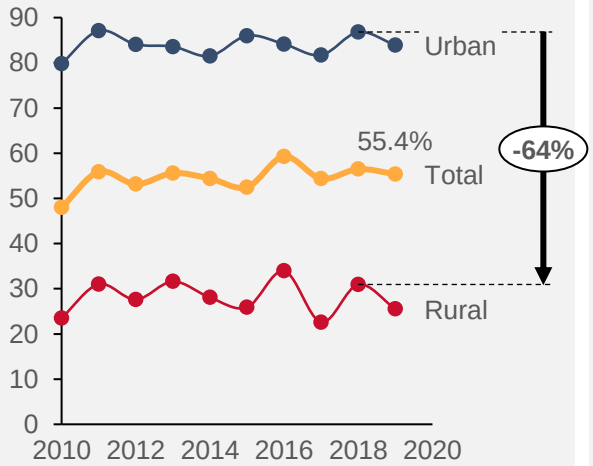
- The country ranked 1st in Africa for the highest value of equity funding raised in 2021 with a 21% share totaling $307 million
- Fintechs attracted the most funding (53%) in 2020 down form 62% in 2019

Sources:1. The World Bank Group, "Nigeria Digital Economy Diagnostic." 2019.; The World Bank Data, In Nigeria, 2021. 2.Ibid., 2021 3. International Monetary Fund, Nigeria Country Report, 2021; World Bank, " Nigeria Current Annual GDP", 2021.; The World Bank Group and IFC, Creating Markets in Nigeria ", 2020; . Council on Foreign Relations, "Nigeria Security Tracker", 2020

Furthermore, weak physical infrastructure constrains farmer productivity & market access

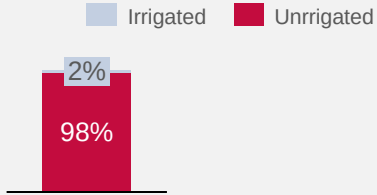
Access to electricity is limited in Nigeria, only 25% of rural populations have access…

Access to electricity
Percentage of population (%), 2010-2019

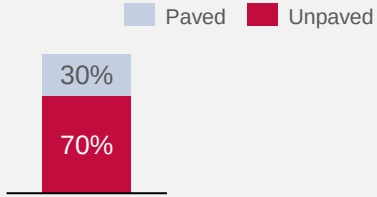


Farmer productivity is hampered by limited use of irrigation, and poor access to markets…

Irrigated arable land
Percentage (%), 2019

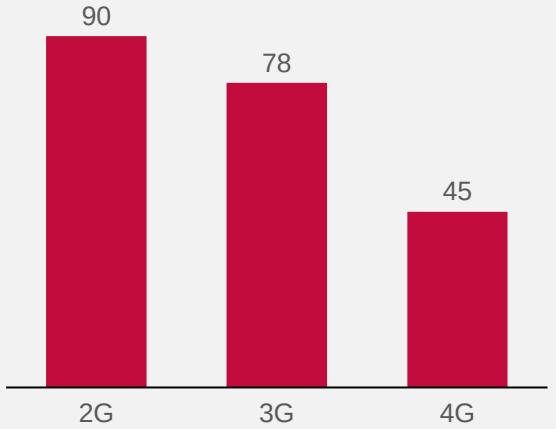


Road network
Percentage (%), 2019



However, strong 2G coverage across the country provides an opportunity to reach farmers

Mobile network coverage in Nigeria,
Percentage (%), 2019



Sources:. GSMA, “The State of Mobile Internet Connectivity 2020”, 2020. 2. The World Bank Group, “Nigeria Digital Economy Diagnostic Report”, 2020.

The financial solutions landscape is fairly developed given the number of actors and growth in agent networks; however, uptake remains low

= Level of service development (Number of suppliers) = SHF uptake

	Performance	Rationale	Example of suppliers
Transactions		Several suppliers in the market, but market is small compared to peers, likely due to the small mobile money share, e.g., only 4% of SHFs own mobile money	paga, AGRO AgroMall, FCMB, airtel, glo, MTN, OPay, Firstmonie Agent, access
		Low uptake of digital payments at only 34% among the adult population	
Credit		Fairly developed given the many suppliers and enablers (e.g., credit schemes)	FirstBank, farmcrowdy, zowasel, FCMB, Sterling, BOA, access, UBA
		Loan access and affordability is low, where only 3% of adults can access loans. Interest rates can be as high as 40% with stringent collateral requirements	
Insurance		Dominated by government efforts with a few private insurance providers	PULA, AIICO INSURANCE, HYGEIA HMO, ROYAL EXCHANGE General Insurance, NIRSAL, NAIC
		Low uptake in agriculture at only 2%	
Savings		Several suppliers of generic savings products in both formal and informal channels	FCMB, Sterling, ZENITH, FirstBank, UBA, LAPO Microfinance Bank Ltd. ...Improving Lives
		Most farmers save through informal groups as only 34% of rural population has bank accounts	

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The non-financial solutions market is private sector-driven and well-developed, which has increased uptake of products

= Level of service development (Number of suppliers) = SHF uptake

	Performance	Rationale	Example of suppliers
Extension		Fairly well developed and provided by private actors, development actors, and government, although the latter only has ~7k extension officers	
		Uptake is high and growing among farmers as credit and bundled services are introduced	
Supply chain		Underdeveloped and mostly provided by off takers following aggregation of products to minimize operational cost	
		In the case of bundled service via offtakes, there is high uptake of supply chain services	
Market access		Digital market access services are relatively well developed by a few large agribusinesses and attaches; however, most approaches are still novel and lack scale	
		SHFs still have limited access to better markets as most produce for subsistence (only 26% is sold) and lack information on market prices	

AgriFin should consider three main interventions to deepen the scale and uptake of solutions to farmers

Expand the reach and scale of existing ag-techs

Nigeria has vibrant ag-tech companies – the biggest strength of the ecosystem. However, many are yet to achieve scale. AgriFin can support these companies to reach more farmers. by:

- **Facilitating multi-partnerships between ag-techs, telcos, banks and agribusinesses.** Agribusinesses, telcos, and banks play key roles in agriculture. Advancing relevant partnerships through ag-techs will help expand digital solutions to farmers
- **Supporting last mile innovation**. AgriFin can work with leading ag-techs to better understand last mile delivery challenges, and innovate on business models, that will allow sustainable service delivery

Crowd in innovative solutions where missing

Solutions are currently lacking in critical spaces such as information services and supply chains. These services are critical to improve farmer livelihoods. AgriFin can support by:

- **Co-hosting agriculture innovation challenges.** Leveraging the keen interest in Nigeria's tech start-up's, AgriFin can unearth new solutions to address challenges with limited services working with all stakeholders
- **Creating a sandbox of exciting solutions** to de-risk investing. AgriFin can work with external solution provides through an innovation sandbox to experiment on programming in Nigeria

Leverage institutional service providers

Institutional actors such as aggregators, and agribusinesses play prominent roles with farmers, given direct contact. AgriFin can help generate demand for services by:

- **Deepen coordinated engagement with medium-sized businesses and aggregators**. Medium-sized off takers and aggregators have the most direct farmer engagement. Digitizing their operations will improve farmer access to solutions
- **Leverage existing agent networks such as SANEF, or telcos** to reach more farmers

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Opportunities

Across the value chains, AgriFin can also focus on improving access to credit and supply chain solutions

		Cassava	Ginger	Sorghum	Rice	Maize
Financial	Credit	• Facilitate partnerships to increase access to credit in the VC		• Partner with asset financing and FSPs providers to expand access to credit, inputs, and mechanization		
Non-financial	Extension	• Leverage OCAP and VAS providers to scale agronomic information	• Scale extension services through existing providers	• Scale climate information services through partnerships with MNOs, VAS		
	Supply chain/ smart logistics	• Support expansion of smart logistics to efficiently get cassava to processing centers	• Support digitizing cooperatives • Support traceability of ginger through smart logistics	• Facilitate the scaling of ware-house receipt systems	• Facilitate the scaling of ware-house receipt systems • Support the adoption of rice water management systems	• Facilitate the scaling of ware-house receipt systems

Sources: Dalberg analysis

AgriFin can seek out innovative solutions to have transformative impact on gender and climate concerns

Climate transformative

- **Facilitate partnerships between aggregators and international funders to incentivize farmers' behavior change** on climate smart practices
- **Facilitate financing partnerships between funders and offtakers** working with agroforestry farmers

Gender transformative

- **Support women farmers with land title deed registration** via digital tools like remote land surveying
- **Provide credit to women farmers for productivity tools** using alternative credit scoring mechanisms by facilitating **partnerships between banks, agtechs, fintechs, and farmer cooperatives**

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OUTLINE

- Introduction
- Executive summary
- **Overview of agriculture in Nigeria**
- Enabling environment
- Smallholder needs and capabilities
- Solutions landscape
- Opportunity areas
- Annex

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Nigeria's agriculture ecosystem faces productivity constraints, but digital platforms have the potential to alleviate them

Agriculture ecosystem

Summary of findings

- **Agriculture contributes significantly to Nigeria's economy** employing 35% of the population and contributing to over 26% of GDP
- **Limited productivity is a key constraint to the sector** and **contributing factors include the lack of finance, limited inputs, poor infrastructure, and unstable macro-economic policies**
- SHFs constitute 90% of total farmers with limited land ownership
- Several policies have been implemented to develop agriculture but will require effort to scale
- The ecosystem hosts several actors including policy makers at the federal and state levels, direct value chain actors, and support service providers
- **Different parts of the agriculture value chains are fragmented, but several innovations through ag-techs are supporting growth**

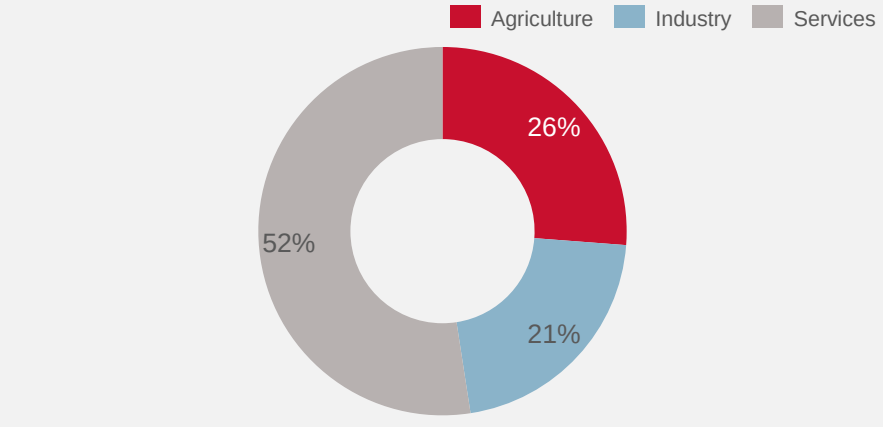
Implications

- **Digital solutions have a significant potential to increase farmer's access to support services** such as input subsidies, extension services, etc.
- **Partnering with agribusinesses and key organizations to organize value chains can unlock value.** Agribusiness have significant touchpoints with farmers along inputs, production, and aggregation stages that could further be enhanced by digital solutions
- **Several ag-tech actors have deployed solutions that can be scaled to reach more farmers**

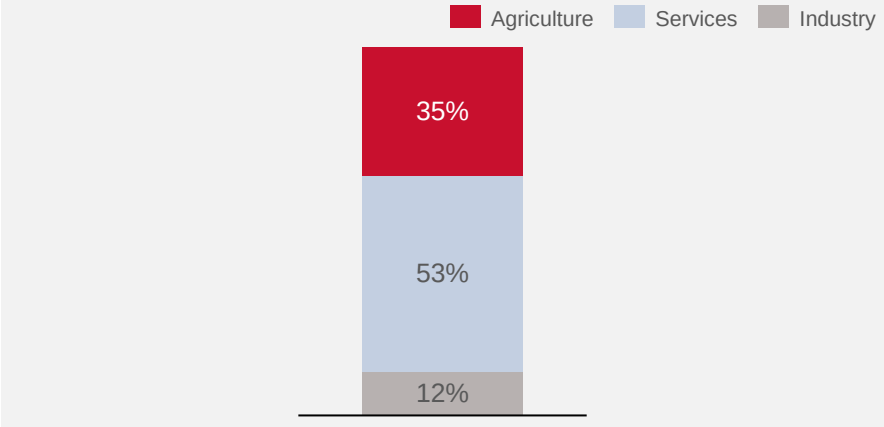
Sources:1. Dalberg analysis

Agriculture plays a significant role to the Nigerian economy, accounting for a third of the GDP and employing 35% of Nigerians

Agriculture contribution to GDP (2020)
Percentage contributed (%)



Breakdown of total employment by sector (2019)
Percentage employed (%)



- Agriculture is segmented into four sectors based on total output – crop production (87.6%), livestock (8.1%), fishing (3.2%), and forestry (1.1%)
- **The sector contributes 26.21% of GDP in 2020 and employed 35% of the population in 2019**. Agriculture employment is primarily in primary production activities
- **Most farmers in the country are SHFs and engage in crop production on small plot areas**. 88% of Nigeria's farmers are SHFs and cultivate 0.5 hectares of land. 55% of them earn a gross income around $9815* of which 49% is from crop production

Sources: 1. NBS, "Nigeria Gross Domestic Product Report: Q4 & Full Year 2020", 2020. 2.Ibid. 3. World Bank and ILO Data, " Employment by Sector: Nigeria", 2019.4. . PWC, "Current State of Nigeria Agriculture and Agribusiness Sector", 2020. FAO, "Small Family Farms Country Factsheet, Nigeria", 2018. Note: The average income of farmers is in constant 2009 dollars

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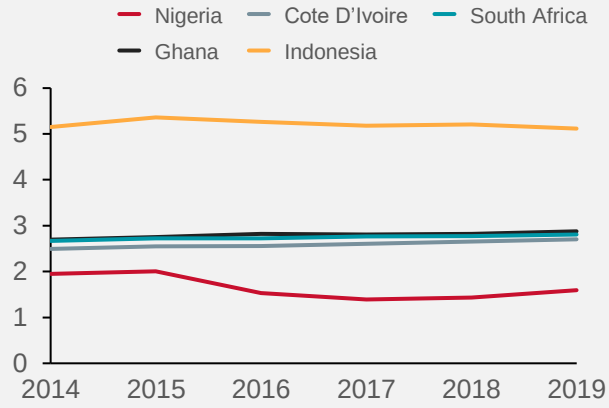
Low agriculture productivity is a key challenge, and is compounded by other factors such as lack of finance and limited value addition

Rice yield in Nigeria and peer countries
Yield *(tonnes/ha)*



Overall agricultural productivity is low compared to other countries and has stalled over the last 6 years. Yields have gone down as much 4% for commodities such as rice.

Low productivity in the sector has led to a dependency on importations and high farmer poverty. Nigeria's agricultural trade deficit was $1.7 billion in 2019 and 72% of SHFs live under the poverty line of $1.9/day. Several factors contribute to the underdevelopment of the sector:

- **Lack of access to finance.** Budgetary allocation to agriculture over the past decade has remained below 2% despite the African Union's Maputo Declaration commitment of 10%. Countries such as Ghana spend above 5% of budget on agriculture. SHFs are also some of the least financially included and ag-tech actors have difficulty raising funding(< 3% of total start-up funding raised/year)
- **Limited agricultural inputs.** Inputs such a fertilizer are still minimal. Nigeria used 19.7 kg of fertilizer/ ha of arable land compared to Ghana 29.4 kg/ha, Cote D'Ivoire 30.8 kg/ha and South Africa 72.8 kg/ha in 2018
- **Limited deployment of modern agricultural tools.** Low mechanization (6 tractors/10,000 ha against 11 tractors in Ghana), and training for farmers
- **Limited value addition and value chain linkages:** Limited processing of produce and limited access to markets lead to low commercialization
- **Weak infrastructure:** Poor road networks and limited irrigation at 2% of farmland
- **Unstable macro-economic context and violent conflicts:** Trade deficits and conflicts between herdsmen and farmers have impacted SHFs

Sources:1.GSMA, "AgriTech in Nigeria Investment Opportunities and Challenges." 2020. 2. Partech "2020 Africa Tech Venture Capital Report",2020. 3. FAOSTAT, "Crops and Livestock Products", Nigeria, 2020. 4. Sahel Capital Partners, "Catalysing Sustainable Agriculture and Nutrition", 2017.

The government sees agriculture as the future and has enacted policies and programs to support its development

The GoN has started major reforms to support agricultural growth…

The GoN developed the Agriculture Promotion Policy (2016 – 2020) following the previous Agricultural Transformation Policy**.** Some key supporting programs included:

- **Presidential Fertilizer Initiative (PFI):** Aims to boost local production of fertilizer
- **Presidential Diversification Initiative**: Aims to promote the development of agro-processing
- **Zero Reject Initiative (ZRI):** Aims to improve agricultural exports through product standardization and better food handling
- **Anchor Borrower Programme (ABP):** Aims to create linkages between SHFs and large-scale processors

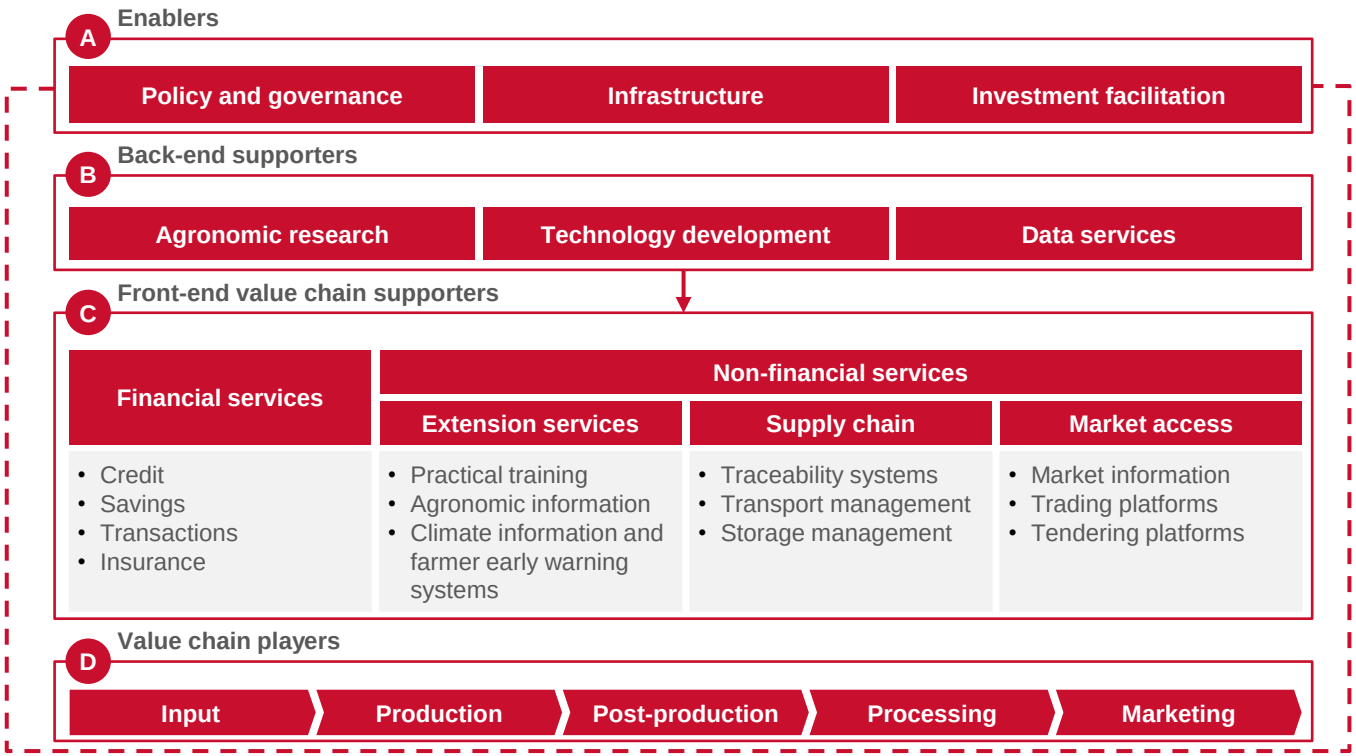
.. that have contributed to greater access to markets and inputs for farmers, but challenges remain

- **Presidential Fertilizer Initiative (PFI):** Has led to the production of 150 million kg of fertilizer, recruited 41 blender enterprises, and enrolled additional 5 million farmers to receive subsidies in 2020. More strict monitoring is need to ensure efficient flow of inputs
- **Zero Reject Initiative (ZRI):** Multiple farmer trainings have been organized (e.g., 500 farmers in the South) and ministerial committees were established to oversee standardization. Despite progress, training programs have been minimal
- **Anchor Borrower Programme (ABP):** The program has reached 2,923,937 farmers across 21 commodity sectors. Challenges include poor monitoring of loan usage and difficulty for some farmers to access them

It is important to create and sustain an economy in the sector, to widen our perspective in the continent" – **FMARD* Minister, Sabo Nanono**

Sources: 1. PWC, "Current State of Nigeria Agriculture and Agribusiness Sector", 2020. Premium Times, "Africa's financial security lies in agriculture – Minister", 2021.
2. FMARD, "The Agriculture Promotion Policy (2016 – 2020)", 2016.
Notes: FMARD – Federal Ministry of Agriculture and Rural Development

Nigeria's agriculture ecosystem comprises four broad stakeholder groups



A Enablers provide functions that **support the broad development across the entire agricultural ecosystem**

B Back-end supporters provide functions that **underpin the services provided by front-end value chain supporters**

C Front-end value chain supporters provide functions to **directly promote the development and efficiency of value chains**

D Value chain players **handle the goods exchanged within a value chain**; they can be:
- Active in single or multiple value chains
- Active across single or multiple stages of value chains

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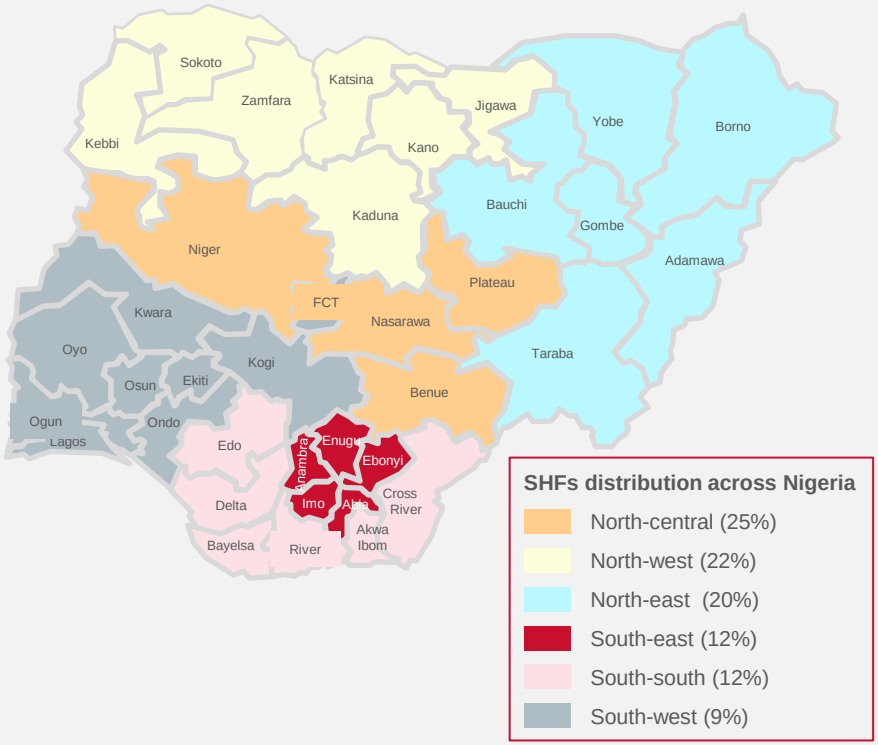
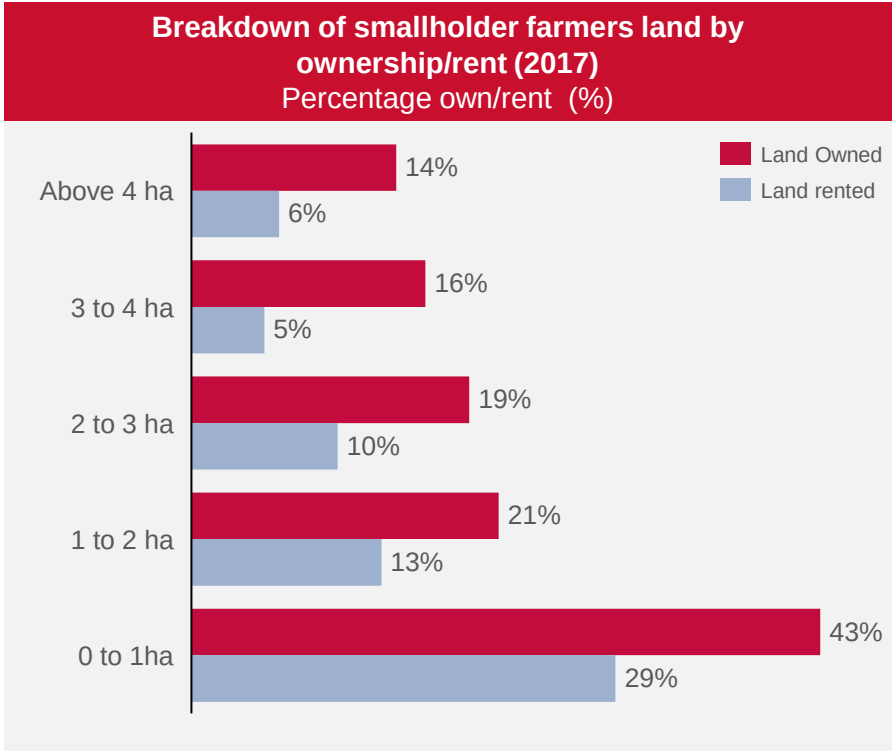
More than one in two smallholders reside in Northern Nigeria; two-thirds own less than two hectares of land





Sources: CGAP, “National Survey and Segmentation of Smallholder Households in Nigeria”, 2017.

NON-EXHAUSTIVE

A range of stakeholders operate across these groups to offer different services such as regulations, access to credit, inputs, etc.

Government | Donors | Private sector

Enablers	Back-end support	Front-end support	Value chain activities

Federal Ministry of Agriculture and Rural Development

Supporting federal ministries: Federal Ministry of Industry, Trade, and Investment, Federal Ministry of Power, Works, and Housing, Federal Ministry of Information and Digital Economy, etc.

State-level Ministries of Agriculture. E.g.: Kaduna State Ministry of Agriculture, Lagos State Ministry of Agriculture, etc.

State-level supporting ministries. E.g., agricultural development authorities, ministries of land in different states, ministries of chieftaincy matters, etc.

Research institutions and universities: National Agriculture Research Institute, Agra NERLS, etc.

Banks: E.g., Sterling Bank, Bank of Agriculture, etc.

While the government plays an important role in setting national agendas and supporting policies, **each state operates its own agricultural programming and implementation through state-level designated agriculture ministries and authorities**

Agribusinesses. E.g., Hello Tractor, Babban Gona, Thrive Agric, etc.

Multilateral donors and NGOs such World Bank, GIZ, FAO, AfDB, IFAD,FAO, IITA, etc.

Input providers, producers, traders, processors, and distributors

Note: The list of stakeholders is non-exhaustive

Key government institutions and farmers associations play an important role in policy, research, and advocacy across value chains

Government Research Institutions and Extension Services

- **The Agricultural Research Council of Nigeria (ARCN):** In charge of coordinating agriculture research activities in Nigeria
- **Institute for Agricultural Research & Training (IAR&T)**: In charge of developing, and validating agricultural technologies through research and extension systems
- **Institute of Agricultural Research:** Conducts crop research and improvement in the savanna region of Nigeria
- **National Root Crop Research Institute**: Conducts research on improvement of cassava, yam, cocoyam, potato, ginger
- **National Agricultural Extension and Research Liaison Services (NAERLS):** Coordinates planning and development of agriculture extension liaison activities throughout the country
- **Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL Plc.):** Responsible for stimulating the flow of affordable finance and investments into the agricultural sector by de-risking VCs and setting incentives for agricultural lending
- **Cellulant**: Implements an e-wallet solution that allows farmers to receive/ purchase inputs in partnership with GoN

Farmers Associations

- **All Farmers Association of Nigeria (AFAN):** Connects all farmers, cooperatives, and other associations involved in agriculture in Nigeria
- **Rice Farmers Association of Nigeria (RIFAN):** Conducts advocacy for all organizations involved in rice farming, milling, storage, trading, export, training, and research in Nigeria
- **Maize Association of Nigeria (MAAN):** Promotes maize research, production, and extension services and brings together, researchers service providers, farmers , seed and fertilizer companies in Nigeria
- **Fertilizer Producers & Suppliers Association of Nigeria (FEPSAN)**: National trade association that represents the interests of fertilizer manufacturers, blending plants, major distributors, dealers, and farmers in Nigeria
- **Organic Livestock and Crops Owners Association of Nigeria:** Facilitates the national organic livestock industry value chain programme
- **Poultry Association of Nigeria:** Association that unites all poultry farmers and producers in Nigeria

Private agribusinesses are involved in aggregation and processing while the government and donor partners dominate inputs provision

	Production	Aggregation	Processing	Distribution
Direct value chain actors	• **Nigeria's private inputs market is still underdeveloped and dominated by government, and donor partners.** For instance, seed companies mention that 100% of their production is channelled through government programs such as the Growth Enhancement Support Scheme	• **Farmer cooperatives are the nexus for aggregation and are often supported by agribusinesses and ag-tech actors.** Aggregation is also supported by aggregation centres set up across states through the GoN	• **Private agribusinesses in Nigeria are mostly involved in the processing and distribution stages.** These include agribusiness conglomerates such as Dangote Group and Stallion Group	• **Distribution centres vary and depend on value chains**. While processed goods are sold mainly in formal markets/ online retail stores, other agricultural products such as groundnuts are also circulated in rural markets. Actors include petty traders, supermarkets, etc.
Example players	FMSFarms, THE WORLD BANK, IITA Transforming African Agriculture	Babban Gona, farmcrowdy, AGRO AgroMall, cellulant	DANGOTE GROUP, OKOMU, Olam, FMN Flour Mills of Nigeria Plc	SHOPRITE, JUMIA, addide ...Your low price neighbourhood store.

Sources: 1. .GSMA, "AgriTech in Nigeria Investment Opportunities and Challenges." 2020. 2. Sahel Capital Partners, "Catalysing Sustainable Agriculture and Nutrition", 2017. 3. Dalberg Interviews

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Service providers face constraints de-risking farmers, but MNOS and ag-techs can help alleviate constraints through various innovations

	Financial Support Services	Non-financial Support Services
Support service providers	• **Micro-finance and other financing stakeholders facilitate access to finance and banking services but still face many issues.** De-risking farmers and raising awareness on utility of products such as crop insurance are major constraints as many farmers do not have credit histories and default on their loans • **Ag-tech actors play an important innovative role in crowding in financing, de-risking farmers.** Example include Thrive Agric, Zowasel, Farmcrowdy, Cash2Crop, etc. • **MNOs are actively playing a role in deepening financial inclusion and allowing for data collection to connect farmers to financial services** through agent networks	• **Extension services such as farmer training are mostly carried out by donor partners** such as AGRA **and social enterprises** such as Babban Gona • **Ag-techs are also driving innovation by providing market linkages and modernizing the sector to improve productivity and yield.** Examples of services provided include access to information, precision agriculture, increased mechanization, digital marketplaces, etc. Companies involved include Hello Tractor, Verdant, BeatDrone
Example players	FCMB, thrive agric, Sterling, MTN, LAPO Microfinance Bank, zowasel	Babban Gona, AGRA Growing Africa's Agriculture, BEAT DRONE, Probity Farms.com, verdant, hello tractor

Sources: 1. .GSMA, "AgriTech in Nigeria Investment Opportunities and Challenges." 2020. 2. Sahel Capital Partners, "Catalysing Sustainable Agriculture and Nutrition" 2017. 3. Dalberg Interviews

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Intermediaries facilitate input supply and market access to SHFs but also contribute to distortions in the quality of inputs and pricing

SHFs Input supply and financing farming	SHFs 1st mile markets	Major markets and processors
• Supplying inputs to farmers (e.g., on behalf of agribusinesses)	• Purchasing produce from farmers at a low price at 1st mile markets to later sell the aggregated produce at a higher price to agribusinesses and wholesalers	• Facilitating transportation and supply of aggregated produce (with a broker's margin) from 1st mile markets to wholesalers and retailers in major markets

Intermediaries play a vital role in Nigeria's agriculture VCs however, they also contribute to market distortions, but digital solutions can help alleviate them

- **Agro-dealers and brokers play an important role in connecting various players in the VCs**. They plug in at different stages and work with farmers, transporters, local traders, and wholesalers to facilitate the movement of produce in value chains across different markets
- **Despite their roles in connecting farmers with inputs, they also contribute to market distortions such as increase in prices and lower quality inputs**. For instance, some actors cite that intermediaries replicate their seeds into lower quality seeds that they offer to farmers
- **SHF's limited access to markets and information reduces their bargaining power**. Farmers are also often unable to sell beyond their farm gates which reduces their ability to secure competitive prices with middlemen capturing margins between 5% and 10% on VCs such as rice
- **Some Ag-tech actors such as Novus Agro and Verdant have created digital platforms that connect farmers directly to processors and markets** pointing to the potential of digital solutions to alleviate these challenges

Sources: 1. Stakeholder interviews.2. Dalberg analysis

NON-EXHAUSTIVE

Donors offer back-end and front-end support for modernizing the sector and building institutional capacity(1/4)

Digital element No digital element

	Program types		
Major donors	**Technical research and technology development/introduction**	**Investments and capacity building support**	**Value chain development**
Country-Specific Projects and Programs (Reached +378K farmers in 2020)	• **Technical Assistance for the Promotion of Drip Irrigation System at Selected Irrigation Schemes in Nigeria**: Providing technology assistance for increased yields through drip irrigation systems • Working to build a REDD+ mechanism for forest conservation through technical assistance as well as capacity building	• **Promotion of Decent Employment for Youth and Women in Agriculture Value Chains**: Has programming focused on youth in agriculture. For instance, FAO hosts an annual digital innovation youth entrepreneurship workshop and holds pitch competitions for scalable impactful digital solutions • **Strengthening Institutional Capacity for Improved Data and Information Systems for Policy Planning and Tracking the SDGs in Nigeria:** Is supporting ministries and agencies in six states to collect, analyze, and disseminate data on policy planning using digital platforms	• Landscape management and restoration for cocoa and palm oil VCs • **FAO Rainy Season Programme:** Working with farmers in northern states to increase crop production, livestock restocking, etc.
Nigeria Country Programme (+2M farmers from 2020 – 2025)	• **Feed the Future – Nigeria Country Programme:** Facilitating the use of improved technologies across Nigeria through research and innovation labs across different value chains	• **Nigeria Agricultural Extension and Advisory Services Activity** connects farmers to finance and extension services through SMEs and digital tools. Aims to reach 2M SHFs across 9 states in the next 5 years • **Agribusiness Investment Activity:** Improves the finance landscape for agribusinesses. Supported 5K MSMES, raised $200M in finance • **Nigeria Integrated Agricultural Activity**: Reached ~ 50K farmers including agro-dealers in Adamawa and Borno	• Activities include the Nigeria and Nestle Maize Quality Improvement Partnership, Innovation Lab for Fish, Innovation Lab for Legume Systems Research, etc.

Sources: 1. Dalberg Interviews.2. Dalberg analysis

NON-EXHAUSTIVE

Donors offer back-end and front-end support for modernizing the sector and building institutional capacity(2/4)

Digital element No digital element

	Program types		
Major donors	**Technical research and technology development/introduction**	**Investments and capacity building support**	**Value chain development**
IFAD Investing in rural people **Nigeria Country Strategic Opportunities Programme** (Reaches ~ 150K farmers/year)		• **Climate Change Adaptation and Agribusiness Support Programme in the Savannah Belt:** Includes training in productivity enhancement and climate resilience in northern states, and institutional capacity building for farmers' organisations. The program targets core poor households and has introduced IVR training during the pandemic. Program trained over 73K farmers • **Livelihood Improvement Family Enterprises Project in the Niger Delta in Nigeria**: Aims to enhance incomes and food security by creating jobs for rural youth and women. Aims to reach 25,500 people and has already chosen 318 incubatees and 100 incubators	• **IFAD Value Chain Development Programme (2012 – 2024):** Aims to address constraints in the cassava and rice value chains to improve rural incomes and food security. The program reached 63K farmers in 2020 (36% women, 49% youth), including training close to 7K processors. Its AMIS platform to send market information via WhatsApp reached 22K users
giz **Nigeria Competitiveness Project** (NICOP 2018 – 2022 has 11 million Euros in funding)		• **The GIZ Nigeria Competitiveness Project (NICOP 2018 – 2022):** Aims to Increasing access to finance for entrepreneurs in five value chains • Influencing policy initiatives at state and local levels	• Supporting key value chains (tomato/chili, ginger, leather, and garment as well as horticulture) through improving storage, processing, cold chain logistics, etc.

Sources: IFAD, "Climate Change Adaptation and Agribusiness Support Programme in the Savannah Belt: Supervision Report", 2021. IFAD, Nigeria, "Value Chain Development Programme: Supervision Report", 2020.

Note: This list is illustrative and not exhaustive

NON-EXHAUSTIVE

Donors offer back-end and front-end support for modernizing the sector and building institutional capacity(3/4)

Digital element No digital element

	Program types		
Major donors	**Technical research and technology development/introduction**	**Investments and capacity building support**	**Value chain development**
IDH, AFDB, AGRA, The Rockefeller Foundation Cassava Initiative (Aims to reach 20K farmers)	• **IDH Cassava Initiative:** Will encourage the adoption of loss-reducing technologies to improve crop handling, storage, and processing • **The Soil Fertility Evaluation for Cocoa Fertilizer Formulation:** Aims to conduct research on soil, foliage of cocoa to produce specific fertilizer for the value chain	• **IDH Cassava Initiative**: Aims to link farmers to markets through large anchor buyers, aggregate farmers and train them to reduce post-harvest losses	• **IDH Cassava Initiative**: Aims to industrialise the cassava value chain by supporting 6 to 8 processors to integrate 20K SHFs into the value chain
World Bank - Nigeria Rural Access and Agricultural Marketing Project		• **The Nigeria Rural Access and Agricultural Marketing Project**: Aims to conduct major civil works, supporting logistics activities and do capacity building in agro-logistics, rural transport, and emergency preparedness	

Sources: IDH, " Cassava" From Subsistence Crop Loss to Sustainable Cash Crop", 2021.

Note: This list is illustrative and not exhaustive

NON-EXHAUSTIVE

Donors offer back-end and front-end support for modernizing the sector and building institutional capacity(4/4)

Digital element No digital element

Major donors	Program types: Technical research and technology development/introduction	Program types: Investments and capacity building support	Program types: Value chain development
AGRA Portfolio (2017 – 2019)	• **KOREA-AFRICA Rice Development**: Invested in high yielding rice germplasm and breeding capacity in Nigeria • **Seed Certification and Traceability System**: Supported the development of a traceability system for quality control and dissemination of early generation seeds in Nigeria	• **AFEX Partnership**: AGRA's is supporting AFEX to strengthen business development capacity, linkages with appropriate investors, community level aggregation, post investment support services, design of food security, and capitalization fund • **Kaduna and Niger States Programming around capacity strengthening for state ministries** • **Policy advocacy for the Nigeria Agricultural Investment Plan (NAIP)**	• **Nestle Partnership:** Supported the development of 500 youth and women agri-preneurs to produce quality maize • Invested in upskilling farmers in the rice, maize, and soybean value chains in Kaduna and Niger states • **Olam Partnership** to build a $150 M facility in Kaduna to support SHFs in increasing productivity and reducing malnutrition
Bill & Melinda Gates Foundation Grants	• **Smart Farming Innovations for Small-scale Producers:** The Foundation is disbursing grants for innovative digital solutions with potential to drive positive impact for smallholder agropreneurs through bundled farmer services that are enabled by scalable digital and data platforms	• The Bill and Melinda Gates Foundation as a grant making foundation has played a partner role in multiple programs such as supporting AGRA with over $M in financing to improve its Soil Health Program in Africa	

Note: This list is illustrative and not exhaustive

Food crops such as cassava, yams and maize dominate production, accounting for 58% of the country's agricultural output

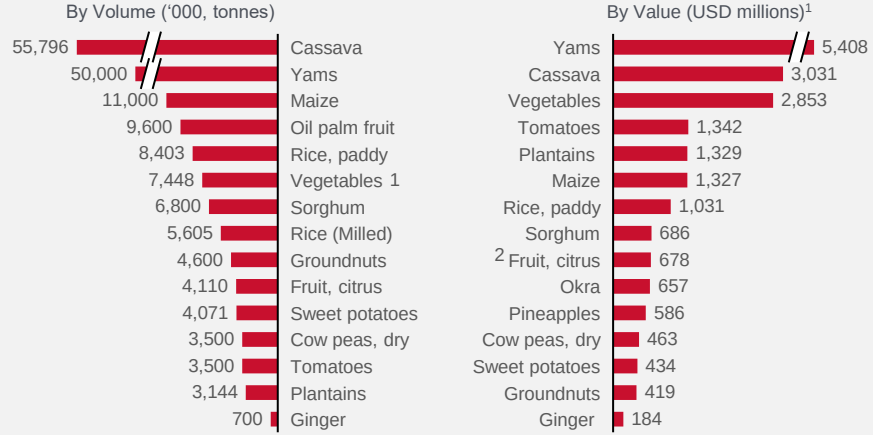
Crops

- **Crop production accounts for 87.6 % of the total agricultural production in Nigeria** with ~30 million households involved in cultivation of at least one crop. The major crops cultivated include cassava, maize and yam which account for over 50% of total produce

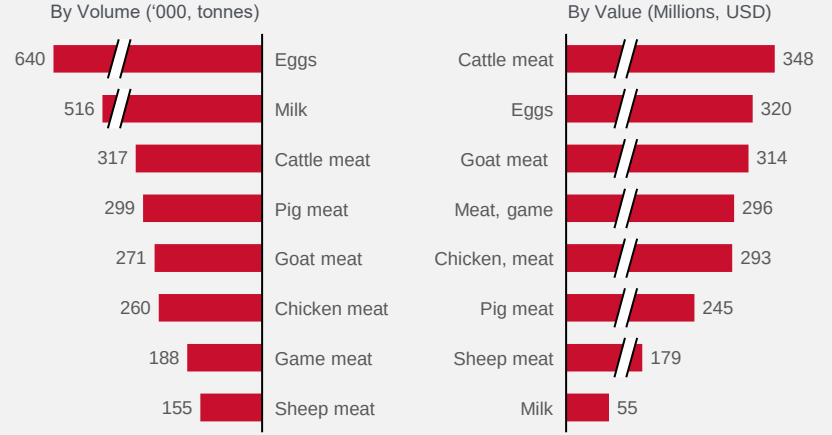
Livestock

- **Livestock accounts for 8.1% of the total agricultural output.** 47% of Nigerian households own or raise livestock. Additionally, 21% of farmers hold livestock as savings/insurance
- **There is significant diversification in agriculture, in both livestock and crops**. The average SHF grows six different crops and 67% of all households both grow crops and raise livestock

Crop production in 2018



Livestock production in 2018



Sources: FAOSTAT,2018; FAO, Nigeria at a Glance, 2019; PWC, Current State of Nigeria Agriculture and Agribusiness Sector, 2020; Helgi Library, Number of Household in Nigeria; Statista, Agriculture in Nigeria - statistics and facts, 2020 Notes: Vegetables include bamboo shoots, beets, chards, capers, cardoons, celery, chervil, cress, fennel, horseradish, marjoram, sweet, oyster plant, parsley, parsnips, radish, rhubarb, rutabagas, swedes, savory, scorzonera, sorrel, soybean sprouts tarragon, and watercress 2. Fruit citruses include bergamot, citron, chinotto, kumquat. Some minor varieties are used primarily in the preparation of perfumes and soft drinks

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Nigeria imports foodstuff like wheat, rice, and sugar, while exporting unprocessed produce like cocoa beans and sesame seed

Crop exports and imports

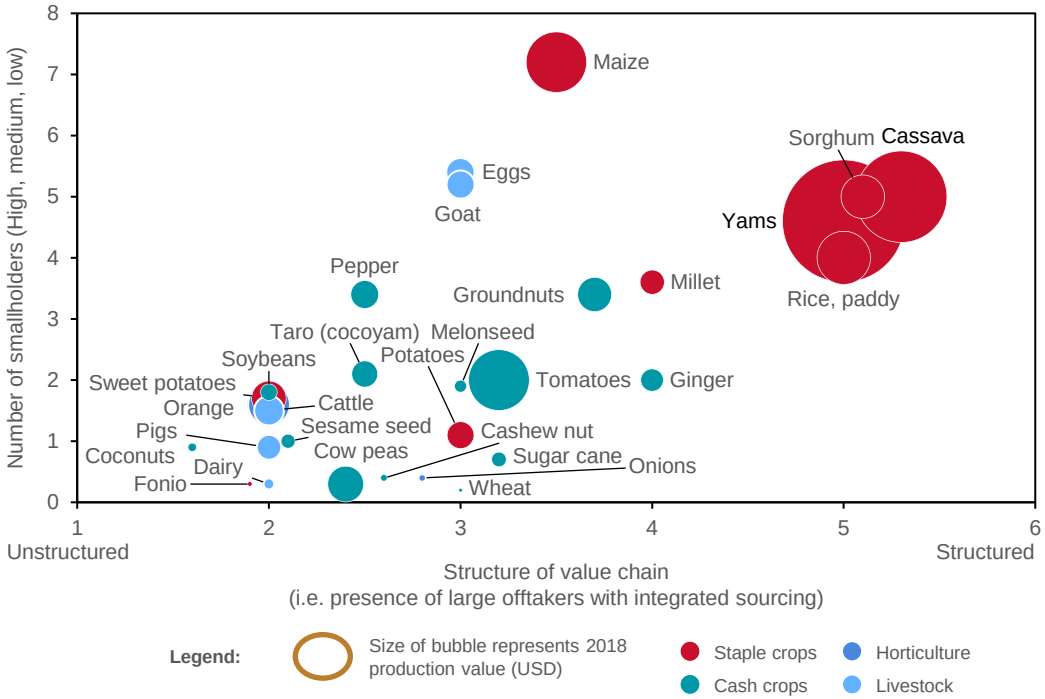
- **Nigeria imports a significant amount of foodstuff to supplement the domestic production of staple food crops.** The importation of food stuff is indicative of an unmet demand and a growing food import bill. Despite, the large number of Nigerians working in the agricultural sector, low productivity has limited the ability of domestic production to meet the local food demand
- **Nigeria exports unprocessed crop produce like cocoa beans, sesame seed, and bran wheat.** This could be indicative of an underdeveloped local processing sector especially when the imports are primarily processed products

Crop imports in 2018

Crop exports in 2018

Sources: FAOSTAT, 2018 ; Dalberg analysis; Stakeholder interviews

Smallholders primarily operate in cassava, maize and yam value chains, with varying degrees of fragmentation



- **Smallholder farmers grow a mix of crops.** Two thirds of the surveyed smallholder farmers grow upwards of four crops, and **predominantly farm staple crops** such as maize, cassava and yam
- **Smallholder farmers operate in highly fragmented value chains** with several farmer groups, aggregators, processors, and off-takers. There is an opportunity to leverage digital solutions to streamline and integrate the operations of actors across the value chains
- **While many VCs are fragmented, medium to large agribusiness play significant roles and can be aggregation points to reach many SHFs.** However, winning their buy-in to use digital services is a high hurdle

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Dalberg analysis; Stakeholder Interviews
Notes: The structure of VCs differs based on the presence of formalized procurement, such as farmers organizations (cooperatives, local markets and off-taking agreements with agribusinesses), which can create a greater ease of implementation for digital interventions (although stakeholders in more structured VCs can also offer more resistance to change and require a higher proof of impact from digitization

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Significant challenges exist across these value chains with some being more pronounced in the less structured value chains

Input	Production	Post-production	Processing	Distribution
• **Poor accessibility to improved seedlings and agrochemicals.** Fertilizer and improved seeds are applied to only 35% and 10% of plots, respectively. Fertilizer usage is low i.e.,13 kg/ha compared to 20kg/ha in Ethiopia • **Land ownership.** Only 10% of male-managed and 4% of female-managed plots have land titles • **Climatic variation.** Low yields due to prolonged droughts especially in the Northern regions	• **Frequent pest and disease attacks.** Two thirds of the surveyed farmers had dealt with pest/diseases within the last three years • **Poor irrigation systems.** Only 7% of potential irrigation land compared to 10% in Sudan • **Low utilization of mechanized tools.** 65% of SHFs cultivate using the hand hoe, 25% use draught animal power and only 10% have access to tractors	• **Poor post-harvest handling.** Farmers are ill-equipped to handle their harvest leading to losses. 15%-25% for grains are lost due to this compared to 12% in Kenya • **Limited access to storage facilities.** Over 50% of the smallholder farmers store their produce at home and another third use barns	• **Frequent power outages.** About 59% of Nigerians compared to 48% in Ethiopia, access to electricity. However, frequent power outages has led to reliance on more costly off-grid sources or diesel-powered generators • **Inadequate skilled personnel.** Most of the farmers rely on family labour with no specialized training	• **High transport costs due to poor road network and limited proximity to commercial markets.** SHFs travel up to 14km to access tarmac road. The main northern region / maize production area is >700km (11 hours drive) from Lagos, the main commercial market • **Price pressure from cheap imported agricultural produce.** In 2018, Nigeria had a food and drink import bill of over $4 billion, which is four times that of Kenya

"Women generally face the same challenges as men, but often lack the same number of resources to invest in the crop, as they rely on their husbands for support " ***Farmer Association representative***

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; PWC, Transforming Nigeria's Agricultural Value Chain,2018; Why Nigeria has restricted food imports, 2019; The Conversation, Key challenges for Kenya in big push to reduce post-harvest losses, 2018; Business daily, Kenya's food imports cross Sh100bn mark for first time, 2018

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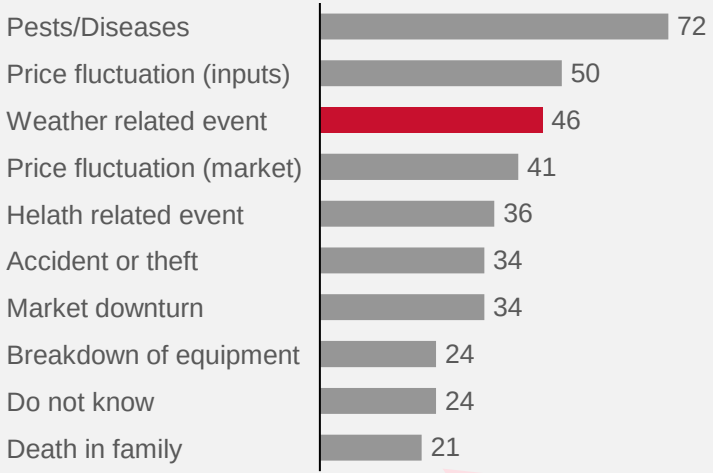
Climate change has adversely impacted famer productivity, and led to increased insecurity yet SHFs are ill-equipped to adapt to it

Source of disruption to agricultural activities
% of respondents n=2502



"Given the changing rainfall patterns farmers are keen of climate smart farming. They want a text telling them when to go out and plant" ***Weather forecast provider***

- **Climate change has induced rainfall and temperature stresses which negatively impact plant growth and lower farm yield.** For maize farmers, evidence shows that there is a likelihood that farm yield will decrease by 15% and 24% by the year 2030 and 2050 respectively. Additionally, given the lower rainfall amounts current cereal production is expected to reduce by 40% in 2050**,** causing food insecurity
- **Frequently long-lasting and intense droughts have led to a reduction in arable land**. A recent study showed that a 5% reduction in rainfall amounts is estimated to result in an increase in the area of arid and semiarid land by 5–8%
- **Climate change has exacerbated the rise in insecurity and theft**. In the last three years, there have been over 3,848 reported security incidences across all regions of Nigeria. This included clashes between frequent clashes between farmers and Fulani herdsmen as the competition for land intensified
- **Smallholder farmers are conscious of the fact that climate change has a negative influences on their farming activities but lack the skills to adapt to it.** 49% of surveyed SHFs did not do anything to adjust to the changing climate, though aware of ongoing changes

Source: Understanding the determinants of climate change adaptation strategies among smallholder maize farmers in South-west, Nigeria, 2019; Council of Foreign Affairs, "Nigeria Security Tracker", 2021 Stakeholder Interviews

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Ease of engagement, scale potential and development impact were used to assess potential AgriFin value chains

Criteria	Description	Parameters for evaluation
AgriFin ease of engagement	• Value chains need to demonstrate presence of development partners • Value chains need to demonstrate readiness for engagement with smallholder farmers	• Number of development partners present in the value chain • Mobile phone access • Number and type of off takers
Scale potential	• Value chains need to demonstrate SHFs participation in local production • Value chains need to demonstrate the presence of multiple type of actors for potential partnerships • Value chains need to demonstrate potential in terms of market demand • Value chains need to demonstrate low level of politics for optimum scale	• Number of smallholders farmers • Presence of multiple actors in the value chain • Export/ import value in terms USD • Government involvement in the value chain
Impact potential	• Value chains need to demonstrate positive impact particularly in terms of gender, and climate change	• Labour participation of women in the value chain • Water footprint of the value chain • Greenhouse gas emissions per kilogram of food product

Source: Dalberg analysis

29 value chains were identified for further assessment based on government priorities and national reports

Basis of value chain selection

1	The Government of Nigeria through the **Agricultural Promotion Policy (APP 2016-2020)** also known as the Green Alternative **aimed at achieving food security goals, import substitution, job creation, and economic diversification** has identified the following focus value chains[1]: **Domestic Production:** Rice, Wheat, Maize, Fish, Dairy milk, Soybeans, Poultry, Horticulture, Sugar **Exports:** Cowpeas, Cocoa, Cashew, Cassava, Ginger, Sesame, Palm Oil, Gum- Arabic, Yams, Horticulture, Beef, Cotton, Bananas, Avocado, Mango, Fish
2	The **Nigerian National Bureau of Statistic** (NBS) identified Cassava, Maize, Guinea Corn/ Sorghum, Beans, Yam, Millet, Groundnut, Rice, Cocoyam , Sesame/ Beni-seed as **the top 10 most commonly grown crops in Nigeria in 2019[2].**
3	The **Nigerian National Bureau of Statistic** (NBS) identified Sesamum seeds, Cocoa beans, Sesame oil, Cashew nuts, Shea Nuts/ Cake, Palm nuts and kernels, Linseed, Coconuts, Groundnut Crude oil, Ginger, Castor oil seeds as the **top traded agriculture products in Nigeria in Nigeria in 2020**[3].

Source:
1 FMARD Green Alternative AGRA Nigeria Green Alternative
2 NBS LSMS Integrated Surveys on Agriculture Nigeria General Household Survey Panel, Wave 4 2019
3 NBS Foreign Trade in Goods Statistics (Q4 2020)

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Cassava, maize, sorghum, ginger and rice were prioritized from the long list for AgriFin consideration

Initial list of 29 value chains

- Cassava
- Maize
- Sorghum
- Yam
- Millet
- Groundnut
- Rice
- Cocoyam
- Sesame seed
- Cocoa bean
- Wheat
- Dairy Milk
- Tomato
- Ginger
- Turmeric
- Aquaculture
- Cashew nuts
- Shea nuts
- Palm nuts and kernels
- Soybean
- Poultry
- Sugar
- Gum-Arabic
- Beef
- Cotton
- Banana
- Avocado
- Mango

11 value chains selected

- Cassava
- Maize
- Sorghum
- Groundnut
- Sesame seed
- Dairy Milk
- Ginger
- Aquaculture
- Cashew nuts
- Sugar
- Rice

5 prioritized value chains

- Cassava
- Maize
- Sorghum
- Ginger
- Rice

These value chains offer strong potential for digital agricultural services; they address food security and commercialization needs

	Cassava	Ginger	Sorghum	Rice	Maize
Description	**Cassava is Nigeria's largest VC, and a staple crop** primarily produced in Southeast states	**A premium horticultural crop** Nigeria is the third largest producer of ginger globally	**Sorghum is another staple crop** for Nigeria. Northwest and Northeast zones account for 80% of production	**Rice is one of the major staple foods** mainly grown in the northwestern and north central regions of the country	**Maize is one of the country's staple crops** that is cultivated majorly in the Northern states
Production ('19)[1]	**59.1 million tonnes produced;** 2175 tonnes exported (0.004%)	**6.9 million tonnes produced;** 30922 exported (4.5%)	**6.6 million tonnes produced;** 1170 tonnes exported (0.02%)	**5.6 million tonnes of rice produced,** only 32 tonnes exported	**11 million tonnes produced;** 1407 tonnes exported (0.01%)
SHFs	**Over 1.5 million farmers are engaged in production** and generate 90% of total volume	**300,000 farmers engaged in production on farms between 0.3 to 0.5 ha.** Most primary processing is done by women	**1.5 million sorghum farmers are smallholder farmers**	**1.1 million rice farmers are smallholder farmers** accounting for 80% of all rice farmers	**Over 1.5 million maize farmers cultivate land between 1 and 6 Ha** (considered smallholder farmers)
Structure	Large number of small to medium sized off-takers	Most of the ginger is bought by independent commodity traders	Most of the sorghum is produced for subsistence use	Three quarters of the off-takers are cottage millers	Most marketed maize goes through traders and aggregators

Sources: Dalberg analysis: Stakeholder interviews Note: Production figures obtained from FAOSTAT data

OUTLINE

- Introduction
- Executive summary
- Overview of agriculture in Nigeria
- **Enabling environment**
- Smallholder needs and capabilities
- Solutions landscape
- Opportunity areas
- Annex

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Developing Nigeria's digital ecosystem requires consideration of its unstable policy environment, poor infrastructure, and social dynamics

	Key findings	Implications
Policy, regulation, and governance	**Nigeria's macro-economic policies have been unfavorable to growth particularly in agriculture** • A large trade deficit and forex shortages have led to inflation and increased the price of agricultural inputs • Import bans have reduced cross-border trade and increased input costs for agribusinesses • DFS policies have slowed financial inclusion for the rural poor including SHFs	• Limited available funding for agriculture • Low DFS reach leads to exclusion for SHFs
Infrastructure	**Nigeria's underdeveloped infrastructure is an impediment for agriculture productivity growth and the uptake of digital solutions for farmers** • Lack of electricity access and poor grid lead to high costs for agribusinesses and investors • Inefficient roads and logistics system inhibit access to rural farms and lead to high logistics costs • Absent irrigation systems and lack of modernization undermine agricultural productivity • Low digital infrastructure such as ack of mobile devices is higher in rural areas and for SHFs	• Limited electricity hinders uptake of digital solutions • Digital platforms such as SMS, IVR, etc. can enhance farmer productivity
Investment landscape	**Nigeria's investment landscape is highly developed in terms of attracting investments for start-ups, but agriculture remains underfunded.** • Other considerations include cumbersome/absent policies that deter investments • Agriculture receives only 3% of raised funding • Insecurity, corruption, and cumbersome policies limit appetite for investments and affect SHFs	• Limited funding is limiting growth for agribusinesses
Social dynamics	• Women are excluded in engaging in the digital economy due to entrenched patriarchal systems. They are also likely to have less land tenure rights and limited leadership opportunities. Social-economic development inequities persist between the north and south	• Targeted interventions can increase uptake for excluded groups

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Sources:1. Dalberg analysis

A contracting economy, limited financing, and security are impacting agribusinesses and SHF's growth and productivity

Low Medium High

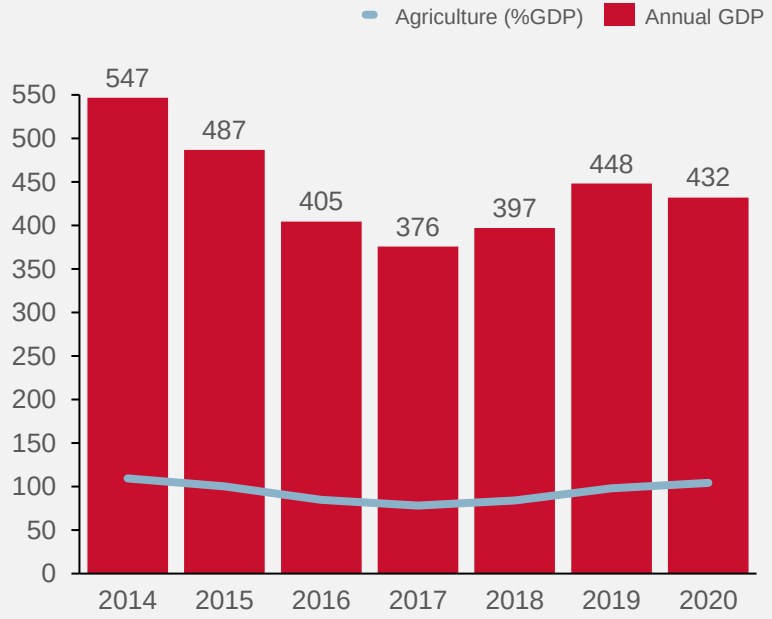
	Key challenges	Description	Implications[1]	Likelihood of alleviation
Macro-economic	• Nigeria is currently undergoing poor growth, which has been exacerbated by COVID-19 • Inflation has led to increased costs for agribusinesses	• **Efforts to diversify the economy from oil exports have not materialized for Nigeria as close to 90% of export revenues depend on oil leading to trade deficits and inflation** • The pandemic further slowed down growth by 4% between 2019 and 2020 and has led to increased unemployment	• Price increases for inputs such as tractors, seeds, etc. lead to lower access for SHF and could affect digitized input distribution	
Business and Investment	• There are limited investments in the agriculture sector • Corruption and unfavorable policies limit investment attractiveness	• **Funding in agriculture remains minimal especially at growth stages.** SHFs also experience high costs of borrowing with interest rates as high as 30% in banks. Several microfinances and agtech actors are pooling in financing but struggle to establish credit worthiness for farmers • **Land policies such as the Land Use Act complicate property ownership and tenure security is low due to informal land management and contracts in rural areas** • **Import bans and heavy fines have resulted in poor regional integration and significant costs for entrepreneurs and SHFs**	• Limited investments undermine agricultural productivity • Formalizing land contracts in rural areas can protect SHFs from livelihood losses • Restrictive policies are unattractive to investors and have led to revenue losses	
Security	• Insecurity has increased in the north and farmer-herder conflicts affect SHFs	• **Conflicts in the north and those arising from environmental degradation between farmers and herders have led to loss of lives and produce**	• Insecurity threatens SHFs' livelihoods and produce	
Digital and infrastructure	• Access to digital infrastructure and basic services such as electricity and irrigation are low • There is a need to increase digital ID coverage and provide cybersecurity and data protection policies • Inclusion of women is limited	• **Access to digital infrastructure is growing through government efforts but is still limited** (mobile ownership is at 50%, internet penetration is at ~ 32%, and 3G coverage is 78%) • **Access to basic infrastructure in the country is very poor** (55%) and a significant urban-rural divide exists. Irrigation is also lacking at 2% of total farmland • **Digital ID roll-out is nascent and fragmented.** Projects are underway to harmonize the system. **Cybersecurity and data protection laws are also lacking or poorly implemented** • Women are excluded due to entrenched patriarchal systems and cultural beliefs about gender roles which prevent them from engaging in the digital economy	• Low access to infrastructure limits the viability and uptake of digital solutions • A strong digital ID system can foster the growth of digital services and inclusion • Women's exclusion is a pressing concern as they represent the majority of SHFs	

Sources:1. Dalberg analysis

The agriculture sector has been resilient despite Nigeria's poor economic growth since 2015 and the adverse impact of COVID

Nigeria's annual GDP and agriculture contribution to GDP (2014 – 2020)

Annual GDP *(USD billion), Agriculture as % of GDP(%)*

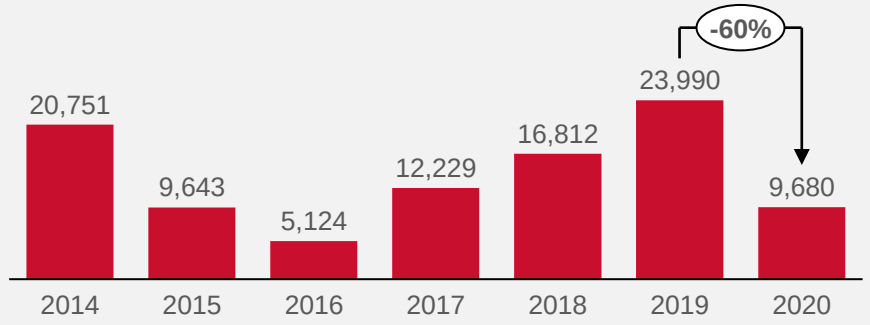


- **Nigeria has experienced a slow economic recovery from the 2016 recession.** Slow growth is a result of falling oil prices which went down from $97 per barrel in 2013 to $56 and $40 per barrel in 2020
- A contracting economy has led to revenue shortfalls as 90% of the country's foreign exports depend on oil. The impact has been felt in the form of slow job creation and declining per capita incomes that went down by 2.1% from 2015 – 2019
- **COVID-19 has also led to a deeper decline in GDP due to border closures, national restrictions, and a reduced demand for primary commodities.** This has aggravated unemployment and put additional pressure on vulnerable segments of the population**.** For example, unemployment was estimated at 27.1% during Q2 2020 and reached 33.3% in Q4 of 2020. The unemployment rate had already been rising by 4.5% from 2014 to 2018
- **The agricultural sector has shown resilience during the pandemic with an increasing number of people shifting to farming as a coping strategy.** The sector maintained 2.17% growth in 2020 and 10% more households moved into agriculture as a source of income in the 2020/2021 agriculture season

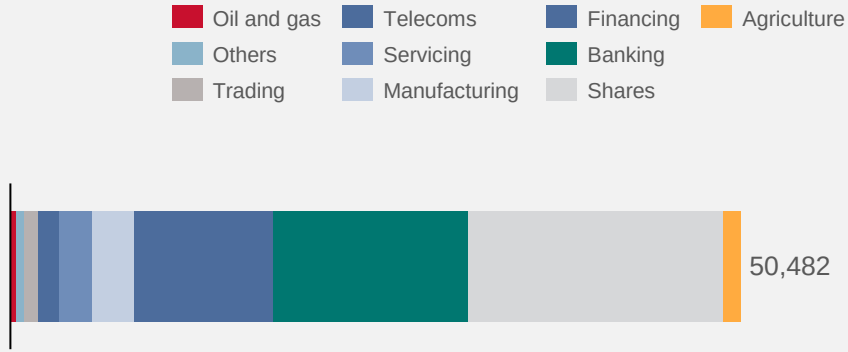
Sources:1.World Bank, Agriculture, forestry, and fishing, value added (% of GDP) - Nigeria", 2021. 2.The World Bank Group and IFC, Creating Markets in Nigeria ", 2020.3..4. UNDP, "The Next Frontier: Human Development and the Anthropocene – Briefing Note for Countries on the 2020 Human Development Report – Nigeria", 2020 NBS, 2020, "Labor Force Statistics: Unemployment and Underemployment Report (Q2 2020)", 2020

Agriculture has only received 2.5% of investments since 2018; current investor apprehension could reduce investments over time

Nigeria's annual capital importation (2014 – 2020)
Annual capital inflow *(USD million)*



Capital importation in Nigeria by sector (2018 - 2020)
Annual capital importation *(USD million)*



- Capital importations totaled $9.6 billion down 60% from their 2019 value, and **FDI inflows have also steeply declined in the last three years compared to other countries** (-48% between 2018 and 2019 vs. -22% in Ghana and -15% in South Africa)
- **The trend of decreasing investments is largely due to a reduction in portfolio investments** (-68.21% in 2020) as a result of **decreasing investor confidence.** Shares, banking, and financing have continued to account for the largest portions of capital importation and agriculture has contributed 2% to capital importations on average per year since 2018
- **The agriculture sector is likely to suffer from a decrease in capital raised** for SMEs as a result of declining investments

Sources: 1. NBS, "Nigerian Capital Importation: Q4 & Full Year 2020", 2021. 2. UNCTAD, "World Investment Report", 2020.2. Ibid.3. UNCTAD, "World Investment Report", 2020.

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Nigeria dominates the African market in terms of startup funding raised due to its vibrant digital entrepreneurship ecosystem

- **Nigeria has continuously ranked 1st in Africa in attracting equity funding for its startups**. The country ranked 1st in Africa for the highest value of equity funding raised in 2021 with a 21% share totaling $307 million. The Fintech sector attracted the most funding (53%) in 2020 down form 62% in 2019
- **Nigeria's strong entrepreneurship ecosystem is supported by a vibrant community of accelerators, angel investors and VCs** who provide mentorship and financing for new and existing ventures. Nigeria is now home to over 3,300 ventures, established unicorns such as Interswitch, and was the test bed for others such as Jumia and Flutterwave
- **In the past, the government has supported digital entrepreneurship by setting innovation hubs to serve as destinations for research, incubation, and development of new technologies**. Examples include the Abuja Technology Village and partnerships with partnerships with accelerators like iDEA (startup) and the Co-Creation Hub (CC-Hub) to attract prominent accelerators such as Y Combinator

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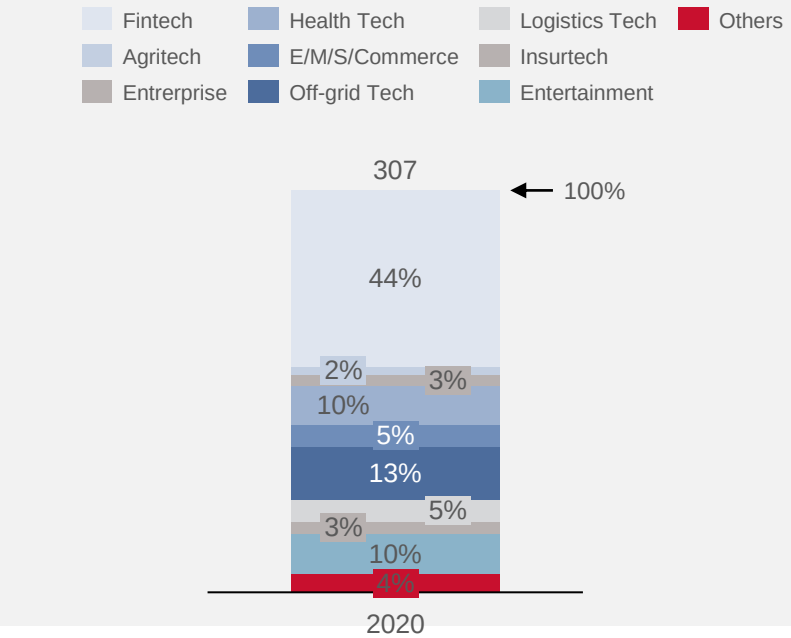
Sources:1. The World Bank Group, "Nigeria Digital Economy Diagnostic." 2019. 2. Partech "2020 Africa Tech Venture Capital Report",2020

However, ag-techs have only received 2% of start-up funding due to perceived higher risks and low returns

Equity funding for tech start-ups in Nigeria by sector (2020)
Amount of funding *(USD million)*



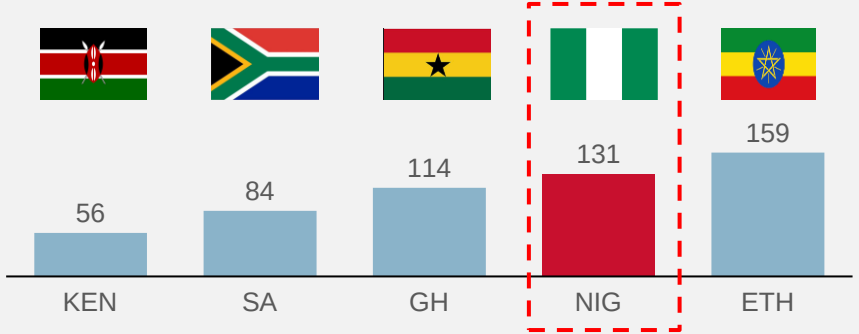
Ag-tech has attracted less than 3% of annual start-up funding in the last few years. Contributing factors include

- **Limited local sources of capital beyond early stages:** Most start-ups mostly rely on foreign sources of capital to grow. Bank lending to the agricultural sector accounts for 3.4% of total lending and interest rates can reach 30%
- **Very few institutional investors in the sector due to low returns and perceived risk.** Agriculture is considered a risky sector due to sup-optimal returns and the long time it takes to realize profits. VCs and other impact investors such as Acumen, GreenTec, Palladium, etc are investing in Nigeria but very few are involved in agriculture. DFIs also provide large-scale financing to de-risked ventures and very few opportunities exist that would tap into that kind of finance. An exception is Babban Gona that raised $4 Million in 2017
- **Inability to raise high amounts of financing.** Investments in Ag-tech have ranged from $4,000 to $1 million at the pre-seed and seed levels whereas the average investment in other sectors was $12.3 million in 2019 at the same levels

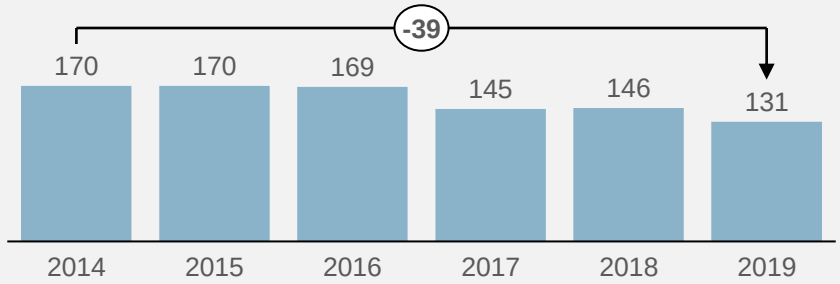
Sources:1.GSMA, “AgriTech in Nigeria Investment Opportunities and Challenges.“ 2020. 2. Partech “2020 Africa Tech Venture Capital Report”,2020

Nigeria has made improvements in the ease of doing business but will need to invest in better infrastructure to enhance agricultural growth

EODB Rank of Nigeria and peer countries, out of 190, (2019)



Nigeria EODB ranking, out of 190, (2014 – 2019)

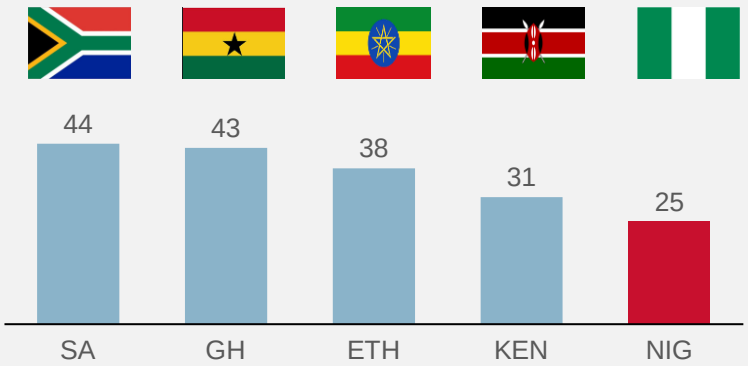


- **Nigeria has made a significant effort to increase its EoB through increasing credit information services and reducing the time needed to register businesses through online services.** Example of improvements include a 25% reduction in the time needed to open a business since 2010. Implication for agribusinesses include better access to road networks for Agri-logistics, and reduction in bottlenecks for accessing credit
- **However, the country is still behind many of its peer countries due to cumbersome taxation and cross-border trade procedures, as well as a lack of adequate infrastructure such as electricity that affect agribusinesses.** For instance, agro-processors are likely to suffer from revenue losses through lack of reliable electricity and bureaucratic costs to obtain permits, etc.
- There are sub-national differences across states. Kaduna, Enugu, Abia, Lagos, and Anambra have made the biggest strides towards better practices. Conversely, Cross River, Gombe, Nasarawa, and Zamfara worsened their EoB due to increased court fees and permits requirements

Sources:1. The World Bank Group, “Doing Business 2020, Comparing Business Regulation in 190 Countries”, 2020. 2. The World Bank Group, “Doing Business in Nigeria”, 2020. 3. The World Bank Group, “Doing Business in Nigeria, 2018”

Corruption undermines development by diverting funds that could support agribusinesses and access to basic services

Corruption perception index (CPI) score, 2020
Out of 100



The corruption index scores 180 countries and territories based on their perceived levels of public sector corruption according to citizens, experts and businesspeople in a country. **On this Index, 100 is very clean and 0 is a highly corrupt public system.**

- **Corruption is still high in Nigeria compared to other countries** with 44% of public service users reporting paying a bribe in the last 12 months in 2020
- **Another study estimates that MSME-related corruption has taken $1 billion from Nigerian state revenues between 2014 and 2018** which exceeds Nigeria's capital expenditure on health and education in the same period
- Pervasive corruption erodes trust from investors by making it harder to predict business costs that are often higher as a result
- **Smallholder farmers and agribusinesses are also affected by significant bribes that hinder their profitability.** For instance, a recent Dalberg survey showed that in some instances, drivers who carry agriculture goods paid 10-20 bribes to pass through checkpoints
- **Vulnerable segments of the population are also affected by embezzlements that divert funds from projects that could improve access to services such as healthcare and education**

Sources:1. Transparency International, “Annual CPI report”, 2020. 2. Mathew T. Page, Celestin Okeke, Carnegie Endowment for International Peace, “Stolen Dreams: How Corruption Negates Government Assistance to Nigeria’s Small Businesses”, 2019. Dalberg Interviews, 2020

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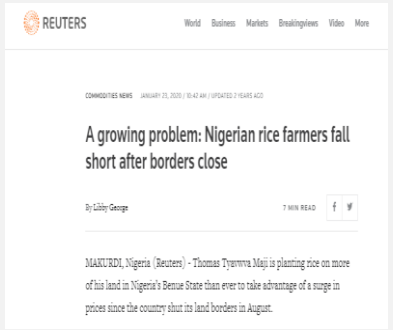
Several government policies have raised costs for agribusinesses and SHFs and have driven uncertainty on doing business in Nigeria


REUTERS

World Business Markets Breakingviews Video More

A growing problem: Nigerian rice farmers fall short after borders close

By Libby George

MAIKURDI, Nigeria (Reuters) - Thomas Tyerwva Maji is planting rice on more of his land in Nigeria's Benue State than ever to take advantage of a surge in prices since the country shut its land borders in August.


Bloomberg

Markets

Dollar Ban for Wheat May Add to Nigeria Food Scarcity

By Tope Ajake

April 21, 2021, 1:25 PM GMT+2 Corrected April 22, 2021, 8:04 PM GMT+2


africanews.

NEWS

ECOWAS countries seek solutions to Nigeria's border closure


BBC NEWS

Why Nigeria has restricted food imports

- Import bans and heavy taxation have affected agribusinesses by raising the cost of inputs and making it hard for them to operate. Some businesses have had to halt operations due to inability to import inputs. For example, some tomato paste producers shut down as they could not procure glass containers for their products. Resulting high prices have also increased food insecurity with prices of products like rice rising to 67% of the minimum wage
- Externally, import bans have undermined Nigeria's regional and international integration. Countries like Cote D' Ivoire have filed complaints for violations of ECOWAS treaties. Other neighboring economies such as Benin have also issued statements on the negative impact that import bans have had on their economies. These protectionist policies present an unclear picture of how Nigeria will participate in boosting intra-African trade through the AFCTA
- Nigeria has imposed other sets of restrictive policies that are unattractive for investors. For instance, heavy fines on telcos have at times reached $5.2 bn and have led to a market reduction of 12 million subscribers in Q1 2021 due stringent policies on SIM card registrations. These policies have caused revenue losses and are deterring the growth of digital economy service providers

Sources:1. Volker Treichel, Mombert Hoppe, Olivier Cadot and Julien Gourdon, The World Bank Group, "Import Bans in Nigeria Increase Poverty", 2012. Libby George, „A growing problem: Nigerian rice farmers fall short after borders close", 2020.

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Inconsistent land policies complicate land tenure for SHFs and deter land-focused investments

Nigeria's land system is mainly governed by two laws, but consistency and formalization of land administration is a challenge across states…

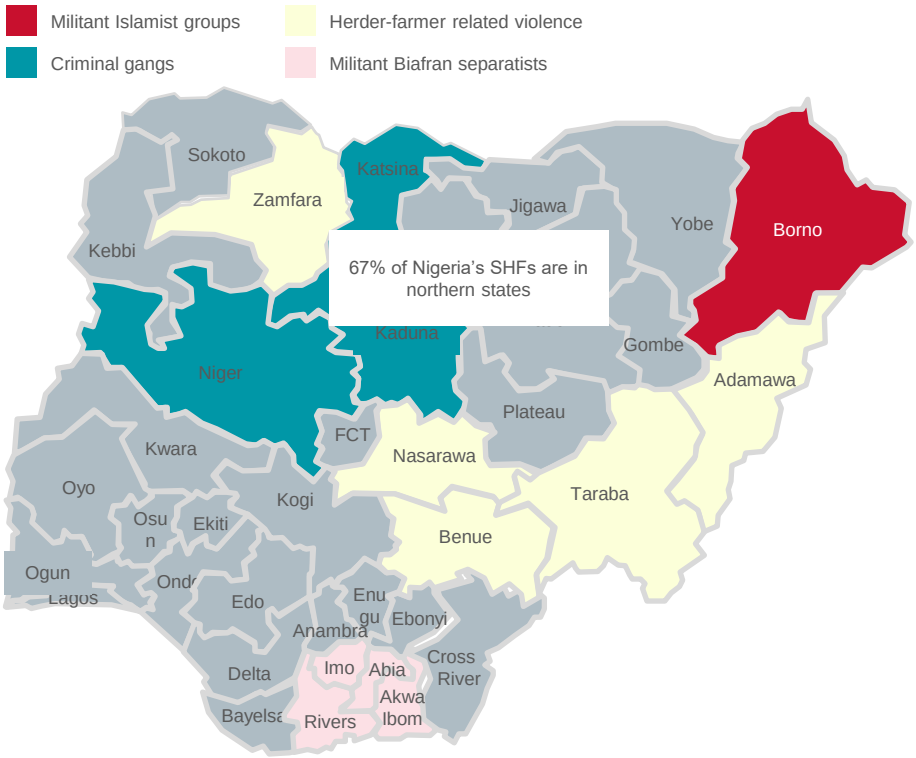
- **The Land Use Act (LUA) of 1978–** incorporated in the constitution in 1999, the act regulates land ownership, rights and transactions
- **The Urban and Regional Planning Act –** decree 88 of the act enacted in 1992 provides a framework for land management
- **Religious and traditional land practices co-exist with federal regulations and thus complicate land administration across states**
- **Informal land markets are prevalent.** Informal land transactions hinder states efforts to collect revenues, and jeopardize land tenure and investments
- **The lack of geographic mapping systems and data collection systems limits project development as there is relatively scare information on land topography**

… this adversely impacts SHF's land tenure, deters land investments, and increases likelihood of land-based conflicts

- **The Land Use Act is cumbersome for property ownership particularly for SHFs**. It places the government as custodian of all land in Nigeria which complicates title ownership and compensation in case of expropriation. Nigeria occupies the 179th position in the ease of registering land compared to Botswana (81st), South Africa (107th) and Ghana (119th). Lengthy procedures to obtain proof of registration and authorization to transfer rights also increase costs for investors and SHFs
- **Tenure security is low.** Ownership in rural areas is mostly enacted through informal customary laws and transactions which endanger property rights for SHFs. This affects farmers appetite to invest in on-farm infrastructure such as mechanization
- **Inconsistent policies exacerbate land disputes and food insecurity.** 85% of the rural population in Nigeria are farmers. Limited access to land and contract breaches threaten livelihoods and worsen land disputes

Sources:1. Isaac B. Oluwatayo, Omowunmi Timothy and Ayodeji O. Ojo, "Land Acquisition and Use in Nigeria: Implications for Sustainable Food and Livelihood Security", 2019. 2. The World Bank Group and IFC, "Creating Markets in Nigeria", 2020. The New Humanitarian, " Who Owns the Land?", 2007

The security situation in the country is on the decline, as violence is increasing notably in the north where the majority of SHFs are located



- Violence has increased in different parts of the country with the insurgence of terrorists' groups such as Boko Haram that have claimed 6,998 lives from 2018 -2020
- **Farmer-herder conflicts due to environmental degradation and grazing challenges have led to significant losses for farmers who have lost their lives and produce.** The crisis has taken 3600 lives between 2016 and 2018
- Militant Biafran separatists have also caused unrest in the southeast in the past few years leading to hundreds of lives lost
- **Other sources of violence include crimes committed by the Special Anti-Robbery Squad that was disbanded in 2020** country-wide protests against police brutality
- These conflicts have led to a total of 80,542 cumulative deaths since 2011[3]

Sources:1. Council on Foreign Relations, "Nigeria Security Tracker", 2020. 2. International Crisis Group, "Stopping Nigeria's Spiraling Farmer-Herder Violence", 2018. 3. Council on Foreign Relations, "Nigeria Security Tracker", 2020.Note: Map was retrieved from the Council on Foreign Relations Website

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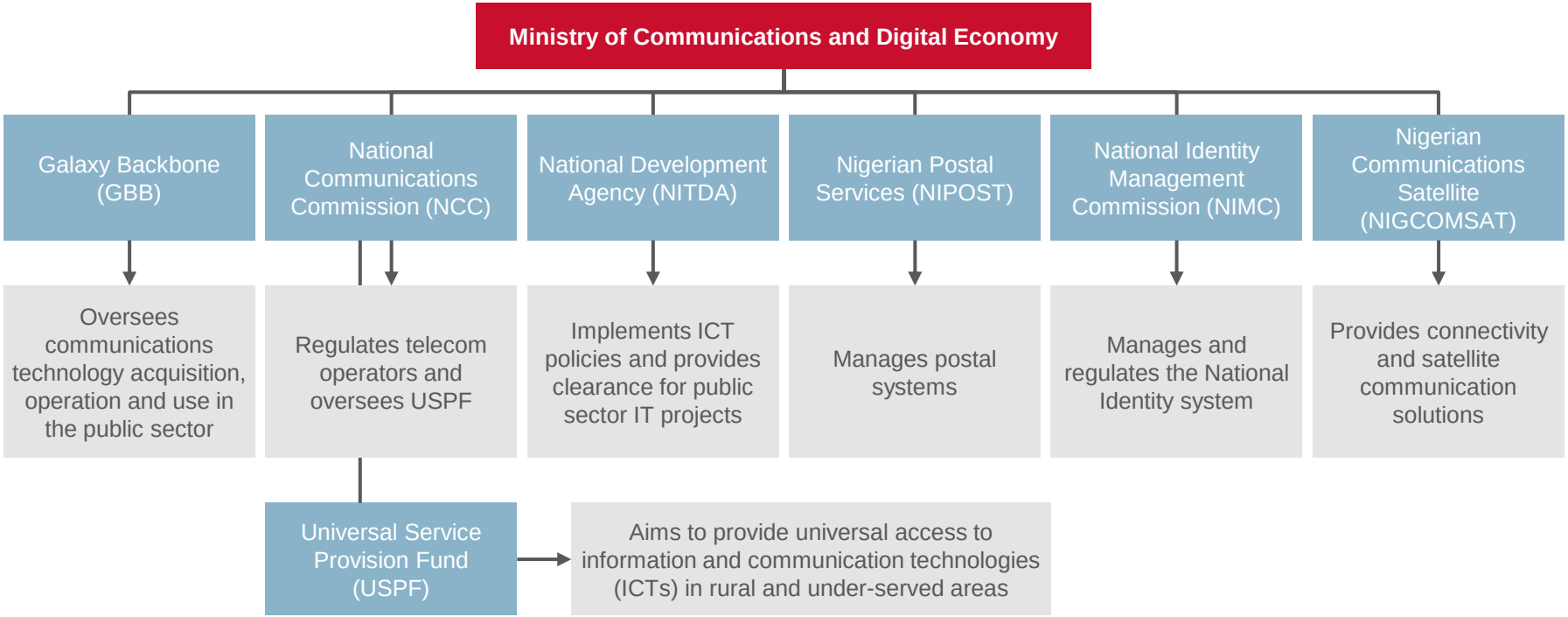
Nigeria has established a robust and complex institutional ecosystem to oversee and promote the development of ICT

Current framework for ICT regulation in Nigeria



Sources: Ministry of Communications and Digital Economy in Nigeria

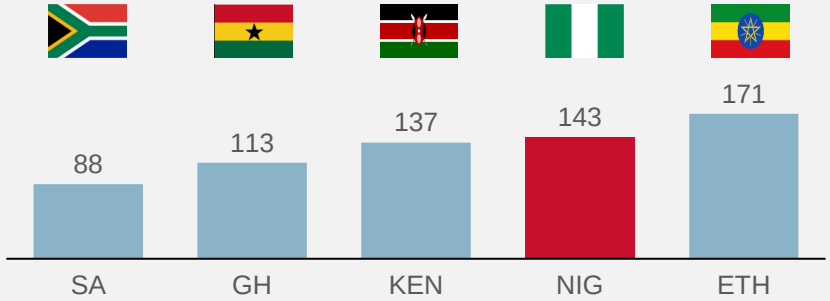
This has led to strong policies for digital infrastructure with a focus on reaching rural areas, but is still lags behind peer countries

Supporting policies

Several policies have been enacted to promote the development of ICT. Examples include:

- **The National Digital Economy Policy and Strategy (2020-2030)** aimed at transforming "Nigeria into a leading digital economy providing quality life and digital economies for all"
- Nigeria launched **the National Broadband Plan for 2020-2025** designed to deliver faster download speeds across rural and urban areas and to extend coverage to at least 90% of the population by 2025
- **Nigeria ICT Innovation and Entrepreneurship Vision (NIIEV)** released in 2018 to achieve three goals by 2025: (I) 95% access to broadband Internet; (ii) 75% digital literacy rates; and (iii) ICT to contribute 25% of GDP

ICT development index ranking, 2017
Global ranking out of 176 countries



Nigeria is behind peer countries on the ICT development index due to poor quality of service and low broadband penetration:

- National fixed line infrastructure is underdeveloped with fixed broadband penetration at 0.04%
- National fiber optic networks are limited, and quality of service is poor
- Nigeria lacks a national backbone to extend high-speed connectivity to the entire country especially rural areas

Sources:1. The World Bank Group, "Nigeria Digital Economy Diagnostic." 2019. 2. Partech "2020 Africa Tech Venture Capital Report",2020

Enabling platforms that connect infrastructure with apps & services have grown, but digital ID systems and cybersecurity need to develop

National digital ID system

- **Nigeria's national ID 's coverage is low.** Coverage of unique ID in Nigeria was at 38 % in 2018 and < 1% had ID cards in 2017
- **The current legislative process of obtaining IDs is fragmented.** Over 13 government agencies offer ID services and 3-4 more at the state level. This has led to duplicative and cost-ineffective efforts to register biometric information
- **The FDN and NIMC issued a strategic roadmap approved in 2018 to harmonize and develop a national digital ID system.** The World Bank invested $433 million into the project that expects to register 100 million Nigerians by 2022

Digital payments systems and e-commerce

- **There has been increasing momentum in the use of e-payment platforms through regulation such as the National Payment Systems Vision 2020.** E-payment channels have recorded over 1.9 trillion transactions in 2018 (+40% from 2017)
- **Increased interventions to deepen digital financial services especially in rural areas.** The government created regulation to provide Payment Service Bank (PSB) licenses to MNOs. The Banker's Committee also created a Shared Agent Network Expansion Facilities (SANEF) to create 500,000 new agents by the end of the 2020, with a focus on rural areas

Cybersecurity and data protection

- **Nigeria currently lack s a Privacy and Data Protection Act which limits the growth of e-businesses and data-driven systems**
- **Gaps in cybersecurity pose a threat to digital businesses through possible identity theft, misuse of government data, etc.** Nigeria developed a Cybercrimes and Cybersecurity Act in 2015 but reviews of implementation revealed gaps in enforcement

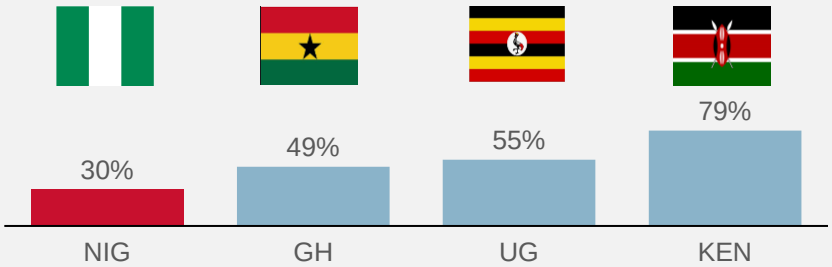
Interoperability

- **Nigeria has developed robust interoperable infrastructure for digital payments.** The CBN created central infrastructure that has allowed interoperability between financial providers. As a result, all ATMs, POS terminals, and mobile money agents are interoperable
- **Despite progress in DFS interoperability, it is still nascent in the public sector.** The government has created a shared services platform "1gov.net", but still needs to expand data sharing

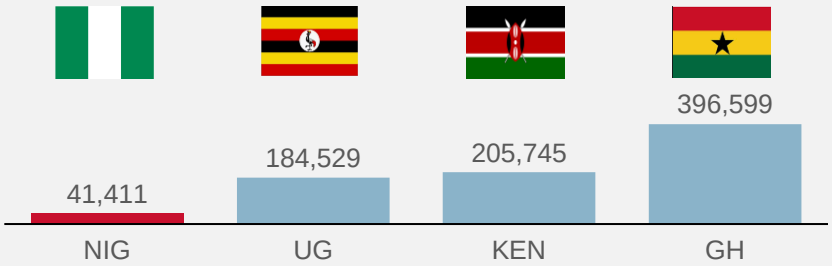
Sources:1. The World Bank Group, "Nigeria Digital Economy Diagnostic." 2019. 2. Chris Burt, "Nigeria to receive $433M from World Bank for biometric national ID registration", 2019. 3. Ayang Mcdonald, "Nigeria directs NIMC to speed up biometrics enrolment for digital identity", 2020

Despite progress in developing digital financial services, cumbersome regulations have slowed financial inclusion for SHFs

Usage of digital financial services in Nigeria and peer countries (2017) Percentage (%)



Number of registered Mobile Money outlets (2018)



Nigeria has not successfully tapped into DFS's potential for financial inclusion notably through the use of mobile money services despite high interoperability and a vibrant fintech sector. Contributing factors include:

- **Recent regulations to approve MNOs to provide mobile money services including credit and savings have been slow**. The CBN issued regulations to allow MNOs to apply for a license to become payment service banks only in 2018. However, despite all major MNOs applying for licenses in 2020, only Glo and 9 Mobile Networks had been awarded an agreement in principle (AIP) by March 2020. Slow adoption has ensued with only 1.7% of the population using mobile money
- **Mobile money has not successfully expanded inclusion due to a lack of awareness and low penetration in rural areas where the majority of SHFs are located**. According to a recent survey by EFInA, the majority of mobile money users already own bank accounts and only 0.3% of users have mobile money wallets only. More than 85% of their survey respondents also cite a lack of awareness around mobile money services

Sources:1. The World Bank Group, "Nigeria Digital Economy Diagnostic." 2019. 2. EFInA, "EFInA Access to Financial Services in Nigeria 2018 Survey", 2018 2018 Survey. 3. IMF Data," Number of Registered Mobile Money Agent Outlets", 2018.

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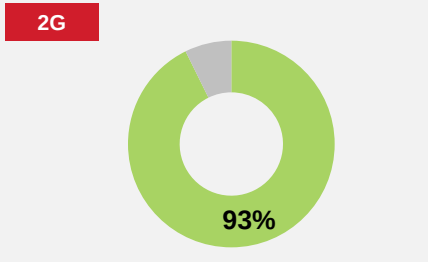
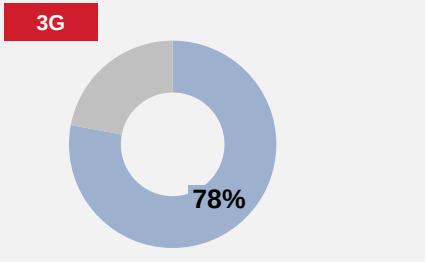
The country has made impressive progress to increase access and affordability of digital infrastructure, but rural and gender gaps exist

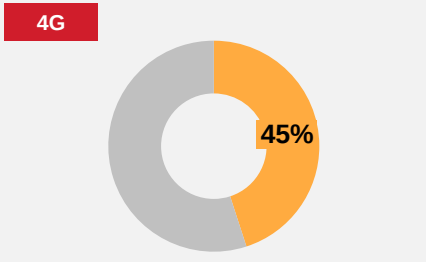
2G coverage, 2019



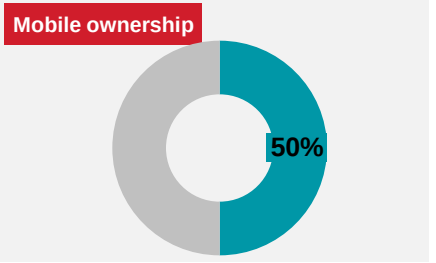
3G coverage, 2019



4G coverage, 2019



Mobile ownership, 2019



- **Nigeria has made considerable progress in expanding digital infrastructure**.The country was the most improved country in sub-Saharan Africa in the Mobile Connectivity Index and 7th improved globally in 2019. 3G coverage reached 78% in 2019 and 4G coverage was at 45% since its inception in 2016
- **Nigeria has also made important strides to make internet and mobile handsets more affordable**. The country has one of the most affordable mobile handsets in the world costing 12% of monthly GDP per capita from 42% in 2017 – the cost of 1 GB has also decreased from 3.3% to 1.71% of monthly GDP as of 2020, a number that is below the international affordability threshold of 2%
- This progress has led to increased smartphone adoption among adults from 28% in 2017 to 44% in 2019. Mobile internet adoption also doubled from 16% to 32% in 2019 and mobile ownership was slightly above 50% in 2019. Nigeria has also developed a competitive telecommunication sector with four mobile network operators namely MTN, Globacom, Airtel, and 9Mobile
- **Despite progress, rural gaps and gender gaps remain**. **31.6 million people living in rural areas do not have access to broadband across 114 clusters mostly located in the north. High internet use is prevalent in Lagos, Oyo, Ogun, Kaduna, Kano and Abuja while Ekiti, Ebonyi, and Bayelsa have low usages**. Gender gaps also persist with 29% less women using the internet and 7% less owning mobile phones

Sources: 1. GSMA, “The State of Mobile Internet Connectivity 2020”, 2020. 2. The World Bank Group, “Nigeria Digital Economy Diagnostic Report”, 2020. 3. GSMA, “ Connected Women: The Mobile Gender Gap Report 2020,” 2020. 3. USPFF, “ Clusters of ICT/Telephony Gap in Nigeria”, 2019. 4. Richard Adeleke, “Digital Divide in Nigeria: The Role of Regional Differentials”, 2020.

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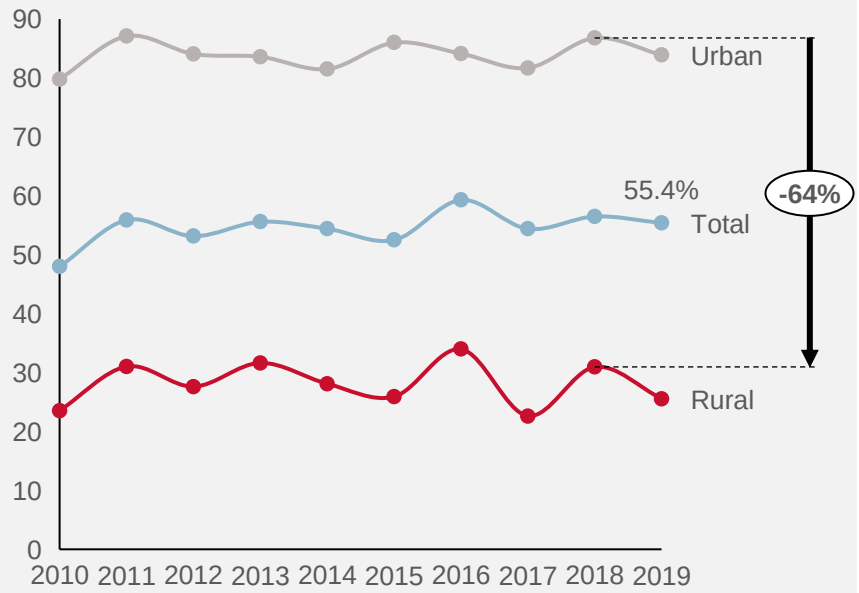
Electricity infrastructure is still underdeveloped and remains out of reach for 85 million Nigerians with a significant rural-urban divide

Access to electricity, % of population, 2010 – 2019
Percentage (%)



- **Access to electricity is higher than SSA's average of 47% in 2019, but has experienced meager growth** (~ 1%) over the last 10 years compared to SSA's average growth of 4% due low investments in upgrading and developing new infrastructure
- **Electricity access is low and connected businesses and households experience numerous outages**. Grid access was at 67% in 2020 and 85 million Nigerians are not connected. For the connected, power outages can be as frequent as 30 times/ month lasting an average of three hours
- **Expanding digital solutions to SHFs is limited by a significant urban-rural divide in electricity (64%)**
- **Lack of consistent power supply and grid access is a major barrier for investors across various sectors.** 48% of businesses cite inadequate access to electricity as a significant constraint to doing business compared to 25% in Kenya and 15% in South Africa
- **Ramifications include increased operating expenses and lost revenues**. Power outages are estimated to cause annual economic losses of $26.2 billion equivalent to ~ 2% of GDP

Sources:1. The World Bank Group, "Nigeria to Improve Electricity Access and Services to Citizens." 2020. 2. The World Bank Group Data, "Access To Electricity, Rural (% of Rural Population), Nigeria", 2021, GSMA, "Agritech In Nigeria Investment Opportunities And Challenges", 2020.

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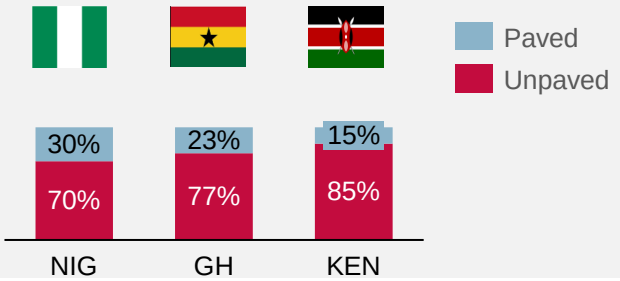
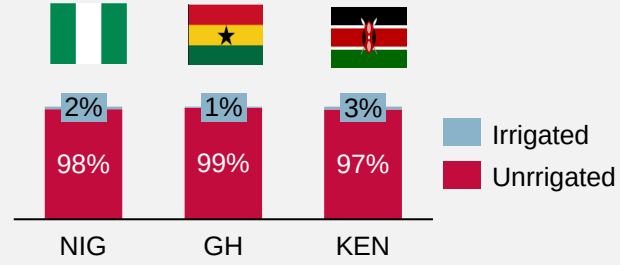
Other infrastructure challenges remain such as lack of irrigation, roads, and logistics services that are lowering productivity for SHFs

Road network, paved vs. unpaved, 2019
Percentage (%)



Irrigated arable land, 2019
Percentage (%)

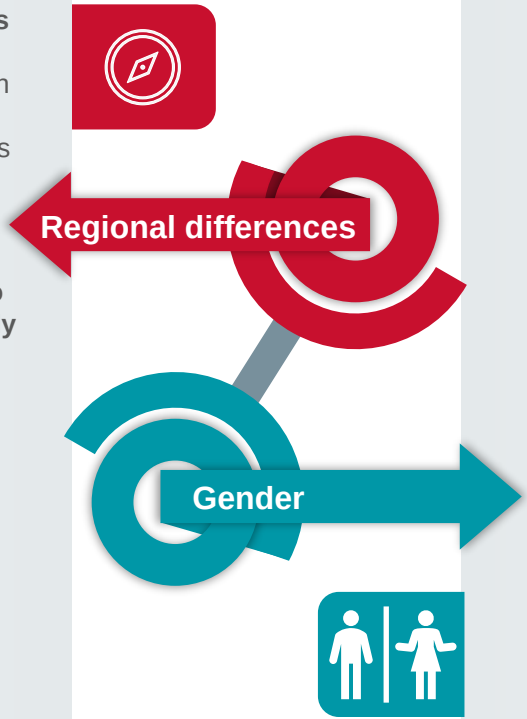


- **Current investments in infrastructure are insufficient**. Nigeria invests about $6 billion annually in infrastructure equivalent to 1.4% of GDP compared to Ghana 7.5% and South Africa 4.3%. The World's Bank estimates that $14.2 billion are needed to fill current gaps
- **Lack of quality transportation complicates logistics and accessibility.** Despite a greater paved road network than Ghana and Kenya, only 30% of roads are paved and most roads are in rapidly deteriorating conditions.
- **Traffic delays at ports affect importers, exporters, and other value chain actors by increasing haulage costs and causing losses of perishable goods**. According to an estimate by The Oxford Business Group, average annual losses of agricultural products and perishables due to port handling were $10 billion in 2018
- **Post-harvest infrastructure is low** with less than 40% of farmers having access to post-harvest infrastructure such as warehouses and storage
- **Access to irrigation infrastructure in the country is minimal limiting yields and revenues for smallholder farmers.** Only 2.2% of farming plots in Nigeria are irrigated compared to Kenya 3% for instance. More affected areas include the North-central (1.3%), South-east (1.1%), South-south (0.8%)

Sources:1. NBS, "LSMS integrated surveys on agriculture Nigeria general house survey panel, wave 4", 2019. 2.Federal Ministry of Water Resources, Government of Nigeria, NBS, and UNICEF, "Water, Sanitation and Hygiene: National Outcome Routine Mapping Exercise", 2020.3. Department of Statistics of South Africa, "Public-sector Infrastructure Investment Falls for a Third Year", 2019. 4. The World Bank Group, "Ghana's Infrastructure : A Continental Perspective", 2021. Ghana Web, "It's a Shame that Only 23% of Our Roads are Unpaved, Roads Minister", 2019. 5. Kenya National Highways Authority 6. Knoema. 7. Dalberg Analysis

Digital services need to be adapted to complex socio-economic contexts and aim to reduce inequities

- **North and southern states are unequal in terms of socio-economic development.** 42% of adults in the north have no education compared to 13% in the south. A study by the Center for Global Development estimated that spending per citizen is more than twice as high in the south than in the north
- **Digital programs should consider bridging the gap in terms of which populations they seek to serve and ensure that their programs are widely accessible**



- **Entrenched patriarchal systems disenfranchise women and create barriers that can prevent women from taking advantage of opportunities such as education.** Women are more likely than boys to not finish primary school (+20%) and marry early. For instance, less than 4% of men at age 20 are married compared to 50% of women in rural areas.
- **Perceived gender roles and cultural beliefs also affect the ability of women to engage in the digital economy.** A recent survey by the Centre for Information Technology and Development (CITAD) showed that 55% of men in Northern Nigeria do not want their wives to use the internet, and 61% of fathers discourage their daughters from using the internet
- **A gender-sensitive approach is thus critical to alleviate inequities and address cultural barriers as women SHFs are affected by stringent cultural dynamics**

Sources: 1. Zuhumnan Dapel, Center for Global Development, “Poverty in Nigeria: Understanding and Bridging the Divide between North and South,” 2018. 2. Equal Access International, “Tech4families: Addressing The Gender Digital Divide,”2018.

OUTLINE

- Introduction
- Executive summary
- Overview of agriculture in Nigeria
- Enabling environment
- **Smallholder needs and capabilities**
- Solutions landscape
- Opportunity areas
- Annex

Smallholders have low access to digitally enabled solutions, but have demonstrated a willingness and ability to adopt solutions that aid

	Summary of findings	Implications
1 Farmer profile	• **Three quarters of the smallholder farmers live below the poverty line with incomes of less than $2.50 a day**, despite accounting for nearly 90% of the country's agricultural output, and nearly all the food consumed	• Farmers have many competing interests for their resources; hence product offerings need to make clear compelling cases for investment
2 Access to financial & non-financial solutions	• **Farmers have limited access to inputs.** Reasons include illiteracy, counterfeits, and lack of timely information • **Farmers access financial services primarily through informal farmer groups**	• Farmer groups serve as a strong entry point to reach farmers, as they already provide a range of services to farmers
3 Ability to adopt digital solutions	• **Farmers have high basic phone ownership,** however smart phone ownership, and digital literacy levels are low • **One third of Nigeria's population is considered financially vulnerable and has low financial capability**	• Digital solutions targeting farmers will need to be simple and based on USSD text • Training is required to bridge the knowledge gap for the adoption of digital solutions among the farmers
4 Willingness to adopt digital solutions	• **Smallholder farmers are willing to adopt solutions from providers they trust** and whose business models align with their needs and capabilities	• Success of any program or digital solution is dependent on the ability to win the trust of the farmers and match their needs and capabilities

Smallholder farmers dominate Nigeria's production, accounting for ~90% of country's agricultural output

- **More than 80% of farmers in Nigeria are smallholder farmers and account for 90% of country's agricultural output.** 43% of the SHFs own less than a hectare of land, on which they predominantly manage mixed crop-livestock systems, which also includes fish farming
- **Approximately 73% of the SHFs live in poverty with incomes of less than $2.50 a day.** 55% of an average farmers' annual income is earned from agricultural activities, of which crop production accounts for 49% and livestock adds the remaining 6%. The rest is drawn from other income sources
- **Most of the smallholder houses are headed by men with less than 5 years of education, who are also the key- decision makers**. Men made over 60% of all the decisions on agricultural activities among smallholder households

13% of smallholder households are female led

2% of the arable land of a smallholder is irrigated

81 % of the SHFs have voter's card for identification

72% of smallholder farmers own a basic phone

6% of the SHFs have access to extension services

66 % of the of SHFs rely on family labour

Source: FAO, Small Family Farms Country Factsheet, 2020; CGAP, National Surveys of Smallholder Households,2019: Mgbenka, R. N., and E. N. Mbah, A Review of Smallholder Farming in Nigeria: Need for Transformation,2016; PwC, Current State of Nigeria Agriculture and Agribusiness Sector, 2020

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Smallholder farmers lack access to quality inputs, knowledge on best farming practices and ready markets

Smallholder farmers' needs	Inputs	Agronomic information	Market access
	SHFs' relatively low yields have been driven by limited access to: • **Seeds**: SHF use self-propagated seeds which produce lower yields and are less suited to agro-climatic conditions. 90% of the seeds SHFs use are obtained informally or saved • **Tools/machinery**: Inadequate digital integration amongst SHFs limits their ability to scale, increase productivity, and income. Only 16.2% of the SHFs have access to agricultural machinery • **Land**: The undocumented and opaque land policies and rights with limited options for recourse has led to fraudulent activities regarding land purchases	SHF often exercise unproductive practices due to insufficient information on: • **Agronomic techniques**: Only 6% of SHFs access to extension services needed to acquire efficient farming techniques • **Weather conditions**: SHFs are unable to deal with irregular weather patterns caused by climate change. 40% of SHF cited weather related events as the greatest risks to their agricultural activities	SHF lack access to market linkages due to limited access to: • **Storage**: SHFs lack access to proper storage leading to post-harvest losses. 78% of the farmers store their crops after harvest, with 54% doing it at home • **Logistics**: Poor road and distribution networks limit the ability of the SHFs to connect to off-takers. As a result, 87% of the crops produced is consumed within the household with very little traded • **Ready off-takers**: SHFs lack ready buyers for their harvest. Only13% of the SHFs have a contract to sell their crop or livestock

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Mgbenka, R. N., and E. N. Mbah, A Review of Smallholder Farming in Nigeria: Need for Transformation, 2016

Smallholder farmers have limited access to land titles, well-funded extension services, and developed market linkages

	Inputs	Agronomic information	Market access
Current access	• **Fertilizer usage among SHFs is relatively high**. 44.5% of SHFs use fertilizers on their crops • **Only 46% of arable land is cultivated, and farmers have no title to 95% of agricultural land**, which impedes them from obtaining finance or investing in improvements	• **SHFs most frequently turn to their families, friends, and communities for information** on their agricultural activities • **Only 2% of the land used by SHFs is irrigated,** with most farmers relying on rain-fed agriculture yet 67% of SHFs have access to enough water	• **Most smallholder farmers i.e., 86% sell directly to the public usually at a local market**, with only 14% having sold to a regional market • **Only 13% of SHFs have a contract with an off-taker** who buys their crops and livestock • **30% are unable to get competitive prices** due to lack of transportation
Key barriers	• Limited expertise among SHFs to distinguish quality inputs • Limited research conducted on input varieties • Importation ban on inputs has limited access to inputs • Under customary law, women rarely inherit land and typically cannot obtain land rights	• Extension services are underfunded resulting in inadequate workers and resources • Lack of prioritization of women by extension programs resulting in a technical skill gap between men and women	• Under-developed market linkages between the various parts of the value chain • Inadequate trade corridors between production regions and processing zones and/or retail markets • Limited bargaining power due to fragmentation and information asymmetries with brokers

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Mgbenka, R. N., and E. N. Mbah, A Review of Smallholder Farming in Nigeria: Need for Transformation, 2016; FAO, Small Family Farms Country Factsheet, 2020

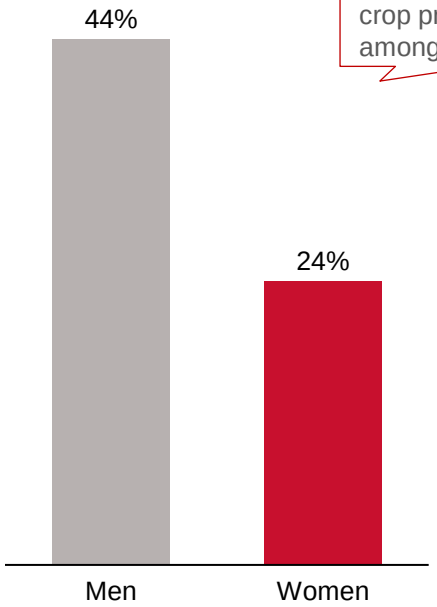
Additionally, smallholders in prioritized value chains faced unique challenges based on the crop, and its geography

	Cassava	Ginger	Sorghum	Rice	Maize
Crop factors	• **Limited access improved cassava seeds.** SHFs have limited access to new cassava cuttings with majority forced to recycle seedlings resulting in lower yields • **High post harvest losses**. SHFs have limited access to storage facilities for the **highly perishable cassava roots** i.e., recording up to 40% loss	• **Limited access to land.** For high yields, farmers need to change plots annually. Most smallholder farmers do not have access to enough land to practice this, especially women	N/A	• **Limited access to irrigation services:** SHFs have limited capacity to deal with the prolonged droughts which lowers their rice yields. Rice requires about 1200 - 1600 mm of rainfall , which is no longer available with the irregular rainfall patterns	• **Limited knowledge on aflatoxins contamination.** SHFs have limited capacity to address aflatoxin contaminations**.** IITA estimates that up to 60% of maize produced in Nigeria may be aflatoxin contaminated
Non-crop specific factors	• **Security risks.** SHFs in Benue state, a key cassava producing region, have reported increased conflict with herders disrupting their farming activities	• **Security risks**. SHFs in Kaduna state, where most ginger is most produced, have previously fled their farmlands due to attacks from herder, bandits and Boko Haram	• **Security risk.** Resurgence of Boko Haram activities in the major sorghum producing region is expected to limit area harvested with many farmers dislodged and access to farms risky	N/A	N/A

Source: "PIND, "Cassava Value Chain Analysis in the Niger Delta," 2011; Dalberg analysis ; Achie, B., Local Government Areas of Nigeria, 2019 Ibrahim, A., Ginger Farming Practice in Jaba Region, Kaduna State, Nigeria, 2018; Johnson, Ginger Farming in Nigeria: A Complete Guide, 2018; CBI, Value Chain Analysis Nigeria Ginger, 2020; African Studies Center Leiden, Sorghum Value Chain Nigeria-Explorative Study, 2020; KPMG, "Rice Industry Review", 2019, Future Agricultures, "The Political Economy of the Maize Value Chain in Nigeria", 2021; USAID, "Nigeria Maize Value Chain Analysis", 2012 Stakeholder interviews

Women face unique challenges; they have lower employment rates, and often dominate the lowest paying roles

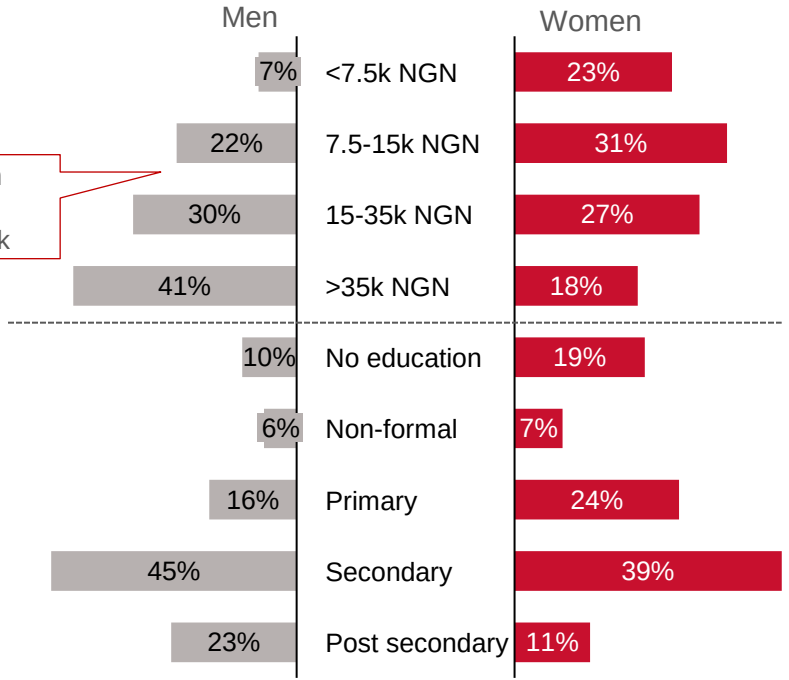
Employment in agriculture
% employed in agriculture 2019



Female contribution to crop productions ranks among bottom of SSA

Female wages are on average 77% of male wages for similar work

Income and education levels by gender



Sources: EFInA Access to Financial Services in Nigeria 2020; EFInA, Assessment of Women's Financial Inclusion, 2019; The Human Account Data; World Bank, Leveling the Field, Improving Opportunities for Women Farmers in Africa, 2014; CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018 World Bank, Gender Data, 2020; Dalberg Analysis

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Female farmers specifically face pronounced challenges around access to productive assets and resources

Women smallholder challenges and needs

Lack of access to land	• **Land ownership among women farmers is low primarily due to cultural and social barriers**: Under customary law, women rarely inherit land and typically cannot obtain land rights on their own. Oonly 34.4% of women nationwide own land compared to 61.4% of men. The outright purchase of land amongst agriculture households is low with only 4.3% of female-managed land being acquired through this method
Lack of access to finance	• **Most of the women remain financially excluded despite having financial need and ambitions.** Only 39% of Nigerian women have access to formal accounts compared to 51% of men. A study by EFInA established that low levels or income, education, and trust in FSPs accounted for 60% of the exclusion. Women in the North are more excluded that those in the South. i.e., 57% compared to 18%, with lower educational levels and income
Skills gap	• **Lack of technical skills makes it more difficult for women to capture value and excel in the sector.** Women lack time to engage in training activities given competing household demands. Due to religion and cultural norms, women hardly leave the house. Service providers noted difficulty in accessing women for some of their extension programs given that their husbands or sons are often the main point of contact
Lack of access to digital tools	• **Women have lower levels of digital literacy which creates a barrier in their adoption of digital solutions.** 60% of the women smallholder farmers are considered to have low digital literacy. In some communities, women have little agency or autonomy in phone acquisition due to control exerted by male family members

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Mgbenka, R. N., and E. N. Mbah, A Review of Smallholder Farming in Nigeria: Need for Transformation, 2016; FAO, Small Family Farms Country Factsheet, 2020

This is driven by limited agency, as well as institutional barriers around the law and cultural norms

Lack of agency

Decision making

- **Few women play an important role in decisions regarding agricultural activities.** Most decisions are made by men only and, in fewer instances, jointly by husband and wife**.** Only 13% of the SHFs households are female-led. Over 60% of the decisions regarding agricultural activities within SHFs households are made by men

Root causes

Cultural barriers

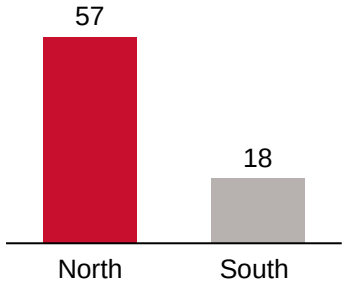
- Men often privilege customary law over statutory law: some customary laws forbid women from owning land, granting them access only to their husband's property, which they lose if he dies or divorces them; other customary laws do not allow women to inherit land from dead fathers or husbands (such restriction is prevalent in the eastern part of Nigeria)
- Female agricultural landowners can be charged up to 3-4x more for labor than their male counterparts
- In addition, male family members tend to seize land from widows upon the death of their husbands

Regulatory barriers

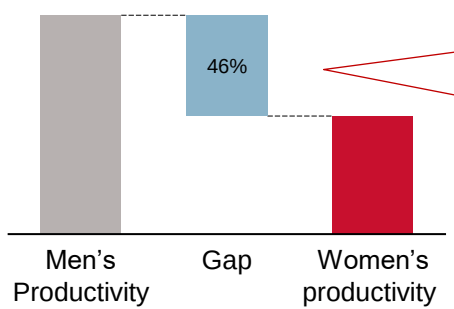
- The Land Use Act allows for discrimination through customary and religious law that do not allow women to own or inherit land in all regions
- Women lack awareness of their legal rights; Land Use Act is not available in local languages and women are often excluded from forums where land administration guidelines are discussed
- In addition, procedures required for registration are lengthy and can be socially inappropriate for women

This gender gap has an impact on the productivity of women farmers, with those in the North disproportionately affected

Comparison of women's financial exclusion in North and South Nigeria (%)

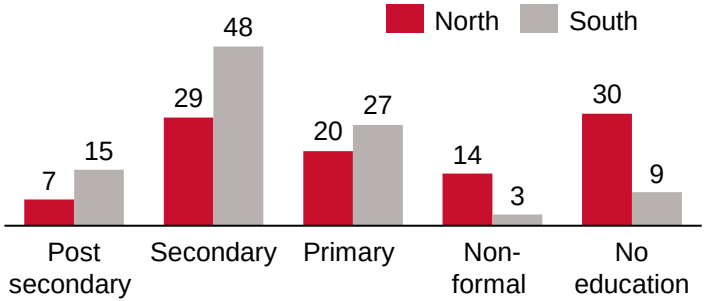


Northern Nigeria gender productivity gap

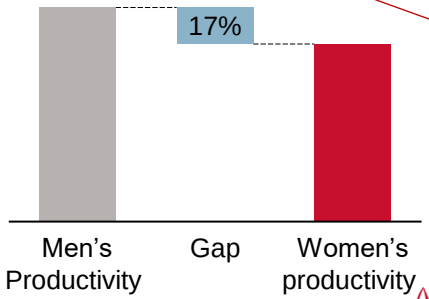


Driven by availability and efficiency of labor, fertilizer use, crop choice, and age of female farmers

Comparison of women's educational attainment in North and South Nigeria (%)



Southern Nigeria gender productivity gap



Driven by availability of labor, herbicide use, and household composition

Sources: EFInA Access to Financial Services in Nigeria 2020; EFInA, Assessment of Women's Financial Inclusion, 2019; The Human Account Data; World Bank, Leveling the Field, Improving Opportunities for Women Farmers in Africa, 2014; Dalberg Analysis

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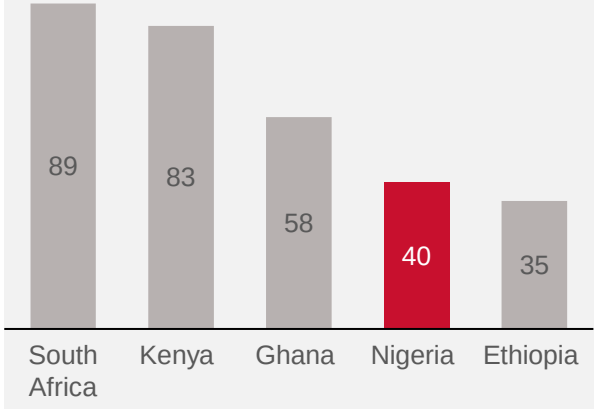
Formal financial inclusion in Nigeria remains a challenge with majority of women and rural communities still financially excluded

Compared to peer countries, a larger segment of the Nigerian population is financially excluded

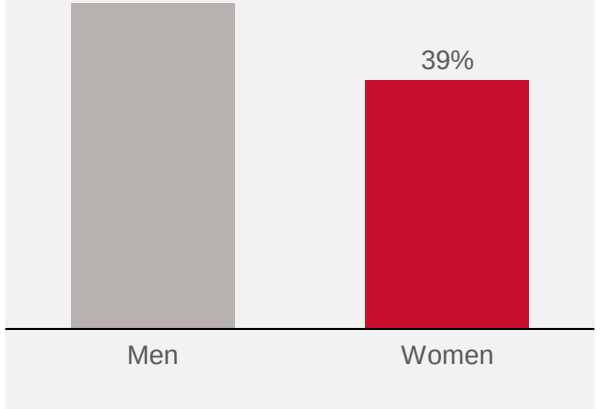
Women are disproportionately impacted by the financial exclusion and lack of access to formal financial services

Majority of rural communities, where most smallholder farmers are based, lack access to formal financial services

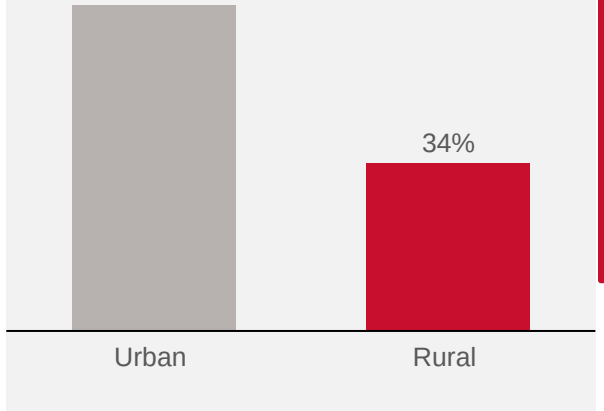
National financial inclusion rates
% of included population, 2018



Account ownership by gender
% of banked population, 2020



Account ownership by geography
% of banked population, 2020

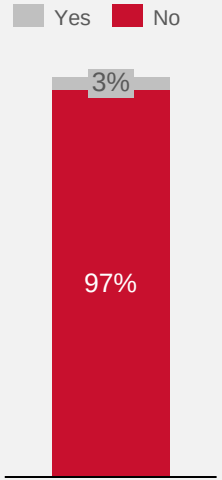


Sources: EFInA Access to Financial Services in Nigeria 2018 Survey, 2018; Universal Financial Access 2020; The Human Account Data, Nigeria; CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; National Financial Inclusion and Development Strategy (NFIDS) 2018–2023; FINDEX report 2017; Dalberg analysis; EFInA Access to Financial Services in Nigeria 2020 Survey, 2020

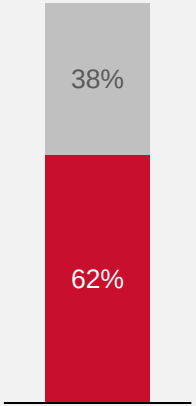
Smallholders have limited access to formal financial services, and scarcely use them when available

Farmers have limited access to formal financial services – access to physical touch points is equally limited

Adult population access to credit, 2020
% of sampled population

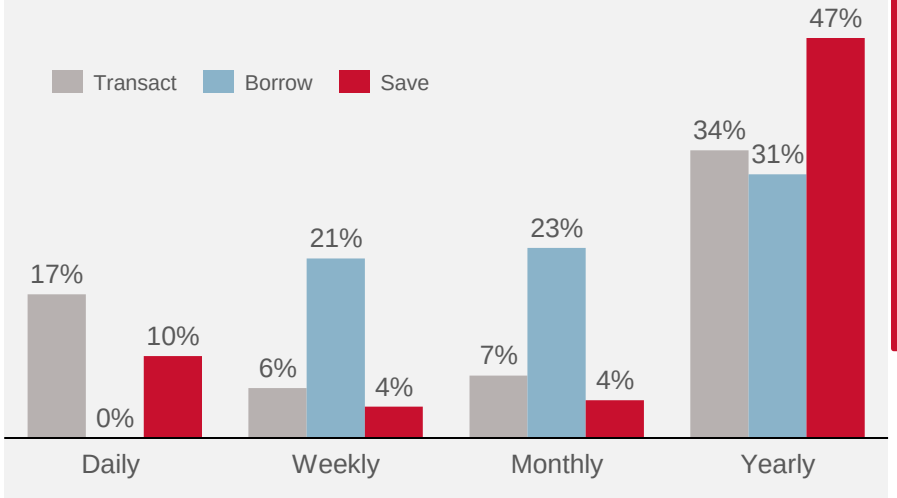


Access to financial point in rural areas, 2020
% of sampled population



However, uptake of these services is poor. Almost half of SHFs surveyed only use a formal bank account once a year

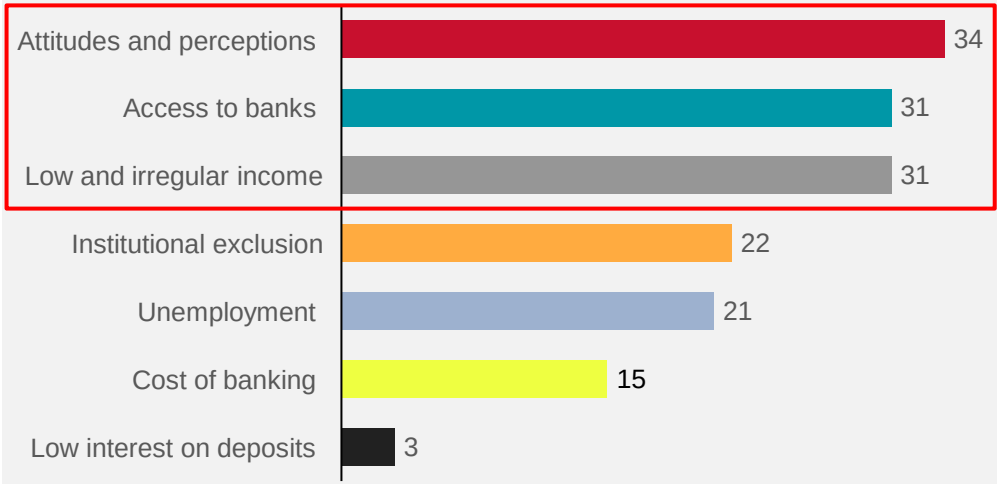
Frequency of transactions, borrowing and savings with banks
% of respondents



Sources: Human Account Dataset, 2018; EEFInA Access to Financial Services in Nigeria 2020 Survey

SHFs barely use formal financial services due perceptions about banking, challenge accessing banks and low incomes among farmers

Reasons for not banking with banks
% of respondents



"Farmers are distrusting of the process of banking, and not necessarily with banks. Farmers are often afraid of fraud, or abuse of their money, and hence are apprehensive to use bank accounts, or use services beyond going to the counter" ***Farmers' association representative***

- **Smallholder farmers have negative perceptions of banks and the banking process**. This is driven by a lack of understanding of the process. In Northern Nigeria, farmers are apprehensive of non-Islamic banking products due to religious beliefs
- **Financial access points are located far from farmers**. On average, it takes 55 minutes to reach a bank, and 32 minutes to reach a mobile money agent. Farmers often face high costs to access these services
- **Low and irregular incomes limit bank use**. Nearly three quarters of the smallholder farmers live on less than $2.50 a day, with most of their income received during the harvest season

Source: The Human Account Data, Nigeria; EFInA Access to Financial Services in Nigeria 2020 Survey; Universal Financial Access 2020 Stakeholder interviews; FAO, Small Family Farms Country Factsheet, Nigeria, 2018; Dalberg analysis

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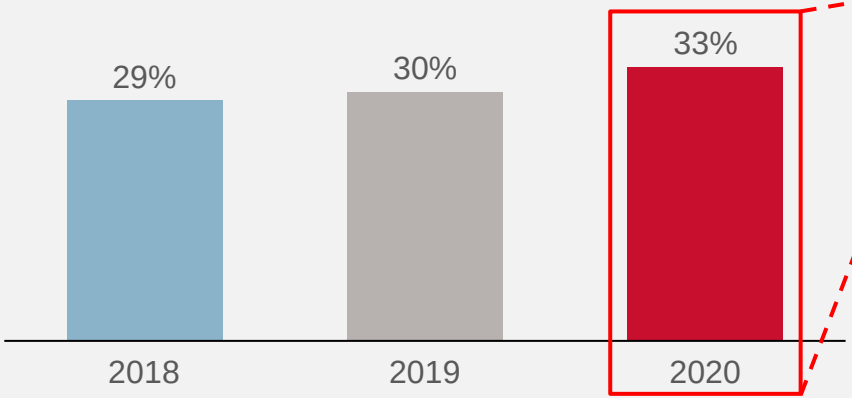
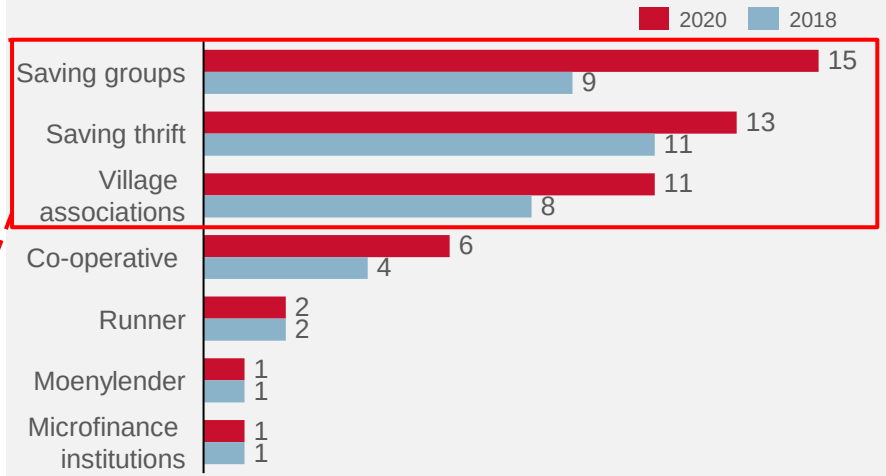
In the absence of formal financing, smallholder farmers often turn to informal groups as alternative sources of financial services

Informal financial services uptake
% of population



Drivers of informal financial services uptake
% of smallholder farmers



- **A third of Nigerians use informal financial services to manage some of their financial needs-**between 2018 and 2020, the number of Nigerian adults using informal services increased by 5.3 million
- **The informal channels offer more flexible terms and high liquidity compared to the formal institutions**. The combination of very low income with moderately volatility creates significant need for cash liquidity. As farmers they may be heavily exposed to exogenous ecological, climate, and market related shocks

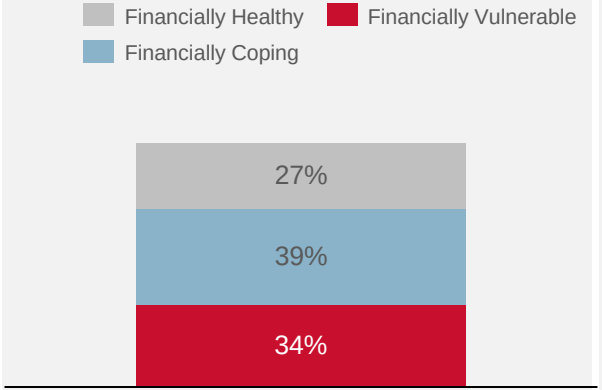
Source: EFInA Access to Financial Services in Nigeria, 2021; Stakeholder interviews; Dalberg analysis

Low financial capability minimizes the ability of smallholder farmers to adopt digital financial services

Generally, most Nigerians struggle with financial planning, financial control, knowledge and skills and making of financial choices. The smallholder farmers are not an exemption

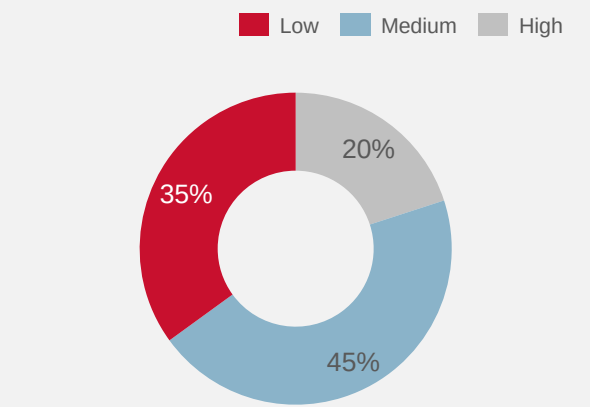
Only 1 in 4 Nigerians is considered financially healthy

Financial health score
% of population



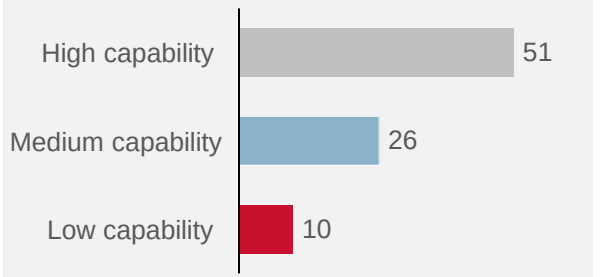
Only 1 in 5 Nigerians have high financial capability

Overall financial capability[1]
% of population



There is a strong positive correlation between the use of DFS and financial capability

DFS usage by financial capability levels
% of population



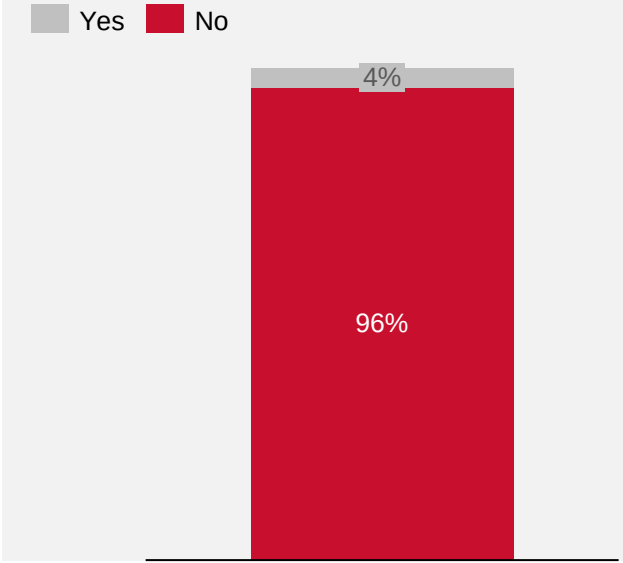
"Majority of the farmers are not educated, and require a lot of guidance and support"
Farmers' group representative

Source: EFInA Access to Financial Services in Nigeria 2020 Survey; Stakeholder interviews; Dalberg analysis Note: 1. Financial capability is an average of the financial planning, financial control, knowledge, skills and making financial choices dimensions.

Access to digital services is also low; though high basic phone ownership presents opportunities for digital agriculture

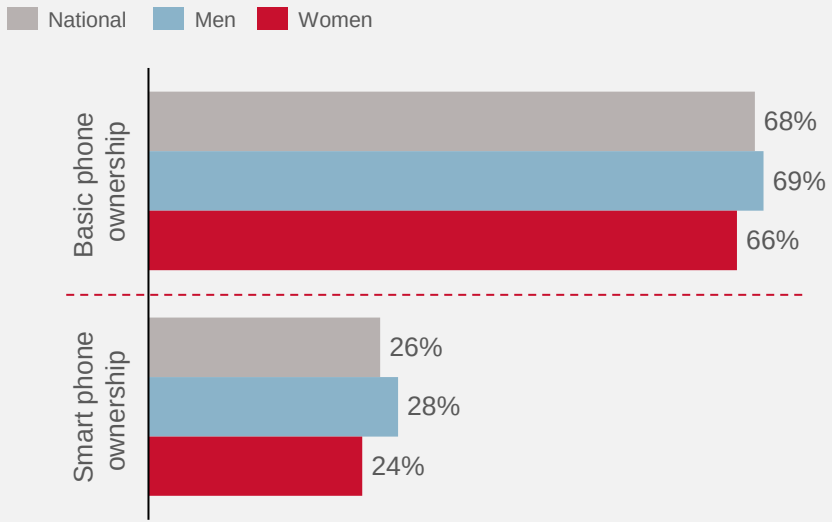
Although access to digital services like mobile money is low…..

Mobile money account ownership
n=704



…smallholder farmers have high basic phone ownership offering potential IVR and USSD entry points

Phone ownership among smallholder farmers
% of respondents

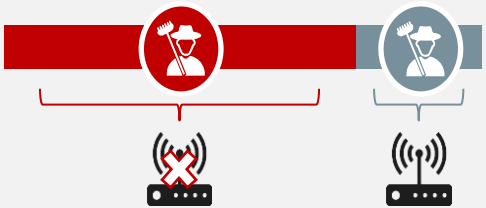


Sources: Human Account Dataset, 2018; EEFInA Access to Financial Services in Nigeria 2020 Survey

Use of digital solutions among smallholder farmers is limited by the inadequate access to internet and low digital literacy levels

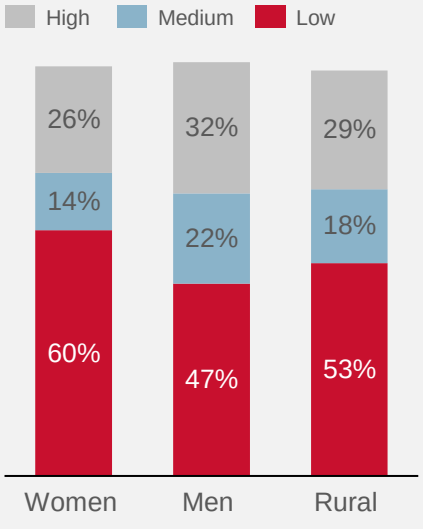
Smallholder farmers adoption of digital solutions is hindered by the limited access to internet and the low digital literacy levels

Access to internet among smallholder farmers
Proportion of respondents



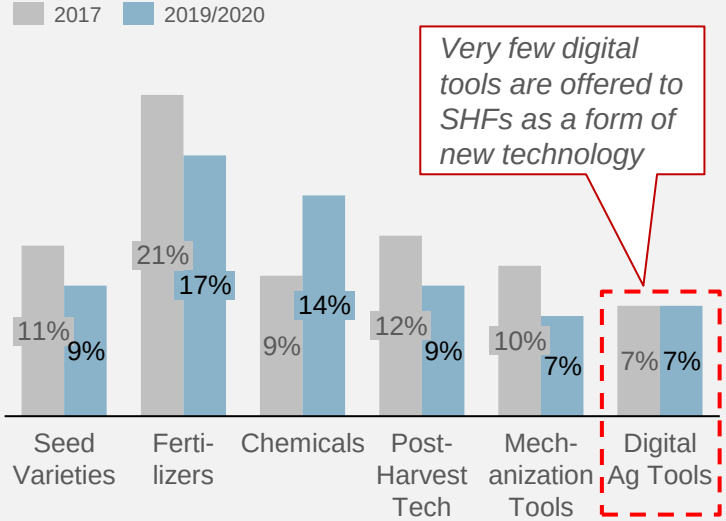
7 out of 10 smallholder farmers

Digital literacy levels
% of respondents by digital literacy quintile



Only a handful of digital tools are offered as a form of new technology to consider

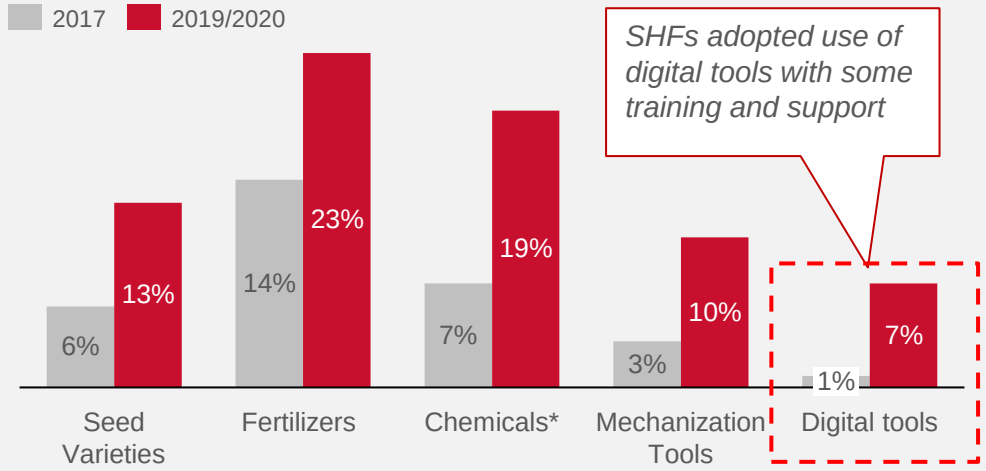
Farmers introduced to new technologies
% of introduced technologies, 2017-2020; n=152



Source: The Human Account Data, Nigeria; GeoPoll Farmers Survey, March 2021; AGRA, SHF Survey, 2020 ; Dalberg analysis

Smallholder farmers are progressively willing to adopt the use of digital tools when offered the right support

Farmers adopting different technologies
*% of farmers that changed approach over period; 2017-2020; n=127**



"There is a willingness to adopt new technology despite low levels of literacy- Even for those who have been farming for years, they are open to new practices " ***Ag-tech provider***

- **Smallholder farmers are progressively willing to adopt digital solutions.** Most farmers have some basic knowledge of using phones. The survey showed 77% of the farmers have used a mobile phone before; 81% of have a voter's card, which allows access to financial services. Hello Tractor, an agtech company linking tractor owners to farmers, has over the last five years enlisted over 2000 tractors on its platform and served over 40,000 smallholder farmers. Babban Gona, over the last year supported over 100, 000 farmers to access inputs, agronomic training, and post-harvest services
- **However, there is a need for training and support to accelerate the adoption of new practices and techniques including the use of digital solutions.** Majority of the smallholder still lack access to information, with 69% of the farmers surveyed by CGAP rely on friends and family for advice on their agricultural activities, with the local leading farmer and the leadership as the secondary source of information

Source: GeoPoll Farmers Survey, March 2021; AGRA, SHF Survey, 2020; CGAP, National Surveys of Smallholder Households,2019: Note: Chemicals include pest, insect, and herb

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SHFs are willing to adopt solutions from providers that they trust and have business models that match their needs and capabilities

Key drivers of willingness to adopt for digital services

Trust in service providers

- **Generally, smallholder farmers distrust banks and formal financial providers because they perceive them as complex and inaccessible.** 48% of smallholder farmers surveyed by the Human Account indicated low to lowest trust in banks
- **In the past, SHFs have been short-changed by service providers,** who have defrauded them of their money or failed to deliver on their promises. This increases the distrust for new entrants looking to offer farmers new services
- **SHFs have trust in their communal networks, fellow farmers and communal leaders like Imams.** More than half of the SHFs rely on their social networks for both information and support

"Trust is the binding factor for agriculture and digital solutions. Trust is an issue for all sorts of digital products" **Ag-tech solution provider**

Business models

- **Many current business models from service providers do not meet farmer financial capacity.** Many value added services (e.g., weather-based updates) currently require upfront payments from farmers. This often puts a strain on the farmer's ability to pay as they have competing interests for their incomes. It in turn leads to lower uptake of these services

"With the cost of data and smart phones, how does the farmers get the money to pay for them." **Ag-tech solution provider**

Source: The Human Account Data, Nigeria; Stakeholder interviews

OUTLINE

- Introduction
- Executive summary
- Overview of agriculture in Nigeria
- Enabling environment
- Smallholder needs and capabilities
- **Solutions landscape**
- Opportunity areas
- Annex

Chapter summary

Digitization of farmer data and financial services, and product bundling can expand uptake of financial and non-financial solutions

	Key findings	Implications
1 Financial solutions	• There is an **increase of agtechs that supply digital transaction solutions** and leverage the data to provide other financial products	• **Digital payments can allow suppliers to pivot to providing other financial products** for SHFs • There is a **need to cater to SHFs that lack the knowledge to access digital services**, e.g., by using agents
	• There are **multiple credit channels, but credit access and affordability remains low** due to the high-risk profile of farmers and the high cost of borrowing, e.g., due to high operational costs • There is a **growing number of agtechs collecting data on farmers and farmer organizations** as they supply both financial and non-financial services	• **Farmer data digitization has the potential to support suppliers in making more accessible and affordable products** (e.g., credit) by lowering the farmers' risk profile • **Informal channels** (e.g., ROSCAs and cooperatives) have made services more accessible, **but their increased digitization could make their products for SHFs cheaper**
2 Non-financial solutions	• **Agribusinesses and agtechs typically provide end-to-end services** to farmers or **bundle services for SHFs**	• **Demand of both financial and non-financial services could be improved by bundling products**. This can also lower costs by increasing revenue streams for suppliers

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Chapter summary

Transactions, credit, and savings are fairly developed given the number of actors; however, the uptake of financial solutions is low

= Level of service development (Number of suppliers) = SHF uptake

	Performance	Rationale
Transaction		Several suppliers in the market providing digital transaction services, but mobile money growth is still sluggish as only 4% of farmers own a mobile money account
		Low uptake compared to peer countries, likely due to low concentration of cash-out services. E.g., there are only 260k agents for its 210M population, compared to Kenya which has ~310k agents for 55M people
Credit		Fairly developed given the suppliers (e.g., banks, MNOs, cooperatives) and enablers (e.g., credit schemes)
		Only 3% if adults have access to loans. Accessible loans such as from informal channels are expensive, with interest rates as high as 40%, while affordable loans have stringent requirements such as property
Insurance		Dominated by government efforts with a few private insurance providers. Most insurance products are offered as bundled products to increase its demand
		Low uptake in agriculture at only 2%, due to limited understanding of insurance schemes, low incomes, lacking specialized insurance products, and supportive enabling environment
Savings		Several suppliers of generic savings products including formal channels (banks, MNOs, fintechs) and informal channels (ROSCAs)
		Formal bank savings penetration is low, as only 34% of rural populations own accounts. Most farmers save through groups – informal savings uptake has grown by 12% since 2018

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Chapter summary

The non-financial solutions market is private sector-driven and well-developed, which has increased uptake of products

= Level of service development (Number of suppliers) = SHF uptake

	Performance	Rationale
Extension		Fairly well developed and provided mostly by the private sector and development partners as government funding for the service remains low, an extension worker to farmer ratio of 1:5000 to 1:10,000
		Uptake is high and growing among farmers as credit and bundled services are introduced. However, there is limited coordination for effective sector wide reform
Supply chain		Underdeveloped and mostly provided by off takers following aggregation of products to minimize operational cost
		In the case of bundled service via off takers, there is high uptake of supply chain services
Market access		Digital market access services are relatively well developed but lack scale. The service is provided by agtechs and some financial institutions (FarmCrowdy, SABEX by Sterling Bank). Some of the agribusiness (AFEX) providing market access to SHFs also provide end to end services to SHFs, including digital marketplaces
		SHFs still have limited access to better markets as most produce for subsistence (only 26% is sold) and lack information on market prices

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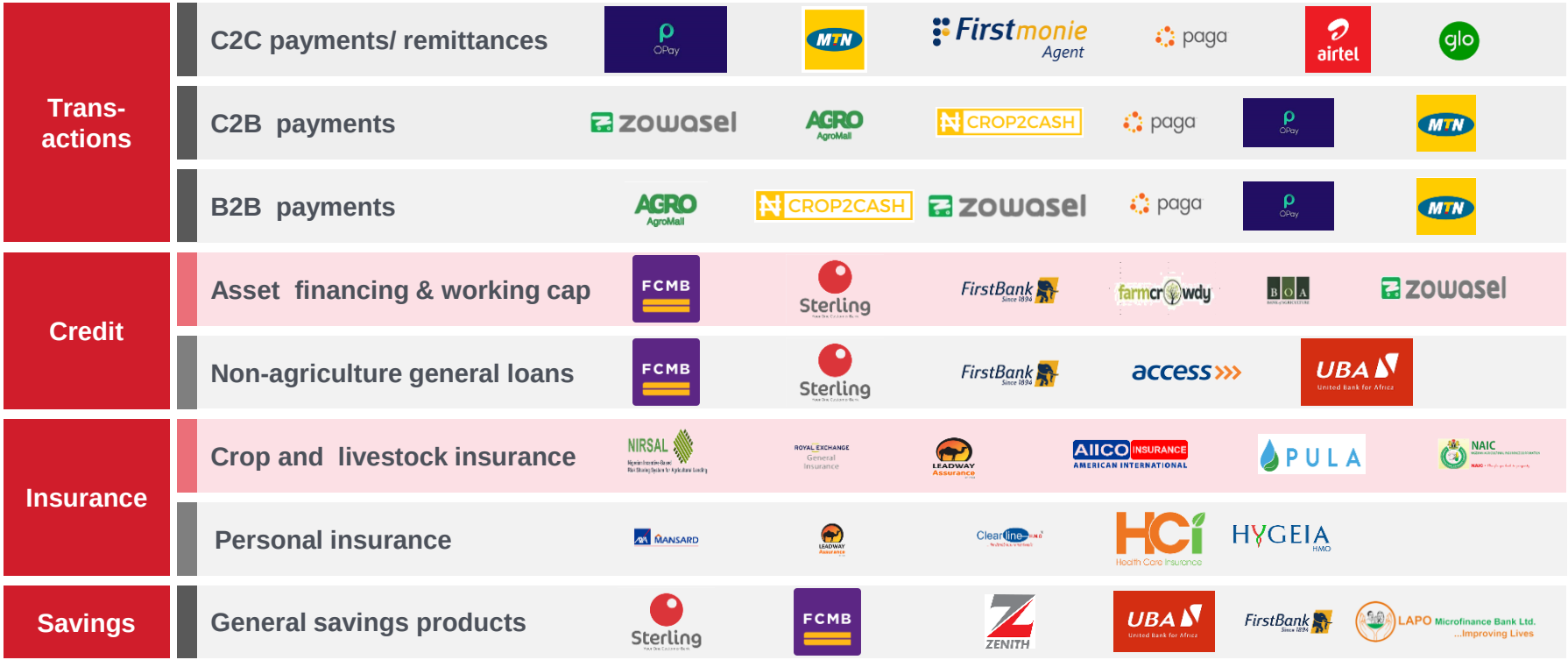
Solutions landscape

The financial services landscape is well developed, however, few actors provide agriculture specific offerings



Key Agricultural products Generic products applicable to agriculture

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Transaction services are well developed, but uptake is low among SHFs, which can limit adoption of other financial solutions

Level of development	• **Transaction services are relatively well developed given the number of service providers.** Commercial banks (e.g., Sterling Bank, FCMB, First Bank) and Agtechs (e.g., Crop2Cash, Social Lender, AgroMall) supply transaction solutions to support payments to suppliers or from buyers for SHFs • **Digital transactions can speed the growth of other financial services.** In peer countries where digital transactions have been prominent via mobile money payments, agtechs use the transaction history to determine credit worthiness and insurance premiums for SHFs. There are some agtechs in Nigeria that use this approach such as Crop2Cash, Social Lender, AgroMall; however, their scale could be enhanced with increased farmer uptake of digital payments
Uptake barriers	• **Compared to peer countries, uptake of digital payment transaction systems is lower, especially among SHFs.** Only 34% of Nigerians use digital payment systems compared to 89% in South Africa. Over 96% of SHFs paid their input suppliers in cash and were also paid in cash by their buyers • **Limited access to cash-out points, coupled with limited trust of formal financial institutions can account for the low uptake of digital transaction services.** Nigeria only has 260k agents for its population of 210M compared to Kenya which has more than 300k for a population of 55M. Other channels like ATMs are also low, where Nigeria has 17 ATMs per 10,000 adults, compared to 65 ATMs per 10,000 adults in South Africa • **The low uptake of transactions could also be a result of low mobile money use in Nigeria.** Mobile money services uptake is low due to delayed issuance of PSB licenses to major MNOs (MTN & Airtel)

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; The Human Account Data, Nigeria; Dalberg analysis; Stakeholder interviews; Statista; World Bank

Credit is fairly developed given the number of suppliers; however, the access to and affordability of loans remains a challenge

Level of development	• **Commercial banks are the dominant formal credit suppliers to SHFs, typically supported by credit schemes to de-risk farmers.** Banks are often provided with loan facilities or guarantee schemes by government and development partners that de-risk farmers (e.g., NIRSAL, FAFIN, CACS, ABP, and GESS). The schemes benefit many SHFs, where a recent CGAP survey found that 30% of farmers considered banks to be a better source for credit, just behind family and friends • **MFBs and several other informal channels dominate credit extension to SHFs.** 13% and 26% of the adult population rely on MFIs and informal channels for credit • **Agribusinesses** (e.g., Olam, Flour Mils) **also extend credit to its supplying farmers in the form of inputs**
Uptake barriers	• **Only 3% of the adult population has access to credit** • **Bank credit favors those in the formal economy, which can impact disenfranchised SHFs, such as women or youth farmers.** For example, disenfranchised farmers often lack access to collateral (e.g., property) which is required to access loans • **Loan affordability remains a challenge**. The high-risk profiles of farmers and the high cost of borrowing especially for MFBs and informal channels lead to high interest rates ranging between 20% to 40% per annum • **Some agtechs provide credit directly to farmers from their balance sheet or through crowdfunding, however, these remain novel approaches with low scale.** The agtechs use digital platforms that enable farmers to conduct transactions and store relevant business data that can inform their credit score. Farmers' limited access to internet coverage, mobile devices, and the widespread use of cash rather than digital payment platforms limit uptake of these solutions

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Enimu et al, Determinants of loan repayment in farmer groups, 2018; Stakeholder interviews

The insurance market is dominated by the government and a few private actors, which influences its low uptake

Level of development	• **The government plays an important role in insurance provision to SHFs via NAIC** (Nigerian Agricultural Insurance Corporation)**.** The government provides insurance via bundled products that include insurance coverage. For example, NIRSAL provides loan products via banks that also cover insurance to SHFs • **There is a recent increase in agtechs which provide diverse insurance products**, e.g., Pula insurance. The most common types of agriculture insurance products include index and yield-based insurance. Index insurance is the most common as yield insurance requires yield data which are often not available. Most agtechs also work with aggregators and farmer groups to minimize the risk on their product • **However, government insurance products are often subsidized, which undercuts the private market.** NAIC offers insurance at a subsidized rate, with up to 50% premium. Public insurers provide insurance at a significantly lower rate (2%) than private insurers (4%+). This places price pressure on private actors, making them unattractive to SHFs
Uptake barriers	• **Insurance coverage in agriculture is only 2%.** Low insurance uptake is driven by both demand and supply factors. On the demand side, low uptake is a result cultural apprehension, and low farmer low incomes. On the supply side, the lack of specialized insurance products for farmers – coupled with an underregulated insurance market as rated by the International Monetary Fund (IMF) and Standards and Poors (S&P) – limit uptake

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; PwC, Nigeria Insurance Survey, 2020; Stakeholder interviews

Like credit and transactions, there are multiple savings channel, but there is low uptake due to low farmer incomes

Level of development	• **There are multiple savings channels that SHFs can adopt, both in the formal and informal sector.** In the formal sector, commercial banks provide regular savings account, in addition to MFBs, and mobile money wallets. Informal savings channels (e.g., ROSACs) are more dominant given their proximity to SHFs and the level of trust they command • **The dominance of informal channels, which are often non-digital solutions can limit graduation to credit and insurance.** Digital financial service providers can use savings history to determine credit scores and insurance premiums. There have been recent efforts to increase digitization of informal farmer group savings, e.g., by RIBY and Crop2Cash
Uptake barriers	• **For both formal and informal savings, uptake remains low due to low and consistent farmer incomes.** 71% of farmers intimate that they only make enough money to afford food and clothes, implying that there is very limited money left for savings after basic needs are met. Farmer incomes are also inconsistent as earnings depend on fluctuating crop prices, market access and yields that are influenced by factors like rainfall

Sources: CGAP, National Survey and Segmentation of Smallholder Household in Nigeria, 2018; Stakeholder interviews

Solutions landscape

Banks, MNOs, fintechs, and informal financial service providers are the dominant suppliers

	Description
Banks	• 22 commercial banks, 900 Micro-Finance Banks (MFBs), and three Payment Service Banks (PSBs) • More than 73 million customers reached with transaction, credit, insurance, and savings services – some of which are digital
MNOs	• 4 MNOs, with the large operators being MTN and Airtel with 39% and 27% market share respectively • MNOs do not have the license to provide digital financial services, but partner with banks to facilitate this • MNOs rely on a large network of agents to deliver financial services to more than 15 million customers, including transaction, credit, insurance, and savings
Fintechs	• 200+ Fintech serving more than 50M customers • 38% involved in payment services, 23% lending, and 15% savings, 13% enterprise services & infrastructure, 8% cryptocurrency, and 3% InsurTech • Fintechs reach customers via e-wallets using mobile phones, instant short-term loans using credit scoring algorithms, and a wide-reaching network of agents
Informal financial service providers	• Financial services obtained through unregulated forms of structured provision, often non-digital services • Providers include input suppliers who also extend credit, ROSCAs, farmer cooperatives, and family and friends

Sources:1. The World Bank Group, “Nigeria Digital Economy Diagnostic.“ 2019. 2. Techcabal, “Why Digital Banking Is The Key To Transforming Nigeria’s Financial Landscape”, 2021. 3. Statista, “Number of active bank customers in Nigeria from 2016 to 2019”, 2021. 4. EFInA,” FinTech Landscape and Impact Assessment Study”, 2020. 5. Fintech Nigeria and Ernst & Young, "Nigeria Fintech Census 2020, Profiling and Defining The Fintech Sector”, 2020

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Solutions landscape

Banks with wider reach focus on commercial farms and large agribusinesses, while smaller banks provide targeted offerings to SHFs

	Capitalization (M USD)	Network reach	Network size	Relevance in agriculture
GTBank	2,000	• ~ 22M customers	• 220 branches • 60 agents • 1,165 ATMs	• ~0.5% of agriculture loan portfolio in 2019 • Participates in the commercial agriculture credit scheme, offering single digit interest loans to agribusinesses
access	770	• ~ 30M customers	• 566 branches • 52,417 agents • ~3,000 ATMs	• ~1% of loan portfolio to agriculture in 2019 • Funds large corporates and agricultural SMEs that supply large clients
FirstBank Since 1894	650	• 30M customers • 11M USSD users	• 818 branches • 100,000 agents • 3,111 ATMs	• Reached ~170K SHFs with bundled products provided through aggregators and agency banking
FCMB	150	• ~ 8M customers	• 205 branches • 1,710 agents • 803 ATMs	• 10% of loan portfolio to agriculture • Supports ~300K farmers
Sterling	110	• 3M customers • >1.5M USSD users	• 157 branches • 10,667 POS devices • 689 ATMs	• Provides agriculture asset financing and working capital credit for actors across the value chain

Sources: 1. Access Bank, “2020 Annual Report & Accounts”, 2020. 2. Bloomberg. 3. Banks Around The World, “Guaranty Trust Bank Plc, GT Bank”. 2018. 4. Trading View, “Market Stocks Nigeria”, 2021. 5. Financial Times,“ Access Bank Plc”, 2021. 6. Sterling Bank, “ 2020 Annual Report and Financial Statements”, 2020. 7. FMCB, “Annual Report & Accounts 2020”, 2020. Guarantee Trust Bank Plc, “2020 Full Year Investors/Analysts Presentation”, 2021.

Agent networks are rapidly expanding; MNOs and fintechs use an extensive network of agents to reach customers with financial services

	Network reach	Network size	Relevance in agriculture
MTN	• 76M connected users • 5M mobile money users • 2G covers 89% of the population	• 395,100 agents	• Has deepened financial inclusion in the north through Mobile Money services for SHFs
airtel	• 42M connected users • 2G covers 70% of the population	• 332,042 agents • 40,000 merchants	• Bulk extension service messages to SHFs • Offers several farming-specific products, e.g., REFARM, GEOTAP
9mobile	• 13M connected users	• ~ 7200 agents	• Launched weather forecast service to support farmers in planting season • Signed an MOU in 2020 with AFAN to develop a payment platform for farmers
OPay	• 5M connected users	• 300,000 agents	• Launched USSD app to allow banking without data and facilitates payments for e-commerce
paga	• 17M connected users	• 27,000 agents	• Enables money transfers, deposit to bank accounts, and other financial transactions

Sources: Stakeholder interviews. MTN, “Annual Report 2020”, 2020. Airtel, “ Transforming Lives : Airtel Africa plc Annual Report and Accounts 2020, 2020. Seeds & Mech Hub, “9 Mobile Launches Payment Platform To Reach Farmers Nationwide” , 2020. The Washington Post, “Nigerian Payments App Paga May Be Africa’s Next Unicorn”, 2021. Nairametrics, “The rise of mobile money operators in Nigeria”, 2021

There is an increase of non-government actors in the supply of extension services, which has increased uptake

Inputs

- **Nigeria's input usage is still low despite efforts to increase adoption.** For example, fertilizer application is only 19.7kg/ha. The government and development partners have instituted various schemes to grow input usage (e.g., GES), but sustained adoption after remains low due to pricing
- **Farmers directly purchase inputs from agro-dealers**, who sometimes extend a line of credit. Some **farmers also get input credit through their off-takers**

Mechanization

- **Mechanization offerings are limited in the country due to high CAPEX.** Less than 8% of households use motorized equipment for farming. Several agribusinesses and agtechs seek to address the high cost of mechanization by renting the equipment to farmers, e.g., TOFHAN and Hello Tractor

Agronomic information

- **There are few agronomic information service providers in the country; however, private actors reach an estimated 1M farmers.** Some of the few private sector providers include Viamo and Ignitia, who partner with development partners to share agronomic data and weather advisory. MNOs are crucial in the dissemination of this information, which is often relayed as bulk SMS

Training

- **Trainings are mostly provided by the private sector, NGOs, and development partners** (e.g., GIZ, USAID, Olam, Nestle, and FMN) **– which limits access to some farmers**. Trainings are conducted in-person or remotely using IVR or SMS solutions provided by MNOs and VAS providers such as Viamo
- Government coverage is low, with 7,000 extension workers, with a ratio of worker to farmer at 1:5000 to 1:10,000

Sources: World Bank; FAO, Small Family Farms Country Factsheet, 2020; Kristin E. Davis, K. Lion, Tunji Arokoyo, Organisational capacities and management of agricultural extension services In Nigeria: Current status, 2019; Stakeholder interviews

There is now a need to improve coordination of extension services given the various service providers and their constraints

Types of provider	Services offered	Channels used	Scale	Constraints
Private Large agri-businesses (e.g., Olam), agtechs (e.g., Ignitia), and commercial banks (e.g., FCMB)	Input provision Agronomic information Practical training	Apps, hotline, Credit, In-person/ remote training, SMS, IVR	• +2M farmers	• Reach limited to farmers working with agribusinesses or program beneficiaries
NGOs and Development partners NGOs (e.g., PIND), Multilaterals (e.g., USAID)	Input provision Agronomic information Practical training	In-person/ remote training, SMS, IVR	• +1M farmers	• Reach limited to project beneficiaries
Government Federal Department of Agricultural Extension Services, Growth Enhancement Support Scheme, Agricultural Development Programs	Input provision Agronomic information Practical training	Field visits, Radio, e-Wallet system to distribute fertilizer subsidies	• ~15M farmers in the GES input subsidy e-wallet	• Limited funding dependent on donors • Lack of a legislated agricultural extension policy

Sources: Stakeholder interviews

SHFs' access to formal markets is low, but is likely to grow as digital marketplaces expand and as agribusinesses directly engage farmers

Level of development

- **There is an increasing number of agtechs that seek to increase market information to farmers and reduce the influence of informal aggregators**. Agtechs provide digital marketplace solutions that directly connect SHFs to markets. They also provide information (e.g., on price) that help farmers identify better markets.
- However, **digital agtechs offering online marketplaces are still relatively fewer in the market, which limits scale** of reach to SHFs
- **To improve product traceability, agribusinesses** – especially international conglomerates – **have increased direct trading with farmers** through select aggregators and cooperatives using out-grower schemes
- **Market access solutions offered by agribusinesses remain largely non-digital**, relying on traditional connection points, e.g., physical markets. A few large agribusinesses have started experimenting with digital marketplaces to engage their farmers, but these are still novel approaches

Uptake barriers

- **Nigerian family farms only sell 26% of their produce** – most of which is sold in informal markets that fetch low prices. Many households still conduct subsistence farming, either due to low productivity and / or due to low access to better markets that could justify increased farming investment costs
- **The limited access to markets is a function of information asymmetry between markets and farmers.** Aggregators remain the main connecting point between markets and farmers. The more aggregators involved in the value chain, the less profits a farmer is likely to absorb as these are passed on to the aggregators

Sources: FAO, Small Family Farms Country Factsheet, 2020; Stakeholder interviews

Supply chain providers typically extend extension service and market access to SHFs

Level of development	• **Supply chain services includes digital and non-digital traceability, storage, and logistics solutions.** Some of these services incorporate digital technology, e.g., smart logistics and warehouse receipt systems • **Nigeria has few providers that extend supply chain services as a stand-alone service.** Instead, supply chain solutions are typically offered by off takers, including agribusinesses and agtechs, as a service in a bundled product. Agribusinesses such as Olam and agtechs such as AFEX provide distribution and storage services through bundled offerings to farmers • **Recently, other actors involved in agriculture may also offer supply chain services to de-risk its agricultural creditors.** For example, Sterling Bank provide warehouse facility solutions allowing farmers to store products during low pricing season against a token
Uptake barriers	• **Except for solutions that bundle supply chain services, the cost of the solution makes it prohibitive for many SHFs.** The cost of supply chain services is often prohibitive to farmers due to high operational costs driven by factors such as the fragmentation of farmers, high electricity cost, and inadequate infrastructure. On the other hand, farmers that have guaranteed market through their off takers that provide the supply chain services are often willing to take on the additional service due to the guaranteed revenue from the off takers • **This indicates that demand of supply chain services are most meaningful to farmers when bundled with market linkage services.** This ensures demand for their produce as they incur additional costs in logistics, storage, etc.

Sources: Stakeholder interviews

Across the three non-financial solutions, agribusinesses, agtechs, and the government are the dominant suppliers

	Description
 Agribusinesses	• In pre-production, agro-dealers typically supply inputs, practical training, and mechanization to farmers • Post-production, farmers engage agribusinesses that connect them to markets. The agribusinesses provide bundled services, such as transport, storage, market information, and market linkages • Some agribusinesses (e.g., Olam) are involved in both pre- and post-production stages, offering non-financial solutions across the value chain, from extension service to market linkages
 Agtechs	• Large and growing number of agtech solutions that provide extension support and market access to farmers and / or other actors in the value chain that engage farmers • Agtechs use digital platforms to supply the non-financial services. E.g., Farmcrowdy, AFEX • Agtechs also use agent networks to capture more farmers given demand limitations. E.g., Riby mostly relies on its agent network to engage its farmer cooperatives
 Government	• The government supplies some non-financial solutions to farmers, in both pre-production (e.g., training via extension officers) and post-production stages (e.g., warehousing) • Given the concentration of private sector actors in post-production, the government is predominantly involved in the supply of extension services such as practical training and inputs provision

Sources: Stakeholder interviews; Dalberg analysis

To ensure product quality, large international agribusinesses provide their supplying farmers with end-to-end services

Solutions	Description	Offerings	Farmer reach	Value chains	Current partners
Olam	• Large international agribusiness that provides farmers with end-to-end services • Recent use of digital platform to supply farmers extension service	• Extension services • Supply chain • Market access • Credit (input credit)	+1M	Soyabeans, poultry, rice, cocoa, cashew	Federal government, BMGF
DANGOTE	• Large domestic conglomerate with different VC production lines such as sugar, rice, and tomatoes	• Extension services • Supply chain • Market access • Credit (input credit)	+100K	Rice, tomatoes, sugarcane, milk	Federal government, AFDB, and BMGF
Nestlé	• Publicly listed company involved in processing of baby foods, cereals, coffee, chocolate, etc.	• Extension services • Supply chain • Market access • Credit (input credit)	+200K	Sorghum, millet, milk, coffee, cacao	IFCD, AGRA, USAID, IDH
FMN Flour Mills of Nigeria Plc	• Food processing company involved in various VCs, agro-allied, and logistics • Recent use of digital tool to provide farmers extension service	• Extension services • Logistics • Supply chain • Inputs credit	+16K	Wheat, maize, cassava, sugarcane,	Crown Flour Mills (OLAM)

Sources:1. Africa Business, “Dangote turns to Nigerian agriculture”, 2017. 2. Dangote 3. Nestle, “Nigerian farmers grow healthier grains”, 2018. Nestle, AGRA, “AGRA Nigeria Operational Plan 2019”, 2019. 4. Olam

Several agtechs also provide end-to-end services to farmers, with non-financial solutions as their primary offering

Solutions	Primary offering	Delivery channel	Ancillary services	Reach	Value chains	Partners
Babban Gona	Market access	Digital platform Agent network	Extension services Supply chain Credit	+100k farmers	Maize Rice	AGRA, Mulago, BMGF, GIF, FMO, Skoll Foundation
AFEX	Supply chain (storage)	Warehouse receipt system and management agent network	Market access Extension services Credit Crop insurance	+220k farmers	Maize Cocoa Soyabeans Rice Sorghum Ginger	WAFMP, UK Aid
Zowasel	Market access	Digital marketplace Agent networks	Transactions Extension service Supply chain	N/A	Maize Rice	Olam, Grand cereals, DIAGEO
AGRO AgroMall	Extension service	Digital platform	Supply chain Market access Credit	~1.1M farmers	Rice Maize Soyabeans	Sterling, FCMB, Agro-dealers

Sources: Stakeholder interviews

Other agtechs combine non-financial and financial solutions but do not offer all services to farmers (1/2)

Solutions	Primary offering	Delivery channel	Ancillary services	Reach	Value chains	Partners
thrive agric	Transactions / Credit via crowdfunding	Online crowdfunding platform	Extension service	+100k farmers	Poultry Rice Maize	FCMB, Sterling, AFEX, Syngenta, USAID
farmcrowdy	Credit	Digital platform	Market access Extension service	+420k farmer networks	Poultry Rice Maize	N/A
CROP2CASH	Credit	Digital platform Agent networks	Market access	15k farmers	Rice	FCMB, CARI, GIZ, We Innovate Hub
hello tractor	Extension service (mechanization)	Tractor leasing through IoT platform	Credit	40k farmers	VC agnostic	Mastercard Foundation, One Acre Fund, Deere & Co.
CoAmana	Market access	Online marketplace that collects farmer data	Insurance Credit	~150k farmers	Rice Maize	AGRA, Sterling

Sources: Stakeholder interviews

Other agtechs combine non-financial and financial solutions but do not offer all services to farmers (2/2)

Solutions	Primary offering	Delivery channel	Ancillary services	Reach	Value chains	Partners
Cropin	Extension service (database management,)	Digital platform	Weather forecasting Supply chain	N/A	VC agnostic	BUHLER, Invested Development, FCCI, UKAID, BETA Computers
NOVUS AGRO Powering Agriculture with Technology	Extension services (Farmer profiling and ID)	Digital platform Agent networks	Credit Input credit Aggregation services	54k farmers	VC agnostic	Syngenta, Zowasel, Terra Agri Farming, Value Seeds, Farmcrowdy, Guinnes
verdant	Extension services	Digital platform (feature phone enabled)	Market access Mechanization (irrigation kits)	10k farmers	VC agnostic	CTA, FARA, British Council, Global Forum Food Agriculture, SLUSH

Sources: Stakeholder interviews

There are also agtechs that specialize in supplying a stand-alone package of non-financial service to SHFs

Solutions	Primary offering	Delivery channel	Ancillary services	Reach	Value chains	Partners
ignitia	Extension service (weather forecast)	48 hr text message to farmers through USSD	None	~200k subscribers	VC agnostic	9 Mobile, 2SCALE
PxD PRECISION DEVELOPMENT	Extension service (weather forecasting)	Bulk messages	None	~100k farmers	Cabbage Cassava Groundnuts Cowpeas Grains Soybeans	FMARD, IFAD, MNOs
TOHFAN	Extension service (mechanization)	Online booking platform	None	N/A	VC agnostic	FMARD, Kaduna state
viamo	Extension service (agronomic information)	Bulk messages Hotline Remote learning IVR (interactive voice response) Mobile surveys	None	3.5M beneficiaries	VC agnostic but previous work in cocoa, cassava, and rice	GIZ, Agrifin, AgroMall, Save the Children, MNOs

Sources: Stakeholder interviews

OUTLINE

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- Executive summary
- Overview of agriculture in Nigeria
- Enabling environment
- Smallholder needs and capabilities
- Solutions landscape
- **Opportunity areas**
- Annex

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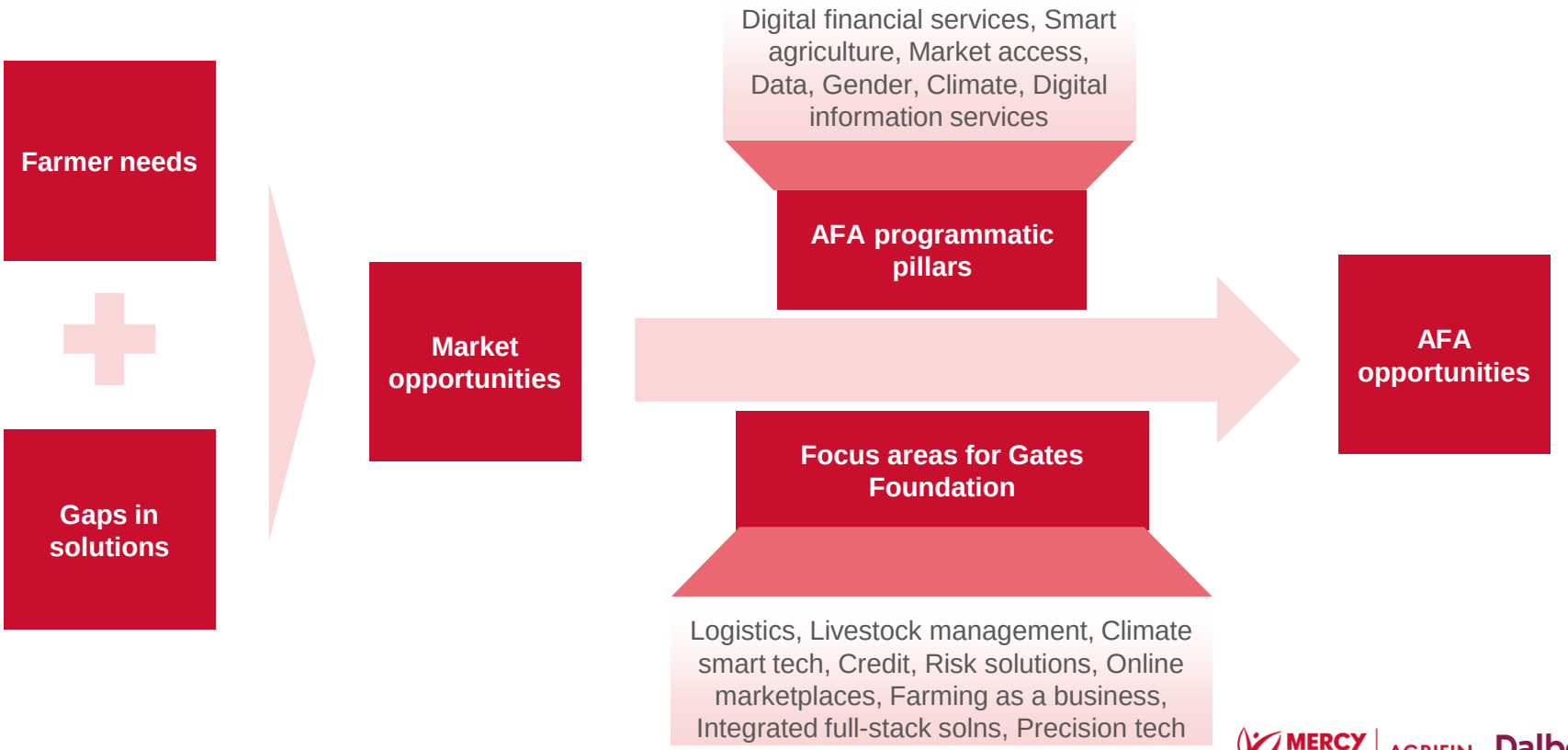
Opportunities

We identified investment opportunities for AgriFin based on farmer needs, solution gaps, and alignment with AFA and donors



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The opportunities identified could be classified into value chain specific interventions and ecosystem opportunities

1 Ecosystem opportunities

- **Identifies digital opportunities that address wider challenges affecting SHFs**
- Given AFA's offerings and modes of operation, the opportunities can be classified into three:

Institutional partnerships to reach farmers

Institutional partnerships *where AFA will focus on large actors to deliver new programs*

Scale existing, but limited ag-tech solutions

Product scaling opportunities *where AFA will work with smaller partners to scale existing but limited solutions*

Innovate to create new solutions

Innovation support opportunities *will combine AFA's expertise with partners to introduce new solutions to the market*

2 Value chain specific opportunities

- **Identifies digital interventions which address key barriers, relevant for the five priority value chains** – cassava, sorghum, rice, maize, and ginger

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2 Value chain specific opportunities

- **Identifies digital interventions which address key barriers, relevant for the five priority value chains** – cassava, sorghum, rice, maize, and ginger

AgriFin can facilitate partnerships that leverage capabilities of institutional actors to effectively deliver solutions to farmers

	Opportunity	Rationale	Themes	Partners / Reach
1	**Facilitate partnerships between banks and MNOs to provide farmers** with more affordable and accessible digital products such as credit	Banks typically provide cheaper products to SHFs due to their lower operational costs and access to schemes that de-risk them. However, proximity to banks is low. A partnership between banks and MNOs would increase farmers' access to affordable products using MNOs' reach	G *Digital credit* A *DFS*	Sterling, FCMB, access, MTN, OPay *300k – 3M farmers*
2	**Support digital service providers to partner with cooperatives and mid-sized agribusinesses**. With digital data, SHFs can develop digital identities, which can help secure services like credit	Farmer cooperatives and agribusinesses have more access to farmers given their geographical proximity. Consequently, cooperatives and agribusinesses provide a range of services to farmers (e.g., credit) that could be made cheaper with the incorporation of digital tools	A *Digital information systems*	NOVUS AGRO, WOFAN, RIBY *5k – 10k farmers per cooperative*
3	**Facilitate MNO and VAS partnerships for weather and agronomic information**, including early warning climate services to build SHFs' climate resiliency	VAS providers supply weather and agronomic information via MNO infrastructure. However, there are few partnerships with MNOs, which limits farmers reach and increases costs	G *Precision agriculture* A *Climate; Smart agriculture*	MTN, viamo *200k – 3.5M subscribers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive | Climate smart | G BMGF focus area | A AFA pillar

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AgriFin can consider opportunities that scale products with high potential to improve farmers' access to affordable solutions

	Opportunity	Rationale	Themes	Partners / Reach
4	**Leverage the SANEF network of agents to drive adoption of VAS**, e.g., inputs, agronomic information, and market prices – to improve yields	While digital tools are important to increase reach, they can also limit product uptake, especially among women. E.g., access to phones is modest, with higher digital illiteracy and limited abilities to read. SANEF can increase farmer uptake	G Climate A Climate	SANEF, PxD Precision Development, ignitia *100k – 1M farmers*
5	**Broker financing partnerships between development partners and digital lenders** to increase supply of credit and insurance to farmers	Agtechs that supply digital credit to farmers / farmer groups lack scale due to modest credit funds made available through seed investments	G *Digital credit* A *DFS*	thrive agric, CROP2CASH *15k – 500k farmers*
6	**Scale SMS services around precision agriculture from PXD** (Precision Development Nigeria) to improve farmers' climate resiliency and increase yields	PXD uses software and IoT analytics to facilitate precision agriculture. It is currently implementing 2 SMS based projects on input access and planting dates that have shown success, and which can be scales to other states and value chains	G *Precision agriculture* A *Smart agriculture*	PxD Precision Development, MTN, airtel *100k – 1M farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive · Climate smart · G BMGF focus area · A AFA pillar

AgriFin can support innovation of new agricultural products by facilitating financing to suppliers and accelerator programs

	Opportunity	Rationale	Themes	Partners / Reach
7	**Finance the development of new products that support asset financing**, working with banks and agtechs. This will increase farmers' access to productivity tools and improve yields	Asset financing is currently available using traditional financing terms that are not well suited to farmers, especially women (e.g., high collateral requirements, high interest). Creating innovative products that adequately manage risk, as well as support businesses, will be key to enhancing smallholder productivity	G *SHF credit* A *DFS*	hello tractor *~50k farmers*
8	**Co-host / sponsor agtech accelerator cohort programs** to leverage the dynamic VC funding ecosystem in Lagos. Innovations in products that are more affordable and accessible could improve farmers' access to financial and non-financial solutions in the medium term	Nigeria has a vibrant innovation ecosystem. However, funding into ag-tech businesses remain low. This presents an opportunity to attract funding for ag-tech businesses, and refine existing business models to better serve last-mile needs	*Cross-cutting*	Co-Creation Hub "we"innovation HUB *~5k farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive · Climate smart · G BMGF focus area · A AFA pillar

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AgriFin should also consider interventions with transformative climate impact – anchoring on new partners and tools

	Opportunity	Rationale	Themes	Partners / Reach
9	**Facilitate partnerships between aggregators and international funders to incentivize farmers' behavior change on climate smart practices.** Adopting climate smart practices will improve farmers' climate resiliency	Farmers are unlikely to change behaviors without clear benefits. Farmers working with aggregators can be incentivized to adopt more climate appropriate practices such as crop rotation, agroforestry, better fertilizer and manure management, and rotational grazing. These practices will increase carbon storage or reduce carbon emissions	G *Smart agriculture* A *Climate*	AFEX, Babban Gona, Olam, Rabobank Acorn *100k – 1M farmers*
10	**Facilitate financing partnerships between funders and offtakers** working with agroforestry farmers	Agroforestry reduces carbon emissions, while providing additional farmer incomes. However, it is difficult to implement due to opportunity costs, particularly on land use. Financing incentives can increase farmers' uptake of agroforestry	G *Smart agriculture* A *Climate*	AFEX, Babban Gona, Olam *~5k farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive · Climate smart · G BMGF focus area · A AFA pillar

Gender transformative interventions anchor on improving access to productive tools

	Opportunity	Rationale	Themes	Partners / Reach
11	**Support women farmers with title deed registration** via digital tools like remote land surveying. With deed registration, women farmers can access credit and invest in productivity tools	Only 4% of women that own land have title deeds. This has translated to poor access to credit as property such as land title deed is often required as collateral	G *SHF credit* A *Gender*	GEOINFOTECH *+5k women farmers*
12	**Provide credit to women farmers for inputs and then for productivity tools** using alternative credit scoring mechanisms by facilitating **partnerships between banks, agtechs, fintechs, and farmer cooperatives**	Only 17% of women have access to inputs and 14% have access to farming equipment. Coupled with time poverty, the lack of productivity tools translates to lower yields for women farmers. Further, women are less likely to access / afford credit due to lack of collateral. Start building women's credit scores by providing input credit using alternative credit scoring mechanisms then expand it for asset finance. Combination with PAYG model could help.	G *SHF credit* A *Gender; Data*	WOFAN, FCMB, OPay *4k – 30k women farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive | Climate smart | G BMGF focus area | A AFA pillar

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To effectively implement gender transformative opportunities, AgriFin should consider gender-responsive programming elements

Bundle product and services to women farmers' needs

Bundled products and services are more likely to achieve better results as they holistically barriers. Further, models that also include social empowerment and leadership and business training have been found effective to increasing traction of interventions, especially when women-led

Consider women's role in the family unit

Women are more likely to divert their resources to family needs and emergencies than men. Effective programming should consider the additional financial responsibilities that women have in the family and identify ways to expand the family income as well as provide women with greater resilience to shocks beyond risks in agriculture.

Prioritize entry points that are women-led

To access more women, entry points that are women-led should be prioritized. For example, poultry and horticulture can be considered for additional support, in parallel with the priority value chains as women are likely to engage in multiple activities. Women-led farmer groups are also good entry points to support traction e.g., WOFAN

Opportunities

Digital services such as smart logistics, digitized credit, and agronomic information can create growth opportunities along VCs

		Cassava	Ginger	Sorghum	Rice	Maize
Financial	Credit	• Facilitate partnerships to increase access to credit in the VC		• Partner with asset financing and FSPs providers to expand access to credit, inputs, and mechanization		
Non-financial	Extension	• Leverage OCAP and VAS providers to scale agronomic information	• Scale extension services through existing providers	• Scale climate information services through partnerships with MNOs, VAS		
Non-financial	Supply chain/ smart logistics	• Support expansion of smart logistics to efficiently get cassava to processing centers	• Support digitizing cooperatives • Support traceability of ginger through smart logistics	• Facilitate the scaling of ware-house receipt systems	• Facilitate the scaling of ware-house receipt systems • Support the adoption of rice water management systems	• Facilitate the scaling of ware-house receipt systems

Sources: Dalberg analysis

AgriFin can facilitate the access to high-yielding inputs, agronomic information and logistical services for cassava actors

	Opportunity	Rationale	Themes	Partners / Reach
1	**Facilitate partnerships between agtechs, agribusinesses, and input providers to extend digital input credit to SHFs and farmer groups**	SHFs have limited access to affordable high-yielding inputs. Provision of input credit would minimize reuse of cassava cultivars and translate to higher yields, with which the farmers can supply industrial processors	G *Digital credit* A *DFS*	the sustainable trade initiative; IITA; PSALTRY *~300k farmers*
2	**Support the expansion of smart logistic services** to support the transportation of cassava from SHFs to industrial processors	40% of produce is lost post-harvest due to cassava's short shelf life. Digital logistic services would minimize the time needed to get the cassava from the SHFs to the industrial processors	G *Smart logistics* A *Digital information systems*	FMN Flour Mills of Nigeria Plc; Nestlé *16k farmers*
3	**Leverage OCAP and network of VAS providers to develop new or scale existing agronomic information tools**	SHFs have limited access to knowledge on improved inputs, extension services, and market information. Access to agronomic and market information offers an opportunity for higher yields and commercialization	A *Digital information systems*	viamo; the sustainable trade initiative; AGRO AgroMall; PxD Precision Development *> 100k farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive · Climate smart · G BMGF focus area · A AFA pillar

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AgriFin can support ginger farmers access export markets through adoption of agronomic techniques and management tools

	Opportunity	Rationale	Themes	Partners / Reach
1	**Support the development of new or scale existing agronomic information tools for both SHFs and aggregators**	Only 10% of Nigeria's ginger meets exports standards due to poor planting and post-harvest handling methods. Washing, drying and splitting have limited processing complexity, but can offer farmers up to 33% higher prices. Access to agronomic information to both SHFs and aggregators will improve product quality	A *Digital information systems*	Olam, AFEX; *+30k farmers*
2	**Support the digitization of cooperatives in major ginger producing locations.** Digital tools can be used for payments, due collection, credit, farmer ID, etc.	Ginger aggregation is highly fragmented. However, most of its production is concentrated in south of Kaduna offering an opportunity to digitize and consolidate the activities by the farmer groups or cooperatives in these areas	G *Farming as a business* A *Digital information systems*	RIBY, Verdant, NOVUS AGRO; *20k – 30k farmers*
3	**Facilitate the development of supply management tools for farmer groups and aggregators to deepen market linkages and enable crop traceability**	Traceability is a big issue, especially for EU exports – traders do not have traceability and supplier management tools to facilitate collection and ensure quality standards	G *Smart logistics* A *Market access*	AFEX; *+30k farmers*

Sources: Dalberg analysis: Stakeholder interviews
Notes: Farmer reach uses a proxy of 10% of the value chain. Assumption is based on the relatively low coverage in the VC

Gender responsive | Climate smart | G BMGF focus area | A AFA pillar

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AgriFin can support the adoption of climate smart farming, mechanization, and efficient aggregation for grains

	Opportunity	Rationale	Themes	Partners / Reach
1	**Support agtechs to scale input credit and mechanization services to farmers** through partnerships with banks and asset financing entities	Farmers have limited access to productivity equipment, which translates to low yields. With access to credit, SHFs can increase fertilizer application and mechanization for better yields	G *Digital credit* A *DFS*	Babban Gona, FMN, hello tractor, thrive agric *40k – 1.1M farmers*
2	**Facilitate the scaling of warehouse receipt system (WRS)** for efficient provision of storage facilities to SHFs	Aggregation is fragmented with numerous middlemen. A warehouse receipt system would incentivize the SHFs to use the storage facilities as aggregation points and offer industrial buyers a source of produce at scale. The WRS would also allow SHFs create an alternative profile for credit access and reduce aflatoxin contamination	G *Smart logistics; Digital credit* A *Digital information systems; Credit; Market access*	AFEX *220k farmers*
3	**Facilitate MNO and VAS partnerships for weather and agronomic information, including early warning climate services**	Grains are vulnerable to climate change. Yields are expected to decrease by 15% by 2030 and 24% in 2050. The value chain must adopt climate smart practices to avoid food security challenges in the future	G *Climate smart advisory* A *Digital information systems*	tomorrow.io, ignitia *+200k farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive | Climate smart | G BMGF focus area | A AFA pillar

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For the rice value chain, AgriFin can help SHFs adopt efficient water management practices and access logistic services

	Opportunity	Rationale	Themes	Partners / Reach
1	**Support the adoption of rice water management systems** as part of climate smart farming practice among SHFs	Prolonged droughts have negatively impacted rice yields. Optimal water management in a rice system, such as alternate wet and dry can reduce methane emissions without adversely impacting yield and potentially increasing yields. It is also a more efficient use of water in many locales	G *Climate smart advisory* A *Climate*	Olam, DANGOTE, Babban Gona *180k farmers*
2	**Support the expansion of smart logistics services for SHFs and aggregators**	12.4% of rice produced is wasted due to inadequate storage and transportation. Access to warehouses and transport facilities would help maintain quality of output and fetch better prices for SHFs	G *Smart logistics* A *Digital information systems*	AFEX *60k farmers*

Sources: Dalberg analysis: Stakeholder interviews

Gender responsive | Climate smart | G BMGF focus area | A AFA pillar

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Opportunities

AgriFin can develop partnerships to scale farmer reach, diversify products, and engage women more inclusively

Suppliers like FCMB, MTN, AFEX, and Babban Gona supply financial and non-financial services…

FCMB	Offers loans and saving products to ~ 7.1M customers. The bank has a strong focus on agricultural lending and reaches ~300K farmers
MTN	Has a 39% market share and a network of over 390K agents and 76M subscribers
AFEX (AFEX COMMODITIES EXCHANGE LIMITED)	Provides credit, training, storage, inputs, and operates digital platforms for commodities trade and business operations management. Reaches 220K farmers
Babban Gona (better your life)	Provides training, financial credit, agricultural inputs, harvesting, and marketing support to member farmers. Reaches 160K farmers

However, uptake of these services could be scaled, which provides attractive partnership opportunities for AFA

Scale farmer reach	Collectively, the four suppliers only reach 680K farmers excluding MTN that does not offer ag-specific products. **AgriFin can support scale by brokering partnerships to increase access to credit, inputs, etc.**
Product diversity	Product diversity is limited for some actors. **MTN only offers DFS but can be supported to design a roadmap to serve farmers and to use its agent network to channel other products**
Gender and climate lens	Limited women engagement is prevalent across actors (4% for Babban Gona and 21% for AFEX). **AgriFin can support program design to increase uptake for women. Additional climate training can also be supported to scale**

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Opportunities

FCMB's "Easy Club" program that provides access to digital savings, inputs, and credit could be scaled to reach over 500k SHFs

Company profile	
Description	Private bank with 7.1 million customers and a strong focus on agricultural lending (5 – 10% of lending portfolio)
Offerings	Savings, credit, transactions, extension service, market linkages
Capital	USD 4.8B
Investors	Public company (517k shareholders)
Scale / Coverage	
Beneficiary reach	~300k farmers
Geography	206 branches across 36 states and 1710 agents
Value chains	Value chain agnostic
Partners	World Savings Banks Institute, IFC, Mastercard Foundation

Business & operating models

Business model

- Offers saving products for fees and loans at interest rates between 15 – 30%
- Provides asset financing to agricultural SMEs including aggregators
- Has developed an easy account product for low-income earners including farmers for saving, money transfers, and bill payments using USSD

Operating model

- Rolled out agency banking country-wide and reaches farmers through an "Easy Club" platform piloted in 6 states, that links input suppliers, markets, and SHFs
- Offers single digit interest loans to SHFs through agents under the ABP program and average interest loans (18% - 30%) to agribusinesses

Challenges

- Difficulty organizing farmers due to low financial literacy
- High cost of training SHFs and agents in rural communities

Potential AgriFin support

- Screen and broker relationships with more input suppliers to onboard on the platform
- Expand partnerships with aggregators for more farmers onboarding
- Design digital training to lower costs for FCMB

Sources:1. FCMB, "Annual Report and Accounts", 2020. FMCB "FCMB Easy Account Launched, Your Phone Number is now Your Account Number", 2021. Stakeholder Interviews, 2021.

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MTN has a wide-reaching network of agents that can be leveraged to supply both financial and non-financial solutions to SHFs

Company profile	
Description	Large multinational telco with a subsidiary in Nigeria with a 39% market share and a network of over 390K agents
Offerings	Internet, mobile telephony, agent banking
Capital	USD 3B
Investors	90% of shares are owned by MTN International Mauritius Ltd, Stanbic IBTC Asset Management Ltd, and Victor Odili
Scale / Coverage	
Beneficiary reach	76M subscribers
Geography	36 states
Value chains	Value chain agnostic
Partners	SANEF, commercial banks

Business & operating models

Business model

- Offers airtime, prepaid data plans, etc. at determined rates
- Licensed under the super-agent network that allows them to offer DFS such as mobile money transfers and agency banking for fees

Operating model

- Uses a network of 395k agents to carry out customer enrollment, agency banking, etc. under its subsidiary Yellow Digital Financial Services
- Customers can operate their own transactions via cell phones

Challenges

- Limited education and financial literacy especially in the North
- Cumbersome regulation to obtain PSB licensing and operate mobile money extensively

Potential AgriFin support

- Support developing a roadmap for serving SHFs in partnership with agtechs and agricultural players and advise on partners to bring onboard, product design, and business modelling
- Design a plan to leverage expansive rural network to deepen farmer reach and channel other products such as inputs, credit, mechanization, weather services

Sources:1. MTN, “Annual Report 2020.” 2020. 2. Stakeholder Interviews, 2021.

Opportunities

AFEX offers warehousing along with other services to farmers that can be scaled by increasing the number of creditors

Company profile	
Description	Private company that aims to enhance productivity, decrease post-harvest losses, and provide market linkages for farmers in Nigeria
Offerings	Supply chain, extension support, credit, market access, insurance, commodity sale
Capital	USD 20M
Investors	Berggruen Holdings, Heirs Holdings, 50 Ventures
Scale / Coverage	
Beneficiaries	220k farmers
Geography	15 states with most SHFs in Kaduna, Niger, Kebbi, and Katsina
Value chains	Maize, cocoa, soyabeans, rice, sorghum, ginger
Partners	WAFMP, UK Aid, OCP, Dangote, AGRA

Business & operating models

Business model

- Leasing storage facilities to SHFs for a fee. The farmers can use the warehouse receipts to secure credit inputs and store commodities
- Provides average loan sizes of USD 200 for up to six months to SHFs at rates between 13% and 18% and insurance at 3 to 4% premium
- Manages the “ComX” platform to trade agricultural assets

Operating model

- Offers 61 storage facilities across 15 states and has a “Workbench” platform for farmers to manage inventory, sell commodities, etc.
- Delivers training through partnerships with Dangote, AGRA, OCP Africa, etc.
- Raises funding through capital markets

Challenges

- Limited tech platforms to help MFIs manage extensive farmer enrolment
- Low digital agriculture profit margins at ~2%
- Fewer women farmers (21%)

Potential AgriFin support

- Support to adopt a greater gender lens in their business and design women-inclusive products
- Support recruit more partners to lower costs and scale extension and loans

Sources:1. AFEX, “Impact Report 2014 – 2020”, 2021.2. Stakeholder Interviews, 2021.

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Opportunities

Babban Gona's farmer trust groups model has demonstrated impact on yields and can be supported to reach 1M farmers by 2025

Company profile	
Description	Social enterprise that aims to increase farmers' access to inputs, credit, and market linkages
Offerings	Extension, credit, inputs, storage, market linkages, insurance products
Capital	~USD 24M
Investors	KFW,GIF, FMO, AgriFin, etc.
Scale / Coverage	
Beneficiary reach	160K farmers
Geography	Six states, i.e., Bauchi, Jigawa, Kaduna, Kano, Katsina, and Plateau
Value chains	Maize, rice
Partners	AGRA, Mulago, BMGF, Skoll Foundation, USAID, Mastercard Foundation

Business & operating models

Business model

- Uses an agricultural franchise model to support farmers with loans that are paid at the end of the planting season

Operating model

- Delivers services through "Trust Groups" of 3 to 5 farmers and provides cell phones for leads. It also uses over 100 field officers to oversee training
- Uses an android application for screening and enrolling farmers and another field mapping platform to map and record data on farms

Challenges

- Limited engagement of women farmers (< 4% of enrolled farmers are women) due to cultural barriers, low land ownership, and financial inclusion
- Limited farmer feedback mechanism on training execution
- Limited uptake of insurance products due to limited awareness

Potential AgriFin support

- Support scaling WEDI* program targeted at women
- Broker partnership with FSP(s) to reach more farmers with credit
- Support design and delivery of farmer training on more sophisticated products and farming practices such as insurance and climate-positive agriculture

Sources:1. FMO, "Babban Gona Evaluation of the Small-Holder Partnership Model", 2019."
Notes: WEDI – Women Empowerment Development Programme

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Robust agents' network, digital focus, and touch points for SHFs of proposed partners can be leveraged to scale digital solutions (1/2)

	FCMB	MTN
Strengths	• **One of the few banks disbursing credit to SHFs** under Anchor Borrower's Program • **Large capacity to raise significant amounts of funding** • **Focus on using agency banking can help reach more SHFs**	• **Established experience delivering last-mile DFS and wide coverage** • **Strong agency network** that can be used to channel other services such as inputs and credit • **Strong emphasis on user-friendly and accessible platforms notably through USSD**
Weaknesses	• **Limited data on impact of programs** as SHF-focused easy club is nascent • **Agent network is still small and has limited rural penetration** • **Current model might lock out farmers not enrolled in cooperatives/other farmer groups**	• **Limited focus on agriculture-specific products currently** • Mobile money not directly tied to improved farmer productivity • **Mandate might be restricted to high volume telecom services** which might limit scaling SHFs' interventions

Sources: Stakeholder Interviews, 2021. Dalberg Analysis

Robust agents' network, digital focus, and touch points for SHFs of proposed partners can be leveraged to scale digital solutions (2/2)

	AFEX (AFEX COMMODITIES EXCHANGE LIMITED)	Babban Gona (better your life)
Strengths	• **Strong focus on digital platforms to avail bundled services to farmers** such as inputs, credit, storage, etc. • **High developed logistics and storage capacities** that can ensure better quality produce • **Current digital marketplaces can connect farmers to high-value markets**	• **Strong bundled services for SHFs** • **Elaborate farmer touchpoint model** that increases likelihood of repayment through follow up with SHFs • **Strong focus on climate resilience and mitigation** through using improved seeds, reducing food waste, and distributing solar home systems • **Increased focus on reaching women** through their Women Economic Development Programme (WEDI)
Weaknesses	• **Expensive model to scale** as requires high CAPEX to build more warehousing • **Digital platforms used required digital literacy that is still low** • **Limited solutions for VCs that require immediate processing** or cold storage such as cassava	• **Small network of field officers** limiting the frequency of extension services • **Limited VC focus (maize and rice)** • **Limited geographical reach**. Strong focus on northern states and limited reach in the South

Sources: Stakeholder Interviews, 2021. Dalberg Analysis

OUTLINE

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- Enabling environment
- Smallholder needs and capabilities
- Solutions landscape
- Opportunity areas
- **Annex**

VALUE CHAIN ANALYSIS

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Five value chains identified offer strong potential for digital agricultural services; they address food security and commercialization needs

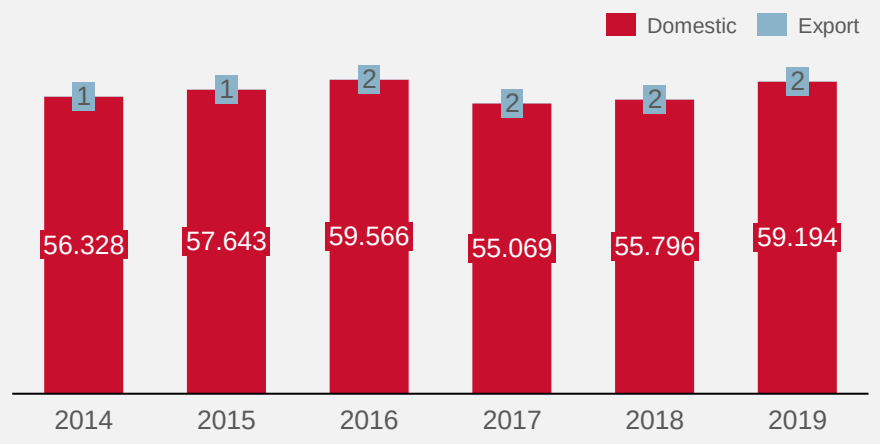
	Cassava	Ginger	Sorghum	Rice	Maize
Description	**Cassava is Nigeria's largest VC, and a staple crop** primarily produced in Southeast states	**A premium horticultural crop** Nigeria is the third largest producer of ginger globally. Primarily produced in Kaduna state	**Sorghum is another staple crop** for Nigeria. Northwest and Northeast zones account for 80% of production	**Rice is one of the major staple foods** mainly grown in the northwestern and north central regions of the country	**Maize is one of the country's staple crops** that is cultivated majorly in the Northern states
Production ('19)[1]	**59.1 million tonnes produced;** 2175 tonnes exported (0.004%)	**6.9 million tonnes produced;** 30922 exported (4.5%)	**6.6 million tonnes produced;** 1170 tonnes exported (0.02%)	**5.6 million tonnes of rice produced,** only 32 tonnes exported	**11 million tonnes produced;** 1407 tonnes exported (0.01%)
SHFs	**Over 1.8 million farmers are engaged in production** and generate 90% of total volume	**300,000 farmers engaged in production on farms between 0.3 to 0.5 ha.** Most primary processing is done by women	**1.5 million sorghum farmers are smallholder farmers**	**1.1 million rice farmers are smallholder farmers** accounting for 80% of all rice farmers	**Over 1.5 million maize farmers cultivate land between 1 and 6 Ha** (considered smallholder farmers)
Structure	Large number of small to medium sized off-takers	Most of the ginger is bought by independent commodity traders	Most of the sorghum is produced for subsistence use	Three quarters of the off-takers are cottage millers	Most marketed maize goes through traders and aggregators

Sources: IITA, An impact assessment of the cassava enterprise development project, 2013; Dalberg analysis: Stakeholder interviews Note: Production figures obtained from FAOSTAT data

Cassava: Nigeria is the world's largest producer of cassava where 99% of production is consumed domestically

Production states

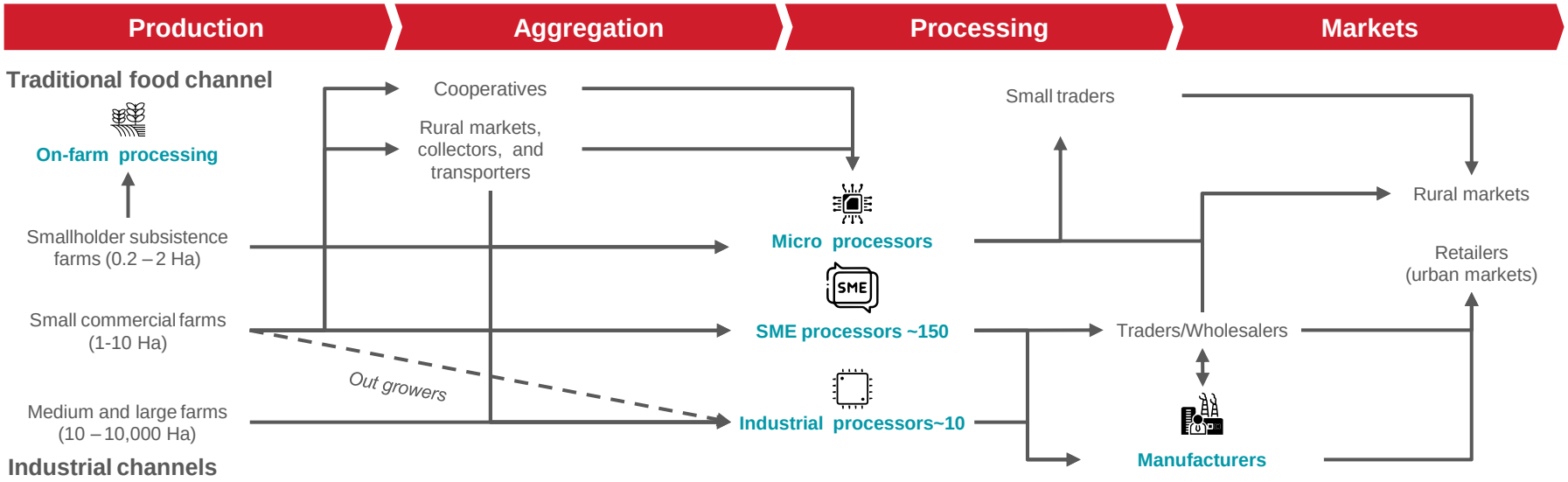
Production volume by markets ('000, tonnes)



- **Cassava is a staple food consumed in both dry and wet forms**, with common products including *garri*—fermented and fried cassava meal and *fufu*- boiled cassava pounded into a dough
- **Over 1.5 M farmers are involved in the cultivation of cassava**
- **Nigeria has the economic potential to generate revenues of $427.3 million from domestic value-addition** and derive income of $2.98 billion in agricultural exports of cassava

Sources: PWC, Harnessing the potential of cassava production in Nigeria, 2020; FAOSTAT

Cassava: SHFs consume most of the cassava produced, with less than 10% of produce going towards coops, traders, and processors



Input providers: AGRA, CGIAR, Indorama Fertilizers, Raw Materials Research Development Connect, and the Root & Tuber Expansion Programme

Development actors: Rockefeller Foundation, IITA,IFAD

Processors: Psaltry International Company Limited (~2.5K farmers), FMS Farms (2K farmers), and Rivers Cassava Processing Company, Flour Mills Nigeria, Arog Bio Allied Agro Services

Sources: Stakeholder interviews; UNIDO, "Unleashing Agricultural Development in Nigeria through Value Chain Financing," 2010; "NIRSAL: Transforming value chains for expanded agricultural lending in Nigeria," 2011; PIND, "Cassava Value Chain Analysis in the Niger Delta," 2011; Dalberg analysis

Cassava: Post-harvest loss remains a challenge due to poor seed variety and aggregation methods

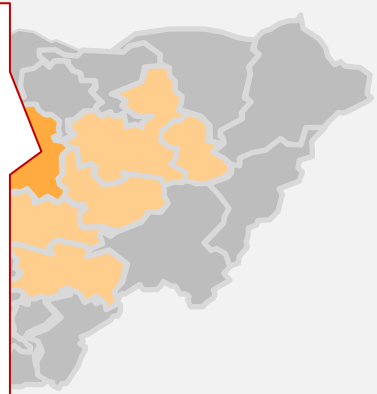
Production	Aggregation	Processing	Markets
Limited rapid multiplication and dissemination of improved seed varieties	Post-harvest loss due to short shelf life. Up to 40% loss in some cases	Underutilization of processing capacity as produce is used for subsistence, along with high post harvest loss	Limited or inconsistent demand for cassava-derived products
Production is dominated by smallholder farmers: • Engages ~ 1.8 M SHFs • 90% farms are 0.2 – 2 ha • Some small farmers plant for semi- commercial purposes on 2-10 Ha • A few thousand mid- size (10-100 Ha) and large commercial farms (>100 Ha) are sources for industrial production, accounting for less than 10% of total volume	**Aggregation is fragmented:** • Aggregators buy at farm gate, accounting for 20% of trade • Large and mid-farms supply directly to processors • Farmer cooperatives also sell to large and mid-farms, accounting for 2 – 8% of trade • Other aggregators buy from rural markets and transport in bulk to larger processors or urban markets	**Rural processing is fragmented and basic:** • Individual households process fresh roots for direct consumption • Traditional small millers produce traditional food products, (>80% of total cassava processing) • Large and mid-size processors produce advanced products like HQCF, starch, and ethanol	**Distribution is fragmented for basic products and concentrated for industrial products:** • Some farmers sell surplus on farm • Retailers of all sizes sell fufu and garri in open markets, stores, and supermarkets • Large processors sell to large manufacturers like wheat mills, biscuit companies, and other food and beverage companies

Sources: Stakeholder interviews; UNIDO, “Unleashing Agricultural Development in Nigeria through Value Chain Financing,” 2010; “NIRSAL: Transforming value chains for expanded agricultural lending in Nigeria,” 2011; PIND, “Cassava Value Chain Analysis in the Niger Delta,” 2011; Dalberg analysis

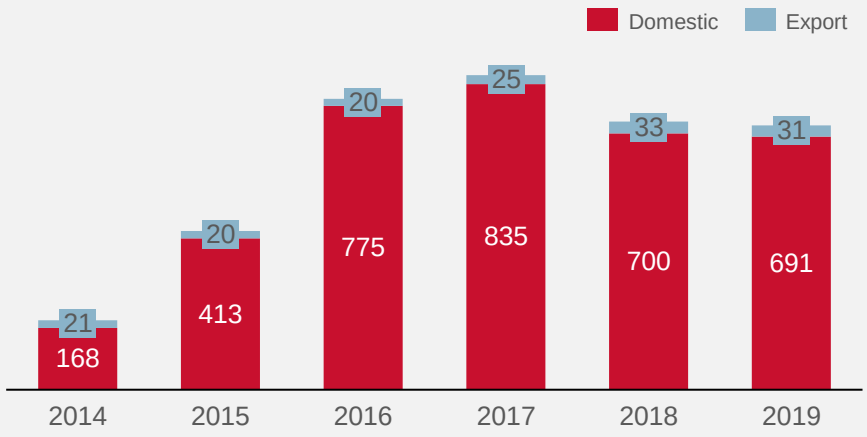
Ginger: Nigeria is the third largest producer of ginger in the world with its production concentrated in the southern part of Kaduna

Production states

Kaduna state produces large the majority of Nigeria's ginger, but neighbouring states in or bordering the Northern Guinea Savanna and Derived Savanna Zones also have some moderate ginger production



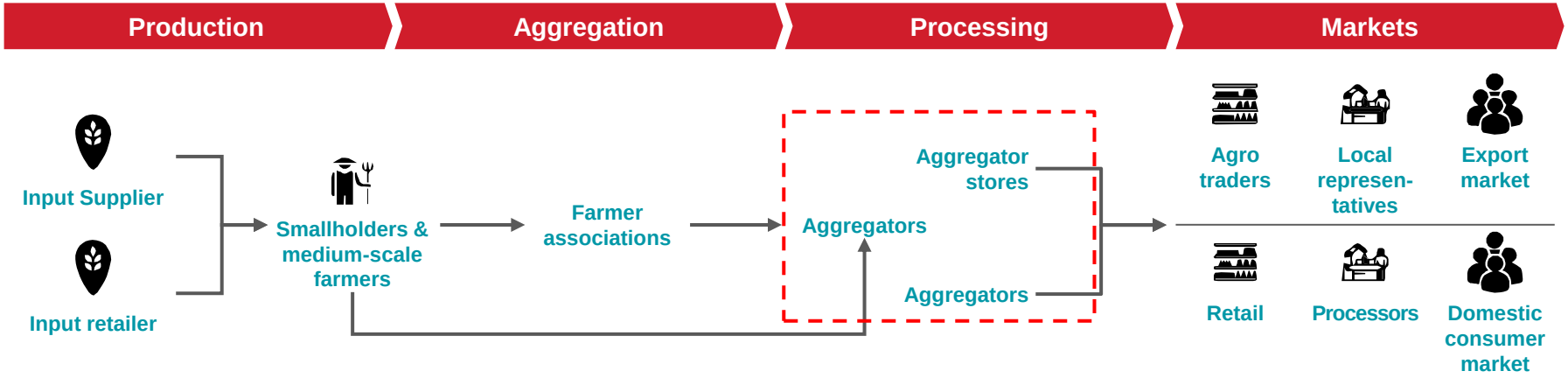
Production volume by markets (millions, tonnes)



- **Kaduna state leads in ginger production (both volumes and quality)**, particularly in the Kachia, Kagarko, Jaba, Jema'a and other southern local government areas.
- **However, Kano state leads in ginger exports** given the it's larger industrial activity and connection to international markets
- **In both states, the production is mainly rainfed,** hence production is dependent on the rain patterns

Sources: Achie, B., Local Government Areas of Nigeria, 2019 Ibrahim, A., Ginger Farming Practice in Jaba Region, Kaduna State, Nigeria, 2018; Johnson, Ginger Farming in Nigeria: A Complete Guide, 2018; Dalberg stakeholder interviews, 2020 ; FAOSTAT; Value Chain Analysis Nigeria Ginger, 2020

Ginger: Aggregators dominate the collection of ginger from farmers, its processing and final distribution to the market



Input providers: Matrix Nigeria Limited, TAK Integrated Company, Notore, Agro-chemical suppliers include MIAGRO, Syngenta, Jubbaili Agrochemicals and BAYER

Development actors: National Root Crops Research Institute, National Ginger Association of Nigeria (NGAN), IDH, GIZ through NICOP

Local aggregators/ processors: Belphins Nig. Ltd, Macedonia, Green Sahara, Olam Nigeria, Tiger Foods, Shandeep and Wacot Nig. Ltd, Levedgate Global Services Ltd

Export market: AACE Foods, Friskas Teas, Verstegen, Solina Group

Sources: Tridge, Analysis on the Ginger Industry in Nigeria, 2020; FAO Stat, ITC Trade Map, 2020; Achie, B., Local Government Areas of Nigeria, 2019 Ibrahim, A., Ginger Farming Practice in Jaba Region, Kaduna State, Nigeria, 2018; Dalberg stakeholder interviews, 2020

Ginger: Inability to meet export standards remains a challenge due to the poor post-harvest handling by the ill-equipped aggregators

Production	Aggregation	Processing	Markets
Limited access to affordable improved farm inputs and agronomic techniques	Aggregation is highly fragmented with dozens of players involved at any one time	Poor post-harvest handling results in poor quality produce. Only 10% meet export standards	Very few producers can meet global food certification standards /organic certifications
Production is traditional and mainly done by women • Farmers generate their own rhizomes by retaining some of their harvest, or by purchasing or being gifted by other farmers • Women manually conduct significant portions of production, especially during the labour-intense portions of weeding, harvesting, and cleaning (90%+ of activity)	**Aggregation is dominated by independent traders** • Traders collect ginger directly from farmers or farmer associations. Some of this is often as a form of repayment for input credit extended during the planting season • Larger aggregators then purchase from traders, and in rare cases directly from farmers in the local markets	**Aggregators handle part of the processing before selling to processors** • Once collected aggregators store, clean and dry ginger further before selling to local processors or international buyers. • The aggregators hire women for manual cleaning and men for re-bagging into higher quality bags	**Aggregators dominate the distribution of ginger to markets** • For local consumption, aggregators market the ginger to processors • For the export market, exporters sell either to traders who often also market a range of other agricultural products, or local representatives of international buyers

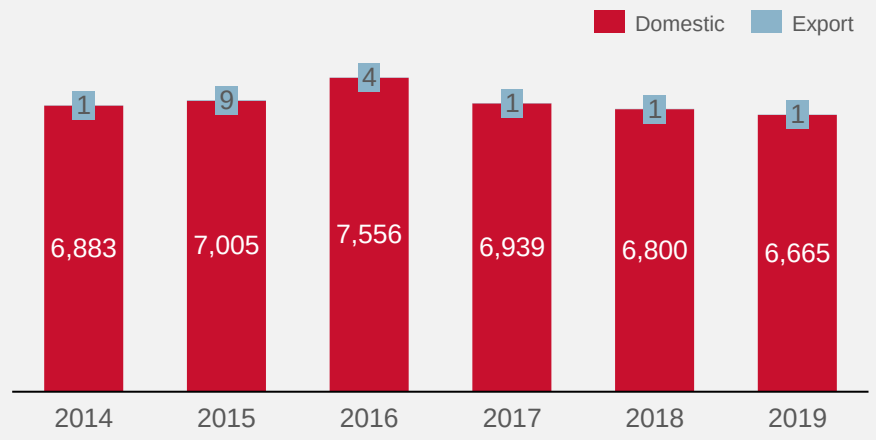
Sources: Achie, B., Local Government Areas of Nigeria, 2019 Ibrahim, A., Ginger Farming Practice in Jaba Region, Kaduna State, Nigeria, 2018; Johnson, Ginger Farming in Nigeria: A Complete Guide, 2018; CBI, Value Chain Analysis Nigeria Ginger, 2020; Dalberg stakeholder interviews, 2020

Sorghum: Nigeria is the second largest producer of sorghum, however, 85% of it is used for household consumption and fodder

Production states

Sorghum is produced in almost all states in Nigeria, with the major producers being in the Savannah areas of the North West and North East zones

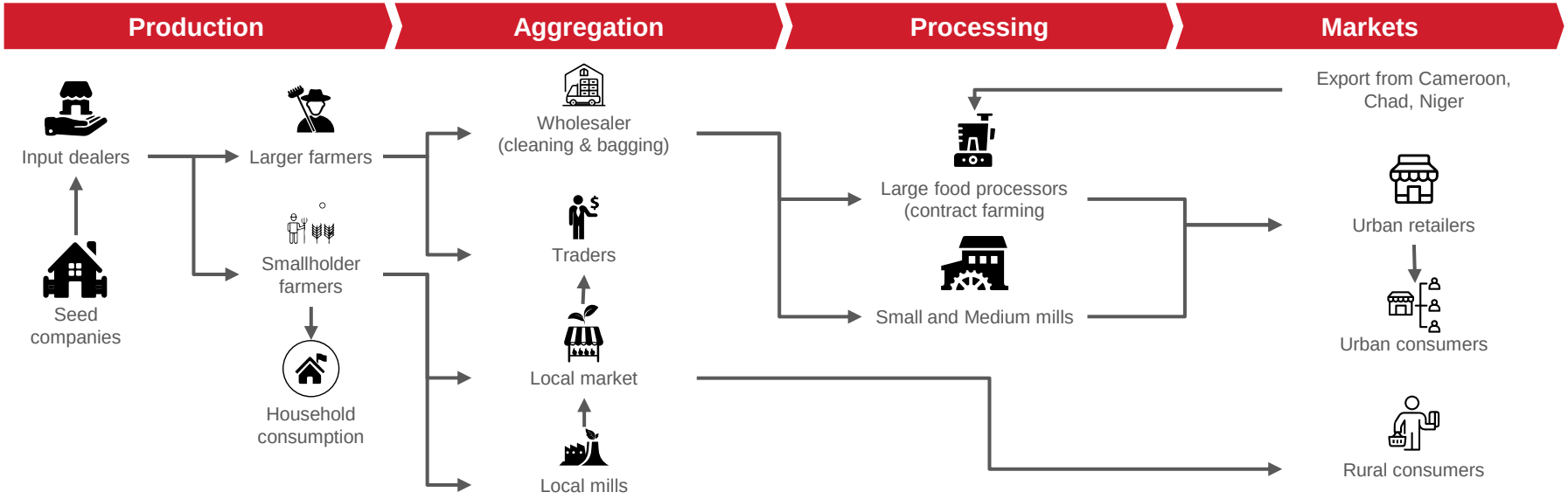
Production volume by markets ('000, tonnes)



- **North West and North East zones account for 80% of production**. Although sorghum is produced in almost all the states, Kano, Katsina, Kaduna, and Borno States account for most of the production
- **Only a small portion of what is left after household consumption and fodder making, is sold to the local market**

Sources: FAOSTAT; MFAP SPAAA, Analysis Of Incentives And Disincentives for Sorghum in Nigeria, 2013; KFW, Agri-Finance in Nigeria, 2012

Sorghum: The sorghum value chain is relatively underdeveloped as most of the produce is for subsistence use



Input providers: IITA, Syngenta Foundation, ICRISTAT

Development actors: IFAD, Africarice, CGIAR, 2SCALE

Processors: Guinness Nigeria (+ 100K farmers), Nigerian Breweries Plc (+200 K farmers)

Buyers: Consumers who buy beer, processed foods, etc.

Sources: 1. Stakeholder interviews; 2. UNIDO, "Unleashing Agricultural Development in Nigeria through Value Chain Financing," 2010;3. "NIRSAL: Transforming value chains for expanded agricultural lending in Nigeria," 2011;Guinness Nigeria, "Guinness Nigeria launches Agricultural scheme, Grow with Nigeria", 2019; Sun News, Nigerian Breweries empowers 250,000 farmers", 2017; African Studies Center Leiden, Sorghum Value Chain Nigeria-Explorative Study, 2020; Dalberg analysis.

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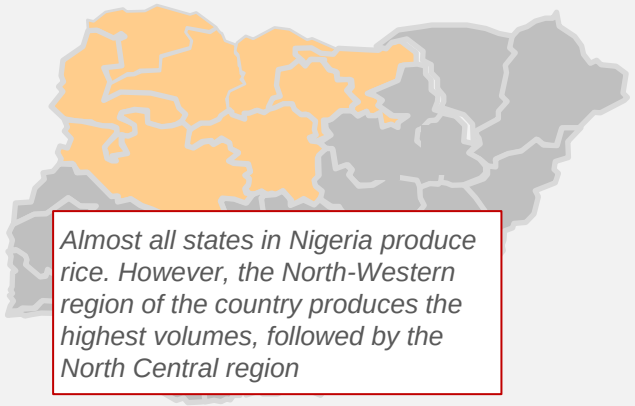
Sorghum: Inefficient production and processing techniques remain a challenge in the development of the sorghum value chain

Production	Aggregation	Processing	Markets
Limited access to affordable inputs and extension services needed to obtain higher yields	High transportation costs due to the poor road network connecting farmers to processors	Inefficient processing due to reliance on on-farm and cottage mills	Lack of market structures to support industrial production and processing of cassava
SHFs dominate production and rely on traditional farming practices, using few and inexpensive inputs • Most farmers have no access to credit to buy better inputs resulting in average yield of ~0.8MT/Ha • Some large off takers like breweries have developed outgrower schemes and provide improved seed; this has improved yields to 2MT/Ha for some farmers	**Aggregation is dominated by traders who buy any surplus from farmer** • Many of the SHFs sell their surplus crop to grain traders at harvest for cash when price is lowest • Traders and collectors then sell to SME processors and a few brewers • Few farmers cooperatives exist as most of the farmers are subsistence and not geared for commercial activity	**Majority of the sorghum never leaves the farm** • On-farm and cottage industry processors currently account for about 90% of sorghum processing, mostly producing products for human consumption • SME processors account for just under 10% of production, while industrial processing accounts for less than 1%	**Fragmented producer ecosystem makes aggregation for industrial processing difficult** • Majority of the sorghum that enters the market goes to micro and small processors for conversion into basic products for human food consumption • Except for malted sorghum, demand for other processed products is not guaranteed

Sources: Stakeholder interviews; UNIDO, "Unleashing Agricultural Development in Nigeria through Value Chain Financing," 2010; "NIRSAL: Transforming value chains for expanded agricultural lending in Nigeria," 2011; African Studies Center Leiden, Sorghum Value Chain Nigeria-Explorative Study, 2020; Dalberg analysis

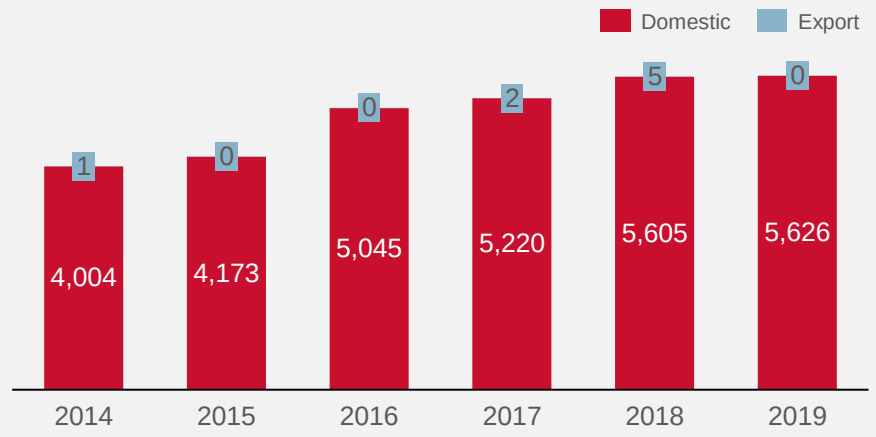
Rice: Nigeria is the largest producer of rice in Africa with 99% of the production consumed domestically

Production states



Almost all states in Nigeria produce rice. However, the North-Western region of the country produces the highest volumes, followed by the North Central region

Rice production volumes by market ('000 tonnes)

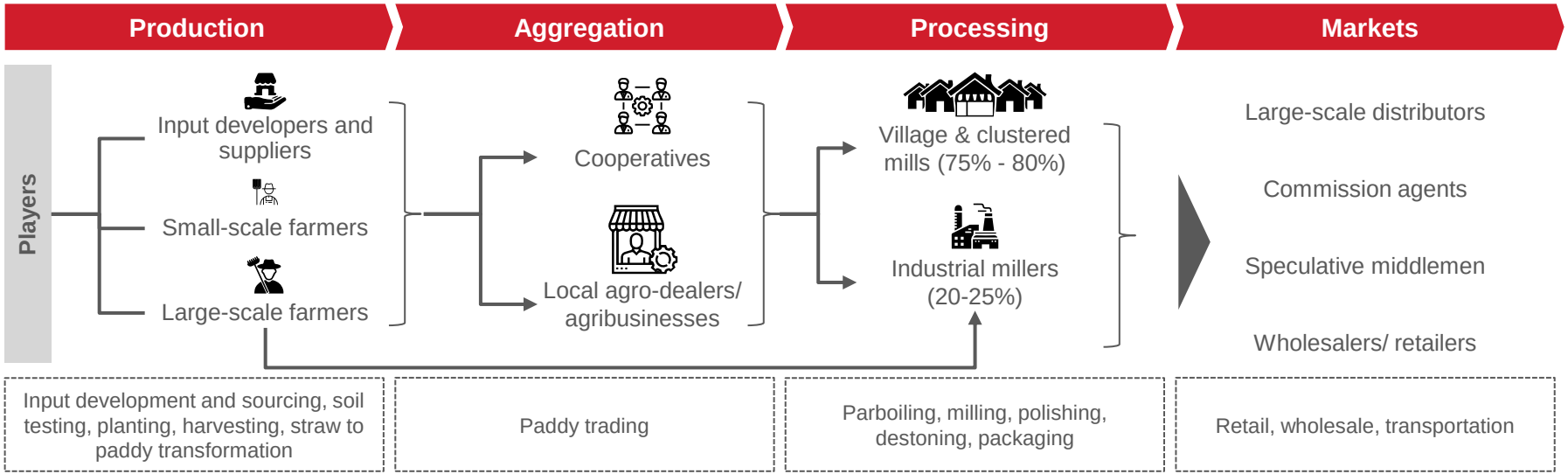


- **Despite the high production, Nigeria is the third largest rice importer globally**. This is attributed to the high consumption and the low yield of ~2 tonnes/ha
- **Rice is the most consumed staple in the country with consumption per capita of 35 kg/ha.**
- **80% of the 1.43 million rice farmers are smallholders.** Commercial farmers account for the remaining 20%

Sources: 1. FAOSTAT, "Crops and Livestock Products" Nigeria Data, 2021. 2. KPMG, "Rice Industry Review", 2019. 3. David O Royal, Vanguard, "Africa: Group Applauds Nigeria As Africa's Biggest Rice Producer, 2020. 4. CABRI, "The Role of Governments In Developing Agriculture Value Chains", 2019. 5. Finelib.com, "Rice Cultivation In Nigeria With The Main Producing States". 6. Dalberg analysis

Value chain analysis

Rice: Rice value chain is dominated by inefficient clustered mills who limit the capacity for domestic production



Example: Players include individual farmers, government, Lapo Microfinance Bank (credit provider)

Example: Babban Gona collects, and stores paddy from its SHFs platform after harvest and offers competitive prices

Example: Olam (+45K farmers), UMZA (228 outgrowers), Dangote (+100K farmers)

Example: Shoprite, Addide Supermarket, Kumi Market, Idumota Market, etc.

Sources: 1.. KPMG, “Rice Industry Review”, 2019. 3. CABRI, “The Role of Governments In Developing Agriculture Value Chains”, 2019. 4. Olam, “The partnership re-imagining the rice value chain in Nigeria”, 2019. 5. UMZA International Farms Ltd

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Value chain analysis

Rice: Additionally, limited access to inputs has limited the ability of farmers to consistently supply commercial millers

Production	Aggregation	Processing	Markets
Limited access to affordable and improved farm inputs	Limited knowledge and application of agronomic techniques	Inefficient processing due to use of poorly managed old machinery in cottage mills	Limited access to premium retail for cottage mills
Production is dominated by smallholder farmers: • 80% of SHF farm on 1-8 Ha with few inputs • There are few medium farmers (20-30 Ha) and the rest are commercial farmers/ outgrowers who often secure big contracts and can sell directly to processors • Majority of production (>70%) is done in rain-fed upland and lowland areas	**The government and a few agribusinesses are supporting farmers to market their produce** • Only 6 % of farmers market their produce as groups /cooperatives • Government has developed schemes to encourage aggregation including the development of 23 aggregation centers • Agribusinesses such as Babban Gona are also supporting farmers to aggregate and sell their produce at competitive prices	**Processing is inefficiently done by cottages, with little left for high quality processing** • Cottage mills process ~75% of total paddy. > 80% of the rice is parboiled resulting in lower quality (>5% broken rice) • Commercial mills process the rest at higher qualities comparable to imported rice but report underutilization due to insufficient supply	**Distribution of rice is dominated by independent traders and retailers** • Majority of Nigerians buy rice from independent traders with supermarkets and modern grocery retailers accounting for only 0.5% of total distribution • Large processors' brands dominate the formal retail market and account for 50% of rice sold in formal retail outlets

Sources: 1. FAOSTAT, "Crops and Livestock Products" Nigeria Data, 2021. 2. KPMG, "Rice Industry Review", 2019. 3. Dalberg Investment Opportunities Studies 4. Dalberg Interviews, 2017. 5 Dalberg Interviews, 2021

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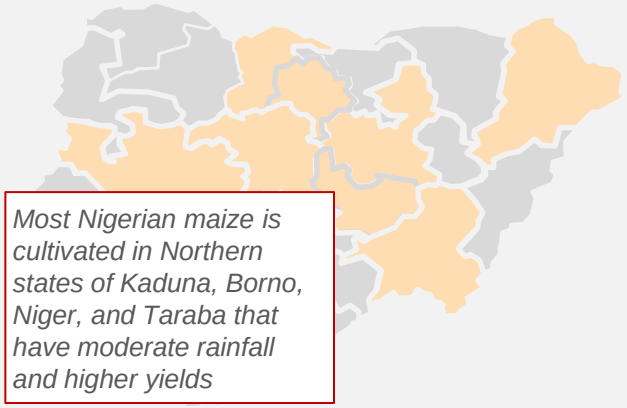
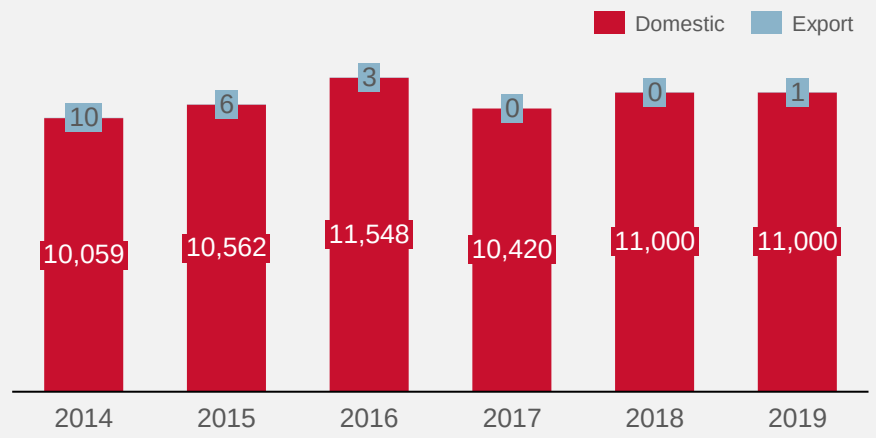
Maize: Most of Nigeria's maize production is consumed domestically, mainly by feed manufacturers who account for 65% of total demand

Production states



Most Nigerian maize is cultivated in Northern states of Kaduna, Borno, Niger, and Taraba that have moderate rainfall and higher yields

Maize production volumes ('000 tonnes)

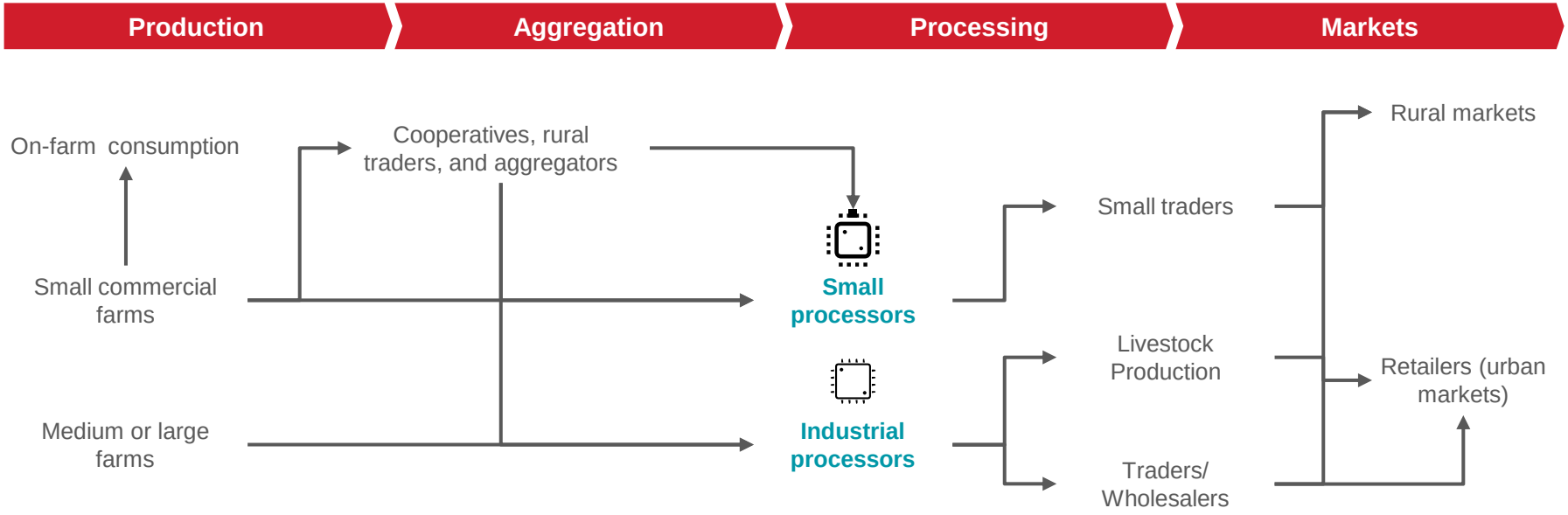


- **Nigeria consumes 11 million MT of maize a year.** Most of the maize produced is consumed by industrial processors particularly animal feed manufacturers such as in the poultry industry who constitute 65 % of the demand
- **Farmers are unable to meet high demand** due to low yields and quality caused by poor post-harvest storage and handling

Sources: 1. FAOSTAT, "Crops and Livestock Products" Nigeria Data, 2021. 3. ThriveAgric, "Maize Production in Nigeria", 2020. 4. Dalberg Previous Studies.

Value chain analysis

Maize: 80% of what is produced by smallholders enters formal industrial processing channels through traders and aggregators



Example: Rice cooperatives, individual farmers

Example: Babban Gona, AFEX

Example: Premier Feed Mills (150K farmers), Flour Mills Nigeria (+25K farmers)

Example: Capsfeed Ltd., Supreme Feeds, Livestock Feeds Plc, etc.

Sources: 1. Flour Mills Nigeria, "Golden Agri Inputs Ltd. (GAIL) Partners With Kaduna State Government On Accelerating The Development Of The Maize & Soybean Value Chain In Nigeria", 2021. 2. Premier Feed Mills. 3. Dalberg Analysis

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Maize: Production is dominated by SHFs, but fragmented aggregation and middlemen contribute to increased prices

Production	Aggregation	Processing	Markets
Limited access to agrochemicals and mechanization equipment	Limited access to aggregation, storage and transportation facilities	High transport costs for small processors with limited access to finance	Fluctuation in prices due to inconsistent supply and middlemen hoarding
Production is dominated by subsistence smallholders: • Farmers with land between 1-6 ha account for 80% of production • 40 to 50% of the produce is consumed on-farm • Few commercial farms operate in the sector • Current production is still very low (1.8 -2.5 tonnes/ha)	**Maize aggregation is fragmented with a mix of cooperatives, agribusinesses and middlemen** • Few farmer cooperatives exists and aggregate produce directly from farmers • Agribusinesses buy from farmer cooperatives and help them secure better prices • There are several middlemen who purchase directly from farmers and hoard the maize to control prices	**Animal feed account for majority of the processed maize output** • Most of the processed maize is for animal feed. 60% of which goes to poultry • Other products include corn syrup, beer, corn oil, corn flour, and corn flakes • Village-level processors are rudimentary. However, they also largely produce animal feed and flour	**Distribution for processed maize is high but limited for raw maize** • Raw maize is mostly consumed on the farm with little quantities penetrating rural markets • Processed products such as flour, animal feed, etc. have a wider market

Sources: 1. Future Agricultures, “The Political Economy of the Maize Value Chain in Nigeria”, 2021, 2. USAID, “Nigeria Maize Value Chain Analysis”, 2012. 3. Previous Dalberg Studies.

VALUE CHAIN METHODOLOGY

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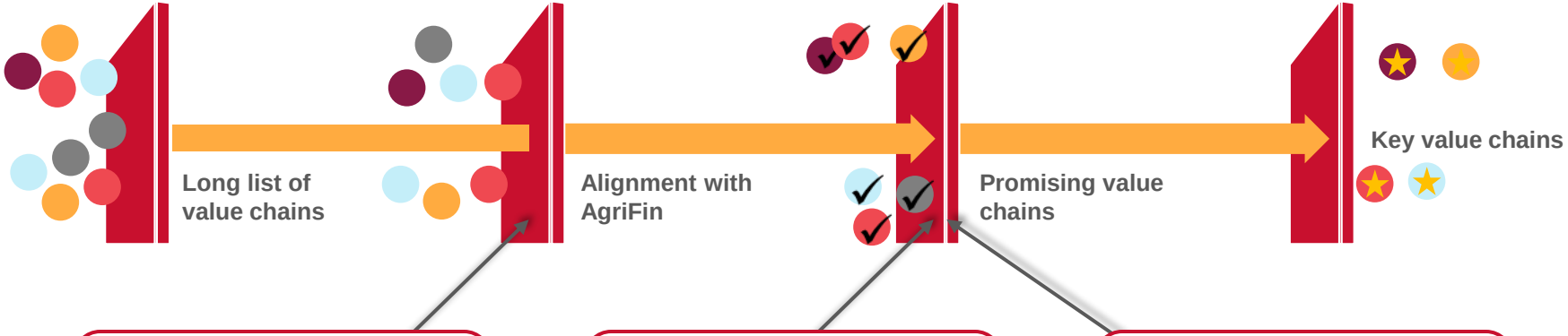
Annex

We assessed 29 value chains for AgriFin engagement based on the ease of entry, scale and development potential

Identification of the key value chains in Nigeria

1. AgriFin (AF) ease of engagement with value chain actors
2. Scale potential of the value chain
3. Impact potential of the value chain



1. AF ease of engagement

Demonstrate readiness to engage with Smallholder farmers (SHFs) and development actors

2. Scale potential

Demonstrate high scale potential in terms of SHFs participation, presence of multiple type of actors in the value chain, and market demand

3. Impact potential

Demonstrate high focus on climate and gender

Source: Dalberg analysis

Annex

We used three main criteria to select key value chains for the assessment of the digital ecosystem potential

Criteria	Description	Parameters for evaluation
AgriFin ease of engagement	• Value chains need to demonstrate presence of development partners • Value chains need to demonstrate readiness for engagement with smallholder farmers	• Number of development partners present in the value chain • Mobile phone access • Number and type of off takers
Scale potential	• Value chains need to demonstrate SHFs participation in local production • Value chains need to demonstrate the presence of multiple type of actors for potential partnerships • Value chains need to demonstrate potential in terms of market demand • Value chains need to demonstrate low level of politics for optimum scale	• Number of smallholders farmers • Presence of multiple actors in the value chain • Export/ import value in terms USD • Government involvement in the value chain
Impact potential	• Value chains need to demonstrate positive impact particularly in terms of gender, and climate change	• Labour participation of women in the value chain • Water footprint of the value chain • Greenhouse gas emissions per kilogram of food product

Source: Dalberg analysis

Annex

We identified 29 value chains to assess the alignment with AgriFin priorities and ease of engagement

Basis of value chain selection

1

The Government of Nigeria through the **Agricultural Promotion Policy (APP 2016-2020)** also known as the Green Alternative **aimed at achieving food security goals, import substitution, job creation, and economic diversification** has identified the following focus value chains[1]:

Domestic Production: Rice, Wheat, Maize, Fish, Dairy milk, Soybeans, Poultry, Horticulture, Sugar

Exports: Cowpeas, Cocoa, Cashew, Cassava, Ginger, Sesame, Palm Oil, Gum- Arabic, Yams, Horticulture, Beef, Cotton, Bananas, Avocado, Mango, Fish

2

The **Nigerian National Bureau of Statistic** (NBS) identified Cassava, Maize, Guinea Corn/ Sorghum, Beans, Yam, Millet, Groundnut, Rice, Cocoyam , Sesame/ Beni-seed as **the top 10 most commonly grown crops in Nigeria in 2019[2].**

3

The **Nigerian National Bureau of Statistic** (NBS) identified Sesamum seeds, Cocoa beans, Sesame oil, Cashew nuts, Shea Nuts/ Cake, Palm nuts and kernels, Linseed, Coconuts, Groundnut Crude oil, Ginger, Castor oil seeds as the **top traded agriculture products in Nigeria in Nigeria in 2020**[3].

Source:
1 FMARD Green Alternative AGRA Nigeria Green Alternative
2 NBS LSMS Integrated Surveys on Agriculture Nigeria General Household Survey Panel, Wave 4 2019
3 NBS Foreign Trade in Goods Statistics (Q4 2020)

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Annex

This long list was assessed based on AgriFin's potential ease of engagement, weighting on partner presence and mobile access

Parameters		Description	Score		
Development partner presence in the value chain	A	Number of development partners present in the value chain through government and private led programs and initiatives	**Low :** 0-1 Development actors	**Medium :** 2-3 Development actors	**High :** 4+ Development actors
Mobile phone access	B	Percentage of access to mobile phone in states with the highest production of the crop	**Low :** below 55% access	**Medium :** 55-70% access	**High:** 70-100% access
Number and type of off-takers	C	Type of off takers present in the value chain: direct local consumption, industrial transformation and export	**Low :** 0-1 type of off-takers	**Medium :** 2 type of off-takers	**High :** 3 type of off-takers

Source: Dalberg analysis

Annex

We selected 11 value chains based on AgriFin's ease of engagement (1/3)

Value chain	Development partner presence in the value chain	Mobile phone access[4]	Number and type of off takers	Overall score
Cassava	High	High	Medium	High
Maize	High	Medium	High	High
Sorghum	High	Medium	High	High
Yam	Low	Medium	High	Medium
Millet	High	Low	Medium	Medium
Groundnut	High	Low	High	High
Rice	High	Medium	Medium	High
Cocoyam	Low	High	Medium	Medium
Sesame seed	High	Medium	High	High
Cocoa bean	Low	High	Medium	Medium
Wheat	Medium	Low	High	Medium
Dairy Milk	High	Medium	Medium	High
Tomato	High	Low	Medium	Medium
Ginger	High	Medium	High	High
Turmeric	Low	Medium	High	Medium
Aquaculture	Medium	High	Medium	High
Cashew nuts	Medium	High	High	High

Source: 4 GSMA Intelligence Country overview: Nigeria June 2014; Dalberg analysis

Annex

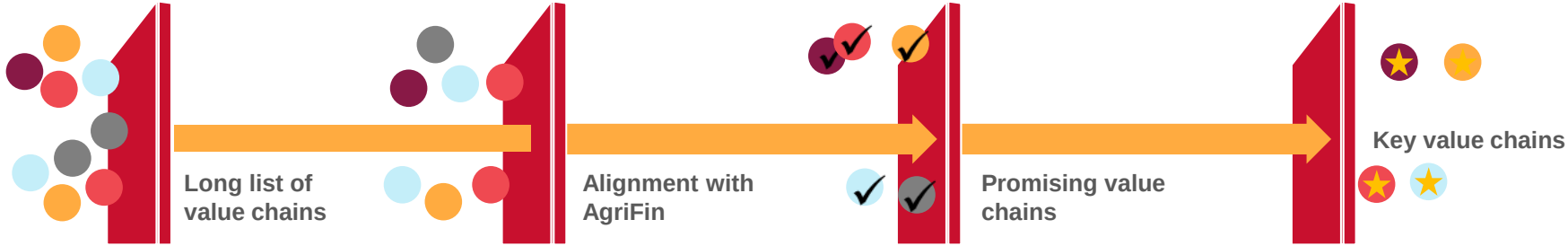
We selected 11 value chains based on AgriFin's ease of engagement (2/3)

Value chain	Development partner presence and work in the value chain	Mobile phone access[4]	Number and type of off takers	Overall score
Shea nuts	Low	Medium	Medium	Medium
Palm nuts and kernels	Low	High	Medium	Medium
Coconut	Low	Medium	Medium	Medium
Soybean	High	Low	Medium	Medium
Poultry	Low	High	Medium	Medium
Sugar	Medium	Medium	High	High
Gum-Arabic	Low	Low	Medium	Low
Beef	Low	Medium	Medium	Medium
Cotton	Low	Medium	Medium	Medium
Banana	Low	Medium	High	Medium
Avocado	Low	Medium	Medium	Medium
Mango	Medium	Low	High	Medium

Source: Dalberg analysis

Annex

We selected 11 value chains based on AgriFin's ease of engagement (3/3)



Initial list of 29 value chains

- Cassava
- Maize
- Sorghum
- Yam
- Millet
- Groundnut
- Rice
- Cocoyam
- Sesame seed
- Cocoa bean
- Wheat
- Dairy Milk
- Tomato
- Ginger
- Turmeric
- Aquaculture
- Cashew nuts
- Shea nuts
- Palm nuts and kernels
- Coconut
- Soybean
- Poultry
- Sugar
- Gum-Arabic
- Beef
- Cotton
- Banana
- Avocado
- Mango

11 value chains selected

- Cassava
- Maize
- Sorghum
- Groundnut
- Sesame seed
- Dairy Milk
- Ginger
- Aquaculture
- Cashew nuts
- Sugar
- Rice

The **11 selected value chains** were further evaluated to **assess their scale and impact potentia**l in order to prioritize five **value chains for the deep dive analysis**.

Source: Dalberg analysis

Annex

The shortlisted value chains were further assessed based on their scale and development impact potential (1/2)

Parameters		Description	Criteria		
Smallholder farmers	A	% of farming households growing crops in Nigeria	**Low :** below 6%	**Medium :** 6-20%	**High :** 20-100%
Actors in the value chain	B	Type of actors present in the value chain: Input suppliers, Farmers, Marketers, Exporter, Processor, Retailer, Distributor, Consumers, supporter (MNOs, Fintech, etc)	**Low :** 0-2 type of actors	**Medium :** 2-4 type of actors	**High:** 4+ type of actors
Export/ import value	C	Crop USD total export/ import value	**Low :** 0-5 million USD	**Medium :** 5-50 million USD	**High :** 50 million USD
Government involvement in the value chain	D	Presence of government body in charge of the regulation of all activities in the value chain	**Low :** Yes	**Medium :** …	**High :** No
Women labor participation	E	% of female household farming activities based on regions with the highest production of the crop	**Low :** below 20%	**Medium :** 20-50%	**High :** 50-100%
Water footprint	F	Global average water footprint of primary crops and derived crop products (m3/ton)	**Low:** above 6000 m3/ton	**Medium:** 3000-6000 m3/ton	**High :** 0-3000 m3/ton
Greenhouse gas emissions per kg of food product	G	kilograms of carbon dioxide equivalents ($kgCO_2eq$) per kilogram of food product	**Low :** above 40 kg	**Medium :** 10-40kg	**High :** 0-10 kg

Source: Dalberg analysis

Annex

The shortlisted value chains were further assess based on their scale and development impact potential (2/2)

Value chain	Smallholder farmers	Actors in value chain	Export value	Import value	Government involvement	Women labor participation	Water footprint	Greenhouse gas emission	Overall score
Cassava	High	High	Low	High	High	High	High	High	High
Maize	High	High	Low	Medium	High	Low	High	High	High
Sorghum	High	High	Low	Low	High	High	Medium	High	High
Groundnut	Medium	High	Low	Low	High	Medium	High	High	Medium
Ginger	Low	High	Medium	Low	High	High	High	High	High
Rice	High	High	Low	High	High	Low	High	High	High
Sesame seed	Low	High	High	Low	High	Medium	Low	High	Medium
Dairy Milk	Low	High	Low	High	High	Low	Low	High	Medium
Aquaculture	Low	High	Medium	High	High	Low	Low	Medium	Medium
Cashew nuts	Low	High	Medium	Low	High	High	Low	High	Medium
Sugar	Low	High	Low	High	Low	Medium	High	High	Medium

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Annex

Cassava, maize, sorghum, ginger and rice were prioritized based on this assessment

Initial list of 29 value chains

- Cassava
- Maize
- Sorghum
- Yam
- Millet
- Groundnut
- Rice
- Cocoyam
- Sesame seed
- Cocoa bean
- Wheat
- Dairy Milk
- Tomato
- Ginger
- Turmeric
- Aquaculture
- Cashew nuts
- Shea nuts
- Palm nuts and kernels
- Soybean
- Poultry
- Sugar
- Gum-Arabic
- Beef
- Cotton
- Banana
- Avocado
- Mango

10 value chains selected

- Cassava
- Maize
- Sorghum
- Groundnut
- Sesame seed
- Dairy Milk
- Ginger
- Aquaculture
- Cashew nuts
- Sugar
- Rice

5 prioritized value chains

- Cassava
- Maize
- Sorghum
- Ginger
- Rice

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RESEARCH INPUTS

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Annex

We built our perspectives based on 31 interviews with a broad group of stakeholders

Interviews conducted

Development partners
- USAID
- GIZ
- Bayer Foundation
- CGAP
- EFInA
- IFAD
- World Bank
- Bill & Melinda Gates Foundation

Financial institutions
- Sterling Bank
- FCMB
- MTN
- Airtel

Farmer groups
- Kagarko Unity Turmeric Farmers' Cooperative Association
- Rice Farmer Group Rep- Aminu
- Rice Farmer Group Rep– Kabiru Suru
- Jet Farms- Farmer Group

Ag-tech
- Babban Gona
- Ignitia
- Pula Insurance Advisors
- AFEX
- Cash2Crop
- CoAmana
- Riby
- AgroMall
- Viamo
- Hello Tractor
- Social Lender

Incubator/ Accelerator
- IITA Business Incubation Platform (BIP)

Agribusinesses
- Tractors Owners & Hiring Facilities Association of Nigeria
- Flour Mills Nigeria
- Indorama Fertilizers

Annex

We also conducted in-depth desk research looking at a range of sources including studies conducted by Dalberg in other assignments

Desk research included a high-level review of the following

2021
- Rural Hub, Commodity Chain Analysis of Groundnut Sector in Nigeria

2020
- NBS, Nigeria Gross Domestic Product Report
- PWC, Current State of Nigeria Agriculture and Agribusiness Sector
- GSMA, AgriTech in Nigeria Investment Opportunities & Challenges
- Partech, Africa Tech Venture Capital Report
- The World Bank Group, Creating Markets in Nigeria
- EFInA Access to Financial Services in Nigeria 2020 Survey
- Universal Financial Access
- ThriveAgric, Maize Production in Nigeria
- Tridge, Analysis on the Ginger Industry in Nigeria
- AGRA, Smallholder Farmers Survey

2019
- World Bank and ILO Data, Employment by Sector: Nigeria
- CGAP, National Survey and Segmentation of Smallholder Household in Nigeria
- NBS, LSMS integrated surveys on agriculture Nigeria
- The World Bank Group, Nigeria Digital Economy Diagnostic
- KPMG, Rice Industry Review
- Traditional and Modern Groundnut Processing and Marketing in North Central Nigeria
- CTA, The Digitization of African Agriculture, 2019

Pre 2018
- The Human Account Data, Nigeria
- National Financial Inclusion and Development Strategy 2018–2023
- PWC, Transforming Nigeria's Agricultural Value Chain
- FINDEX report, 2017
- FMARD, The Agriculture Promotion Policy (2016 – 2020)
- MFAP SPAAA, Analysis of Incentives and Disincentives for Sorghum in Nigeria, 2013
- KFW, Agri-Finance in Nigeria, 2012

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