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MAINSTREAMING CLIMATE ACTION INTO NIGERIA'S DEVELOPMENT PLAN

POLICY PAPER

Mainstreaming climate change into agriculture and food security in Nigeria

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About this Series

Nigeria has made notable progress on climate action in recent years: the submission of its updated Nationally Determined Contribution (NDC) to the UNFCCC; the passing of the Climate Change Act; and the establishment of the National Council on Climate Change (NCCC), to name but a few. However, operational challenges remain. Misalignment of targets and goals, overlapping institutional mandates and multiple points of interface with government all present obstacles to further progress.

This series of eight research briefs aims to support the Nigerian government in overcoming these hurdles and mainstreaming climate action across its key economic sectors and development agenda. The series provides a comprehensive analysis of the challenges and opportunities associated with integrating climate considerations into Nigeria's economic planning, with a focus on both adaptation and mitigation.

The briefs delve deep into specific sectors crucial to Nigeria's economy and climate future. These include: decarbonizing the petroleum and transportation sectors; aligning industry, trade, and investment with climate goals; promoting climate-smart agriculture and food security; leveraging the digital economy for green development; analyzing the role of critical minerals in Nigeria's climate transition; and exploring the potential of green jobs. Each brief examines existing policies, initiatives, and institutional frameworks within the sector, identifying climate-related risks, vulnerabilities, and opportunities. Furthermore, they provide concrete recommendations for policy changes, capacity building, and investment strategies to facilitate climate action.

By analyzing climate finance opportunities, highlighting the role of the private sector, and emphasizing the importance of aligning with international climate commitments, the series offers a roadmap for Nigeria to achieve a sustainable and climate-resilient future. The research not only provides valuable insights for policymakers but also fosters collaboration among government institutions, private sector actors, and development partners to effectively mainstream climate action into Nigeria's national development agenda.

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Acronyms

AAI	ActionAid International
ADF	Agricultural Development Fund
AFO	Annual Flood Outlook
AFOLU	Agriculture, Forestry and Other Land Use
AI	artificial intelligence
ALCCMS	Agricultural Land and Climate Change Management Services
AP	Agro-Pocket
ASI	Agricultural Stress Index
ATAPS	Agricultural Transformation Agenda
COP	Community of Practice
CSA	Climate Smart Agriculture
CSOs	civil society organizations
ECM	Enterprise Content Management System
FAO	Food and Agricultural Organization
FGN	Federal Government of Nigeria
FMAFS	Federal Ministry of Agriculture and Food Security
FMARD	Federal Ministry of Agriculture and Rural Development
FMD	Federal Ministry of Defense
FME	Federal Ministry of Education
FMEnv	Federal Ministry of Environment
FMF	Federal Ministry of Finance
FMH	Federal Ministry of Health
FMI	Federal Ministry of Interior
FMP	Federal Ministry of Power
FMTI	Federal Ministry of Trade and Investment
FMMSD	Federal Ministry Mines and Steel Development
FMWater	Federal Ministry of Water Resources
GDP	gross domestic product
GHG	green house gas
GIEWS	Global Information and Early Warning System
GIP	Green Imperative Projects
GRID	Global Report on Internal Displacement
LGA	Local Government Area
MDA	ministries, departments and agencies
MCO	Mining Cadastral Office
NAGS-AP	National Agricultural Growth Scheme and Agro Pocket
NASPA-CCN	National Adaptation Strategy and Plan of Action on Climate Change for Nigeria
NADF	National Agricultural Development Fund
NATIP	National Agricultural Technology and Innovation Policy
NLTP	National Livestock Transformation Plan
NBS	Nigerian Bureau of Statistics
NCCC	National Council on Climate Change

NDC	Nationally Determined Contributions
NESREA	National Environmental Standards and Regulations Enforcement Agency
NGOs	non-governmental organizations
NIMET	Nigeria Meteorological Agency
PPP	public-private partnerships
PSPAs	Policy Support Programs & Actions
PSALI	Partnership for Securing Agricultural Land and Investment
R&D	research and development
REA	Rural Electrification Agency
SHWF	smallholder women farmers
SPA	Sustainable Participatory Agriculture
US	United States

Executive Summary

The integration of climate action into Nigeria's agriculture policy and food security strategy is essential for addressing both national food security challenges and global climate commitments. The alignment between the Federal Ministry of Agriculture and Food Security (FMAFS) Roadmap and Strategy, the National Agricultural Technology and Innovation Policy (NATIP) and Nigeria's Nationally Determined Contributions (NDC) Action Plan underscores the need for sustainable agricultural development that prioritizes climate adaptation and mitigation efforts. Unfortunately, these established alignments are not backed by adequate financing and capacity utilization. By directing budgetary resources and reaching out for international climate finance, towards climate-resilient agricultural practices, Nigeria can simultaneously enhance food security and achieve its climate goals, reinforcing the country's commitment to sustainable development.

NATIP is closely linked to Nigeria's NDC goals for the agricultural sector, which include promoting sustainable practices, reducing greenhouse gas emissions and building resilience against climate impacts. However, analysis of the sector's performance reveals critical challenges in both budgetary allocations and implementation. Between 2022 and 2024, the capital budget allocation for the Ministry of Agriculture ranged between 70-88% of the total agricultural budget, yet actual spending was only an average of 17% of NATIP's target. This gap highlights inefficiencies in the utilization of funds, which severely hampers the achievement of both agricultural and climate objectives.

The poor capital budget utilization across various ministries, departments and agencies (MDAs), including the FMAFS, can be attributed to several factors. These include the unavailability of funds due to projected revenue shortfalls, delayed releases and inconsistent distribution of budgeted revenue, where other sectors, such as security or political welfare, may be prioritized over agriculture. Inflation further erodes the real value of the budget, particularly the capital expenditure, reducing its effectiveness in driving meaningful sectoral development.

Additionally, certain elements within the capital and overhead budgets lack critical details like specifications, timelines and implementation plans, creating opacity that disrupts procurement processes and weakens monitoring, resulting in the misuse of the allocated funds. Another contributing factor is the limited human capacity within MDAs, bureaucratic hurdles and a reluctance to explore partnerships with the private sector and experts. Systemic and human-induced obstacles in civil service procedures, particularly where conflicts of interest exist among top officials, further slow down the procurement processes, impede progress and hinder potential collaborations.

Key findings emphasize that despite the NATIP and the sector capital budget allocation aligning with national climate and food security priorities, issues such as poor budget utilization, poor coordination, limited exploration of local adaptation initiatives and lack of transparency hinder progress. The limited capital budget usage, coupled with challenges in meeting procurement procedures, delays in fund disbursement and inadequate human capacity, obstructs the implementation of climate-smart agricultural projects. These inefficiencies not only undermine the agricultural sector's potential to improve food security but also limit its contribution to climate adaptation and mitigation efforts.

The report also finds that the Ministry of Agriculture has focused disproportionately on rural infrastructure projects that do not directly address food security or climate resilience.

Community-led initiatives in Nigeria have emerged as a vital force in addressing climate change and enhancing agricultural resilience. These grassroots efforts often outperform state-led climate actions due to their ability to leverage local knowledge and cultural understanding. These initiatives allow communities to identify specific vulnerabilities and develop tailored adaptation strategies, fostering greater engagement and ownership among community members. The flexibility and adaptability of community-led initiatives enable them to respond swiftly to changing environmental conditions, a significant advantage over state-led programs that may face bureaucratic inefficiencies and lack coordination.

Despite the advantages of community-led initiatives, there is a pressing need for their upscaling as a climate action strategy. By integrating local experiences into broader national policies and frameworks — such as the National Adaptation Strategy and Plan of Action on Climate Change for Nigeria (NASPA-CCN) — policymakers can enhance the effectiveness of climate actions across the country. This integration ensures that strategies are both relevant and impactful, addressing the unique challenges faced by different communities.

To achieve meaningful progress, Nigeria must direct budgetary resources toward climate-resilient agricultural practices while actively seeking international climate finance. By doing so, the country can enhance food security and fulfill its climate goals, reinforcing its commitment to sustainable development.

To effectively mainstream climate action into agricultural policy, a comprehensive set of recommendations is proposed:

- **Increase agricultural and climate action funding**: Significantly raise budgetary allocations for agriculture to meet the 10% target set by the Maputo Declaration. Funds should prioritize projects enhancing climate resilience, such as sustainable farming practices and renewable energy solutions. Additionally, establish dedicated funds at local levels to support community-led adaptation projects through partnerships with governmental and non-governmental organizations.
- **Community-based learning initiatives:** Establish farmer field schools where smallholders can learn from each other about successful adaptation techniques, fostering peer-to-peer learning and strengthening community ties. Develop leadership programs for local leaders to facilitate community engagement in project implementation.
- **Reprioritize budget allocations for climate-smart agriculture**: Focus spending on initiatives that directly address food security and climate action, including promoting agroforestry and renewable energy adoption in farming.
- **Develop agricultural insurance schemes:** Create affordable insurance products that protect against climate-related losses, encouraging farmers to adopt riskier but potentially more productive practices without fear of total loss.
- **Enhance coordination for climate-resilient agriculture**: Strengthen policy coordination among Ministries to align agricultural policies with climate action plans. Establish an inter-agency task force to promote collaboration across sectors.
- **Build capacity to access climate finance**: Enhance institutional capacity at both community and organizational levels to effectively access international climate finance through targeted training programs focused on proposal writing and fund management.
- **Support mechanization with climate-friendly technologies:** Promote the use of solar-powered irrigation systems, bio-digesters and energy-efficient processing tools that contribute to increased productivity while minimizing carbon footprints.

- **Promote organic agriculture, agroecology and afforestation**: Expand support for organic farming initiatives by increasing budgetary allocations for local adaptation projects that improve soil health and biodiversity.
- **Strengthen local research and development (R&D):** Invest in R&D focused on context-specific climate-smart farming techniques through partnerships between research institutions and local communities.
- **Promote community-based agroecology networks:** Facilitate local agroecology networks that encourage collaboration among farmers, non-governmental organizations (NGOs), research institutions and government agencies to drive innovation and resource sharing.
- **Enhance transparency and accountability**: Establish robust reporting mechanisms to ensure the effective utilization of funds allocated to climate-resilient agriculture while promoting transparency in budget processes.
- **Strengthen security for farmers:** Collaborate with local communities to create community policing frameworks that safeguard farmers' assets while establishing conflict resolution mechanisms at the local level.
- **Strengthen monitoring and evaluation for climate action:** Enhance monitoring systems to assess the effectiveness of climate-related agricultural interventions to ensure projects achieve their intended outcomes in food security and climate resilience.
- **Facilitate knowledge exchange platforms**: Create forums or digital platforms where farmers can share experiences related to climate adaptation practices, fostering a culture of continuous learning.
- **Encourage public-private partnerships (PPPs):** Promote collaborations between government agencies, private sector actors and local communities to leverage resources, expertise and technology in implementing climate-resilient agricultural practices.

Agriculture in Nigeria: The slopes

Agriculture in Nigeria plays a crucial role in the economy, contributing approximately 19% to 25% to the country's overall gross domestic product (GDP) between 2023 and the first quarter (Q1) of 2024 (Figure 1). In the Q1 2024, agricultural crop production accounted for about 19.24% of GDP, compared to trade (15.7%), telecommunications and information services (14.58%), oil and gas (6.38%), financial institutions (6.35%), real estate (5.20%), food, beverages and tobacco (5.11%) and construction (4.01%) .

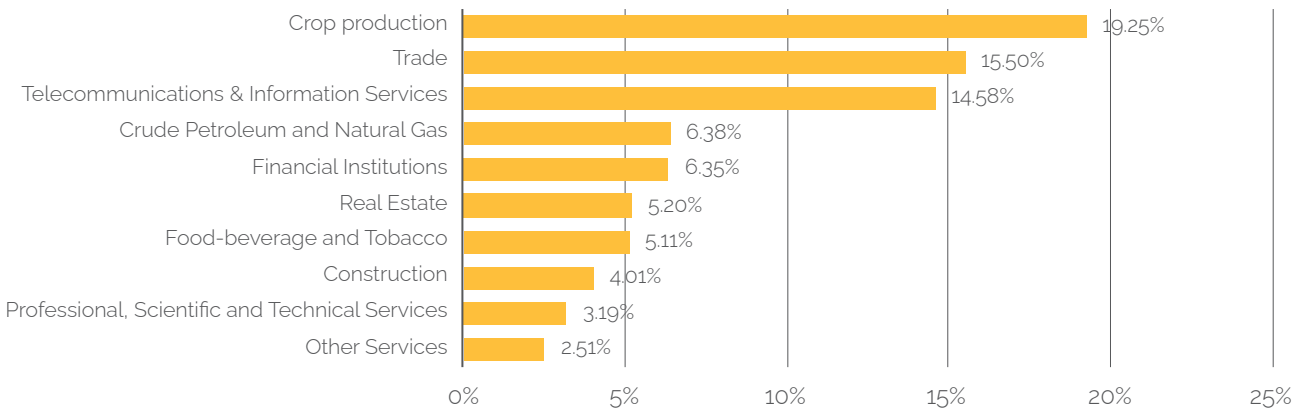
Smallholder farmers, most of whom are women, predominantly characterize the agricultural landscape in Nigeria. These farmers typically engage in subsistence farming, focusing on food crops for local markets and producing over 60% of food production. They remain the backbone of Nigeria's agricultural sector – feeding the nation amidst a multitude of challenges and experiencing over 40% food wastage, partly as a result of these challenges.

More than half of the country's population, precisely 152 million (or 68%), live in highly vulnerable conditions (World Poverty Clock, 2024). This includes living in physical, social, economic and environmental conditions that increase the susceptibility of its citizens and communities to the impacts of climate change and other socioeconomic deprivations. The Food and Agriculture Organization (FAO) predicts that about 26.5 million people in Nigeria will face food shortages by the end of 2024 (BusinessDay Nigeria, 2024). This crisis is exacerbated by ongoing conflicts, climate irregularities, removal of petrol subsidies in May 2023 and rising food production costs.

Food inflation has surged, with rates exceeding 34% as of May 2024, driven by rising prices of staples due to supply shortages and insecurity (Nigerian Bureau of Statistics [NBS], 2024). According to the World Bank, this rising inflation caused the number of impoverished Nigerians to rise from 89.8 million in the beginning of 2023 to a staggering 104 million in 2024 (BusinessDay, 2024).

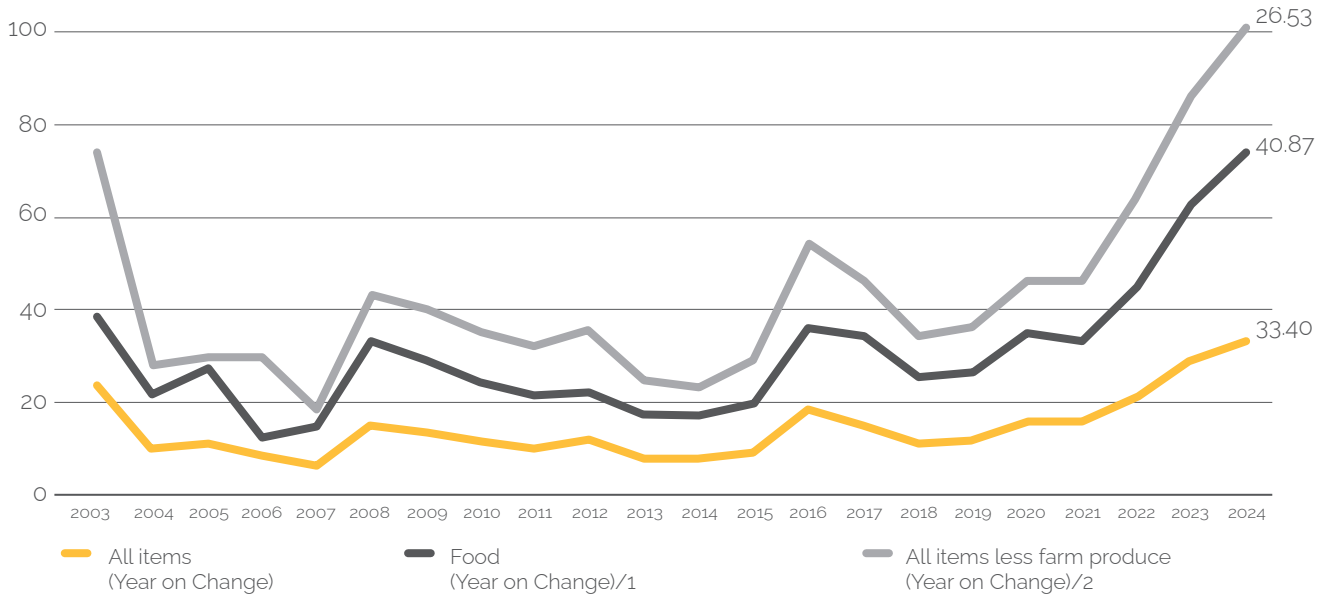
Despite efforts to boost local production, Nigeria still imports substantial quantities of farm inputs like fertilizer, pesticides and staple foods, including staples like rice, where only 57% of the 6.7 million metric tons consumed annually is produced locally (FAO, 2024).

Figure 1: Agriculture to GDP (%) from 1999 - 2023



Source: Nigerian Bureau of Statistic, Nigeria GDP Report Q1 2024

Figure 2: Inflation Rate in Nigeria 2003 - 2024

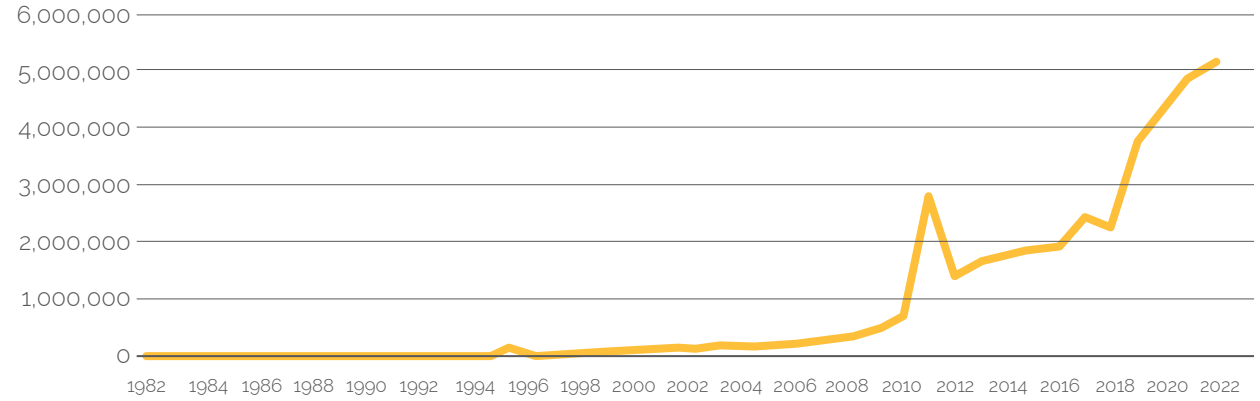


Source: Central Bank of Nigeria (CBN) Statistical Bulletin

Nigeria recorded a 121.7% increase in the value of imported foods within the 5-year period, rising to NGN 1.9 trillion in 2022 from NGN 857 billion in 2018. Nigeria's food and beverage import bill increased by 30% from NGN 1.21 trillion in the fourth quarter of 2023 to NGN 1.59 trillion in the first three months of 2024 (NBS, Q1 2024). According to the International Trade Administration (2023)[1], Nigeria relies on USD 10 billions of imports to meet its food and agricultural production shortfalls (mostly wheat, rice, poultry, fish, food services and consumer-oriented foods). Europe, Asia, the United States (US), South America and South Africa are major sources for Nigeria's agricultural imports.

Nigeria is particularly vulnerable to the adverse effects of climate change due to its fragile economy, low resilience and limited capacity to adapt. The country's economy relies heavily on climate-sensitive ecosystems and natural resources, with the agricultural sector largely dependent on rainfall.

Figure 3: Value of Major Food Import in Nigeria 1982 – Q2 2022



Source: Central Bank of Nigeria (CBN) Statistical Bulletin

Extreme weather events, such as floods and droughts, have increasingly disrupted agricultural production in Nigeria. Key staples like rice, maize and sorghum are particularly affected, pushing many smallholder farmers and communities into cycles of poverty. The frequency of these climate-induced events has escalated, leading to severe consequences for food security and livelihoods.

As rainfall patterns become more erratic, farmers face challenges in planning planting and harvesting schedules. In northern Nigeria, prolonged droughts have resulted in decreased water availability for irrigation and crop growth. Meanwhile, southern regions experience heavy rainfall that leads to flooding, damaging crops and infrastructure.

The interplay of rising temperatures and changing precipitation patterns exacerbates these challenges. For instance, increased heat can lead to heat stress in both crops and livestock, negatively impacting productivity. The cumulative effect of these climate-related challenges not only threatens food security but also undermines the economic stability of farming communities across Nigeria. Moreover, inadequate infrastructure hampers farmers' access to markets and increases post-harvest losses, making it difficult for them to effectively sell their produce.

These challenges are further exacerbated by ongoing violence and conflicts, banditry, kidnapping and insurgent attacks, particularly in northern Nigeria – making farms unsafe for smallholder farmers and farming communities as well as threating climate actions, especially in the rural areas.

To address these challenges, urgent action is needed to enhance the resilience and adaptive capacity of smallholder farmers while prioritizing sustainable agricultural practices within policy frameworks.

Research Questions

These research questions will guide a comprehensive examination of how Nigeria's agricultural policies are addressing climate change and help identify effective strategies for the mainstreaming of climate action in the near future:

- How effectively have agricultural policies in Nigeria, such as NATIP (2022–2027), integrated climate change considerations into their strategic frameworks?
- What specific climate-related challenges do stakeholders in Nigeria's agricultural sector face, and how do these challenges vary across different regions and crop types?
- What existing programs, projects and initiatives aimed at mitigating climate change effects and/or improving food security have been implemented in Nigeria's agricultural sector and how effective have they been?
- What core recommendations can be derived from an analysis of current policies to better embed climate considerations into Nigeria's development and economic planning processes?
- How can stakeholder engagement be improved to ensure that smallholder farmers' perspectives are included in policy formulation regarding climate action?

Aim of this policy document

In light of the pressing challenges posed by climate change to Nigeria's agricultural sector, it is imperative to emphasize the need for a focused policy brief that examines how agricultural policies and strategies have mainstreamed climate change in their plans and actions. The policy document will assess the alignment in the

Sector Policy document - NATIP (2022 – 2027), its Strategic Road Map (2023 – 2027), implementation strategies and public expenditure for climate-related programs, projects and activities. The anticipated outcome will be core recommendations that support the embedding of climate considerations into the country's development and economic planning processes. The document will analyze existing efforts, projects and initiatives, identifying climate-specific challenges and opportunities.

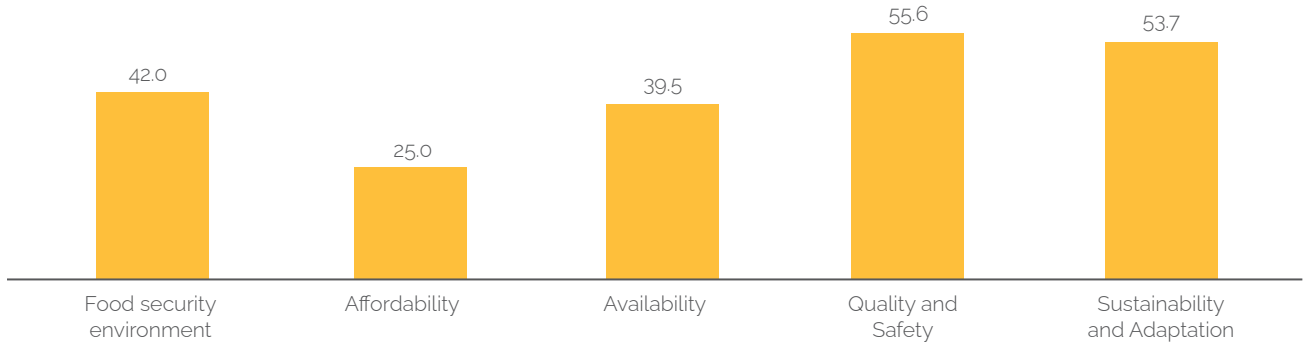
Climate change: Loss, damage and risk on Nigeria's food security

Nigeria ranked 107th out of 113 countries in the 2022 Global Food Security Index (Punch, 2023a) and most recently, 109th out of 125 countries in the 2023 Global Hunger Index (Tribune, 2024). With a score of 28.3 in the 2023 Global Hunger Index, Nigeria has a level of hunger that is serious (Global Hunger Index, 2023).

Between 2020 and 2022 alone, an average of 21.3% of the country experienced hunger (Statista, 2024). According to the Food and Agricultural Organization (FAO), this situation could potentially worsen, as it warned that over 26.5 million Nigerians were at risk of hunger in 2024.

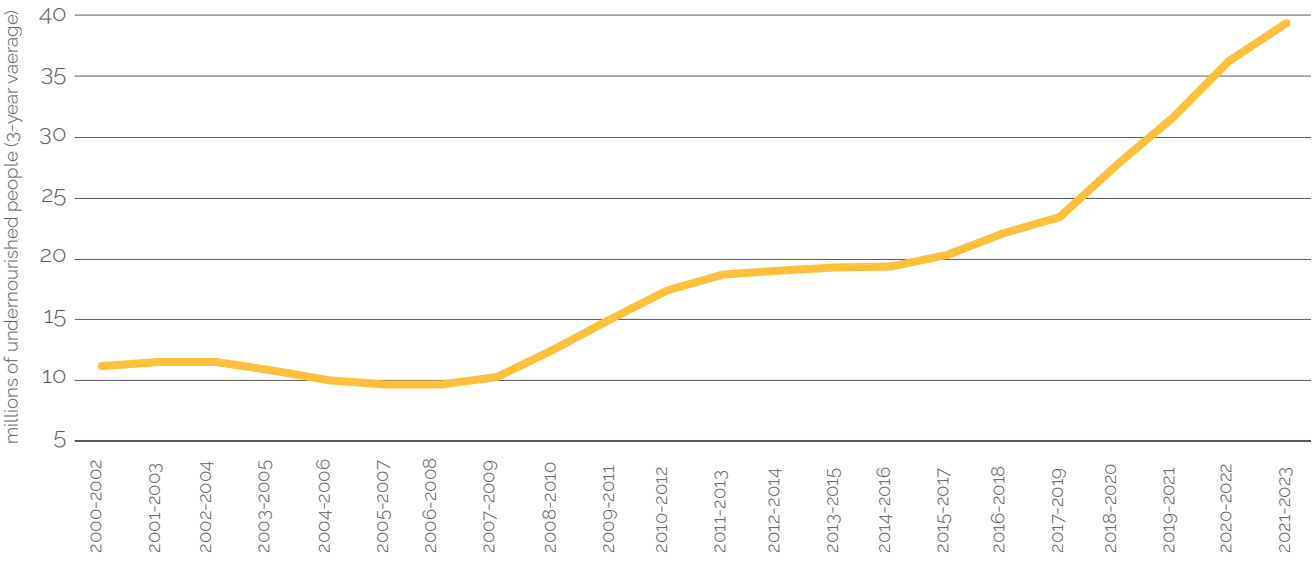
The estimates for 2024 indicate a sharp rise from the 18.6 million people currently vulnerable to food insecurity (from October to December 2023) (FAO in Nigeria, 2023).

Figure 4: Global Food Security Score for Nigeria 2022



Source: Global Food Security Index 2022

Figure 5: Number of People Undernourished in Nigeria 2000 - 2023



Source: FAOstat

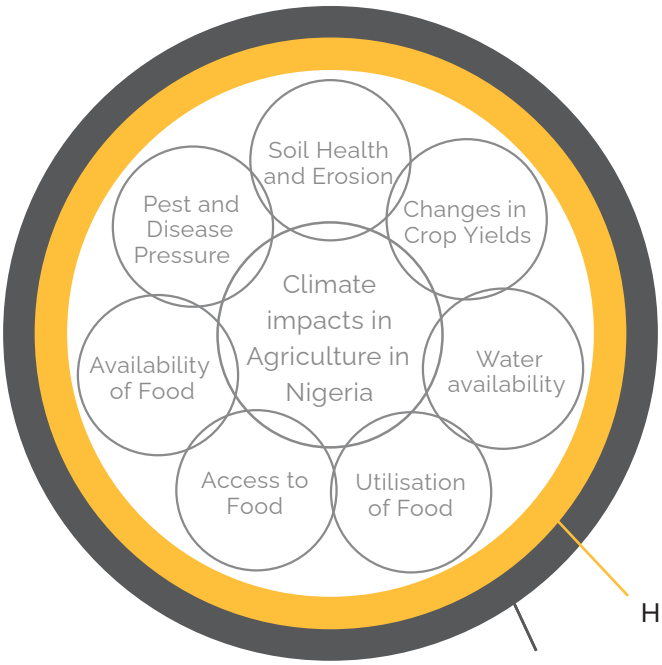
Of the 2024 figures, approximately 9 million children are at risk of suffering from acute malnutrition or wasting (nearly 4.4 million of these children are in northwest and northeastern Nigeria (IPC, 2024). For the 2024 lean season, it was estimated that the figures would go as high as 31.8 million people in acute food insecurity (GIEWS, 2024).

With a population projected to increase to over 400 million people by 2050 and approximately 35% living in extreme poverty as of April 2024, the United Nations predicts that 82 million Nigerians may go hungry by 2030 (Punch, 2024). The Federal Ministry of Agriculture projects that the demand for staple food will increase by over 50% by 2050. By 2080, agricultural production in the country is expected to decline by 10% to 25%, as the decline in rain-fed agriculture could be as much as 50% (ActionAid Nigeria, 2022). The UN has called on the Nigerian government to tackle climate change, pest infestation and other threats to agricultural productivity.

Climate change poses significant threats to Nigeria's agricultural sector and food security. These impacts are multifaceted, affecting crop yields, food availability, access, utilization and stability, as a result of the alteration of rainfall patterns, increasing temperature, soil degradation, increasing incidents of pests and diseases, water scarcity, diminishing nutritional values, increasing production costs and reduced farmer income, forcing pastoral migration, conflicts and the displacement of agrarian communities.

In northern Nigeria, prolonged droughts and rising temperatures are major concerns. These conditions particularly affect rain-fed crops such as maize and sorghum, leading to decreased yields and increased food insecurity. The Sahel region is experiencing desertification, which threatens arable land and exacerbates competition for resources among farmers and herders.

Figure 6: Intersection between Climate Impact, Food Insecurity and Conflict



Cereal Production in Nigeria	2018-2022 average	2022	2023 estimate	change 2023/2022
	'000 tonnes			*percent*
Maize	12,691	12,949	11,053	-14.6
Rice (paddy)	8,387	8,854	8,902	3.7
Sorghum	6,702	6,806	6,402	-5.9
Others	2,077	2,135	1,754	-17.9
Total	29,857	30,475	28,111	-7.8

Source: Author's Analysis and FAOGIEWS – Nigeria Country Profile Cereal Production.

Conversely, southern Nigeria is grappling with increased rainfall and flooding, which disrupt agricultural activities. Crops like cassava and yams are particularly vulnerable to waterlogging, leading to significant yield losses. Coastal areas face additional challenges from rising sea levels, which threaten farmland through saltwater intrusion and flooding. The central regions experience a mix of these challenges, with increased aridity affecting both crop and livestock productivity. The variability in rainfall patterns complicates farming schedules across all regions, making it difficult for farmers to plan effectively.

Crop yield

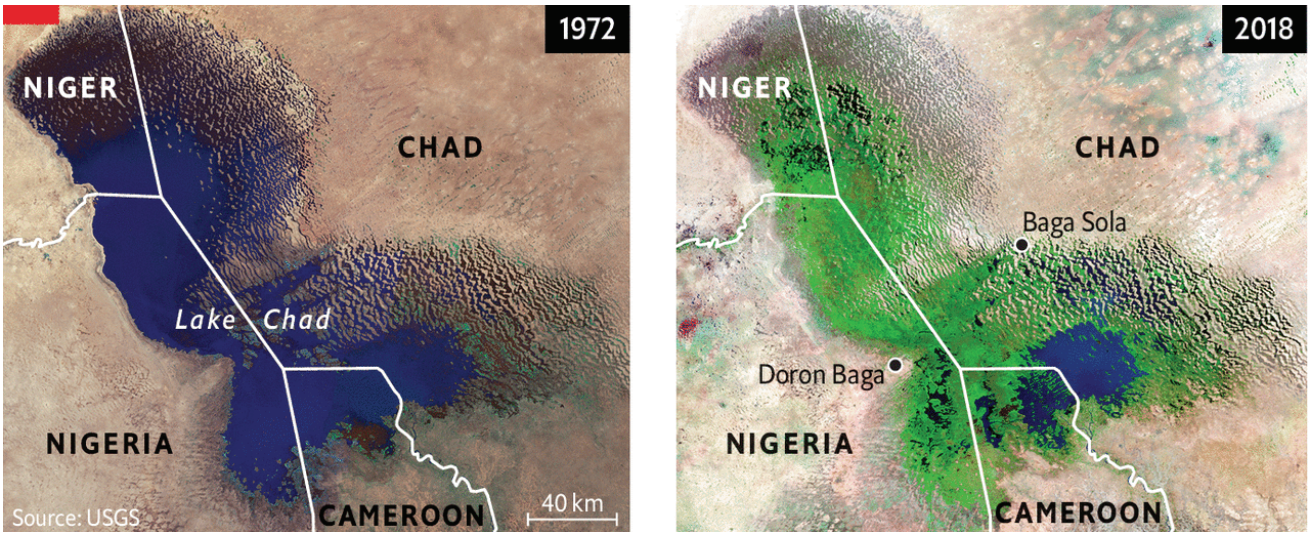
Increases in temperature and altered precipitation patterns have led to negative impacts on crop yields, particularly in lower-latitude regions of the country. For instance, crops such as maize and wheat have shown declines in yield due to climate stressors, while some higher-latitude regions have experienced yield improvements for certain crops. According to the FAO – Global Information and Early Warning System (GIEWS), the 2023 aggregate cereal production is estimated at 28.1 million tons, about 5 percent below the five-year average and about 8 percent below the previous year's level. Dry spells, limited access to fields due to insecurity and high costs of agricultural inputs, which led to a decrease in planted area, resulted in a reduced cereal outturn (GIEWS, 2024).

The Nigeria Meteorological Agency (NIMET) has reported changes in rainfall patterns, including a delayed onset and an early cessation of rains, leading to increased drought occurrences and reduced soil moisture (Ani et al., 2022). According to FAO's Agricultural Stress Index (ASI), as of end-July 2024, between 40 and 85 per cent of cropland in these areas was affected by drought conditions. For instance, in Adamawa State, precipitation amounts have been below average since the start of the season, hindering plantings and leading to crop wilting and stunting.

Water scarcity, drought and desertification

Desertification affects as much as 60% of Nigeria's land. This is exacerbated by drought and climate change. For instance, Lake Chad, once one of Africa's largest lakes that catered for over 30 million people, has experienced significant shrinkage due to a combination of climate change and human activity.

Figure 7: Satellite image of Lake Chad 1972 vs 2018.



Source: Earth Resources and Observation Science (EROS) Center, USGS

The lake's surface area was approximately 2,000 to 4,800 square kilometers in 2018 (about 1,850 square miles), a drastic reduction from around 25,000 square kilometers in the 1960s and even more from its historical size of about 28,000 square kilometers in the 1870s (GIZ, 2015). Over the past few decades, it has shrunk by over 90%, primarily due to a combination of climate change, unsustainable water usage and prolonged droughts in the Sahel region.

Violent conflict

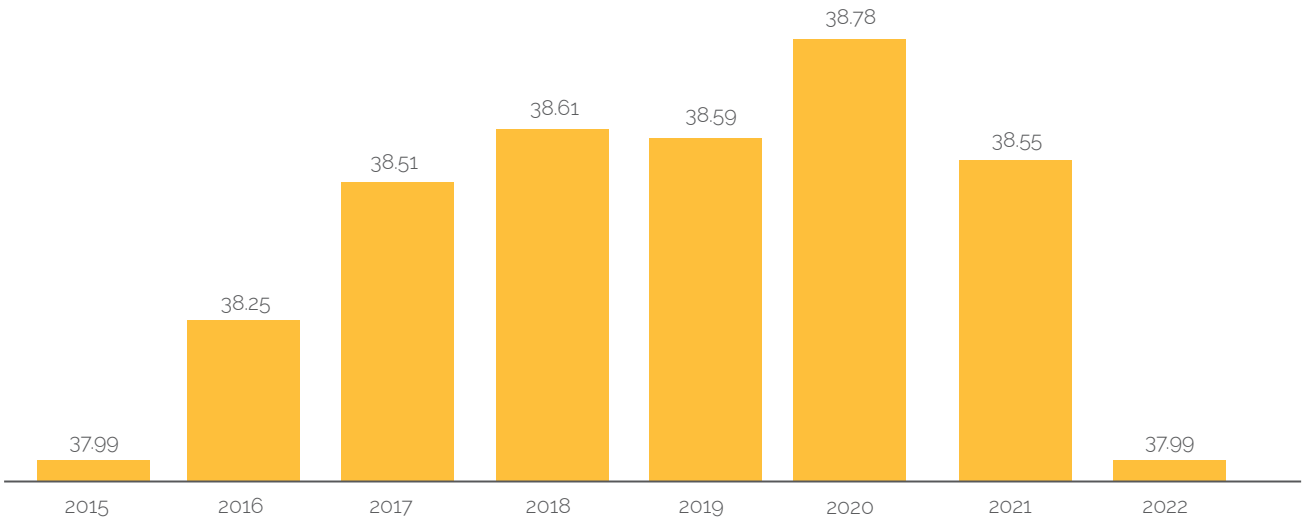
Environmental changes, such as desertification and changing rainfall patterns, have intensified competition for land and water resources, contributing to conflicts between agricultural and pastoral communities. Climate change is increasingly recognized as a significant driver of violence and displacement in Nigeria, particularly in regions already vulnerable to socio-economic and environmental stresses.

As of June 2024, about 3.4 million people were estimated to be internally displaced, leading to a significant reduction in agricultural labor availability in these regions, with many farmers unable to cultivate their lands due to insecurity. Reports indicate that northern Nigeria accounts for 68% of violent deaths related to land disputes, highlighting the critical link between environmental stressors and conflict (Olagunju T.E et al., 2020). The resulting violence and resource competition have forced many individuals to migrate in search of safer and more sustainable livelihoods. According to the Global Report on Internal Displacement (GRID) 2024, a total of 457,000 people were internally displaced by conflict and disaster in 2023 in Nigeria. Of this figure, 291,000 were displaced by violent conflict (Global Report on Internal Displacement, 2024). While the rest were displaced by disaster related factors such as flooding. The violent conflict and insecurity on farms across Nigeria led to a marked decline in agricultural labor supply as individuals flee violence and seek safer, alternative livelihoods.

Flood and soil health

Climate change contributes to soil degradation in Nigeria, where extreme rainfall events lead to flooding, erosion and nutrient loss. The degradation of soil health results in lower agricultural productivity and threatens the livelihoods of rural communities that depend on farming.

Figure 8: Proportion of Direct Labour Employment in Agriculture Sector in Nigeria



Source: International Labour Organization. "ILO modelled estimates database" ILOSTAT

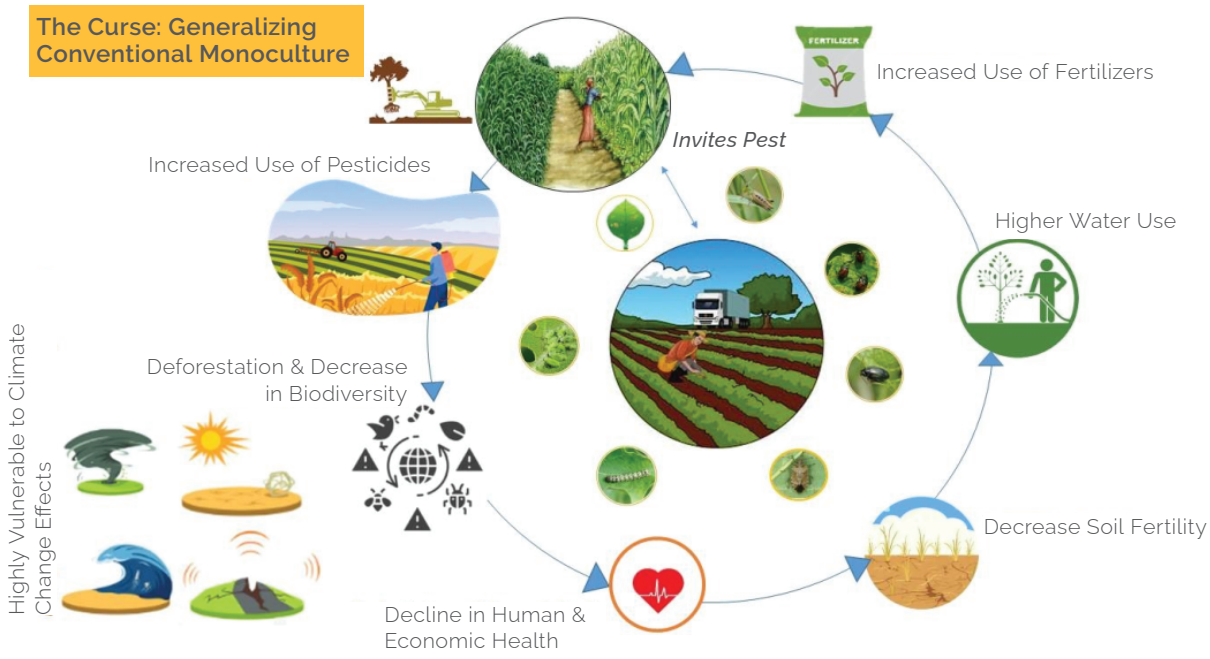
The primary climate hazards faced by the coastal regions of Nigeria include floods, storms and erosion, which account for over 76% of the average annual hazard occurrences from 1980 to 2020 (World Bank, 2014). Between 1980 and 2000, Nigeria experienced flooding in six separate years, a number that surged to 18 between 2001 and 2020 (ibid.). It is estimated that in Abia, Anambra and Imo States, there are no fewer than 600 gully erosion sites (FMoEnv, 2021).

In 2012 alone, the floods affected over 7 million Nigerians, displacing over 3.87 million people (Federal Government of Nigeria, 2012). Thirty out of Nigeria's 36 states were affected, notably Kogi and Benue. The floods caused extensive damage to infrastructure, with reports indicating that nearly 600,000 houses were either damaged or destroyed. The flooding devastated agricultural lands, with approximately 152,575 hectares of farmland destroyed. This destruction had long-term implications for food security, as many farmers lost their crops and livelihoods. The estimated economic losses from the floods were around NGN 2.6 trillion (approximately USD 16.9 billion) (Punch, 2013), which included damage to property, infrastructure and agricultural losses.

In 2018, the country was again struck with flooding, affecting 12 states. Over 2 million people were impacted, with 199 deaths and over 4,000 people injured. More than 600,000 people were internally displaced. The damages to property and agricultural land were massive (Nigeria NDC, 2021).

More recently in 2022, Nigeria suffered its deadliest flood on record, displacing 1.5 million people (Carrington, 2022). The flood destroyed more than 200,000 homes. A little over 600 people across the country died due to the flood (WEF, 2022), which affected 33 out of the 36 states in Nigeria. The floods also destroyed thousands of hectares of farmland (266,000 acres), ultimately costing the agricultural sector about NGN 700 billion (USD 9 billion) in damages (Bloomberg, 2022). Key agricultural businesses like Olam Nigeria, which produces a quarter of Nigeria's rice, said 10,000 acres of their farmland were submerged, leading to a shortfall that could raise prices (WEF, 2022).

Figure 9: Conventional monoculture increasing climate vulnerability and food insecurity



Source: Author's Analysis

The 2024 Annual Flood Outlook (AFO) Report identified 148 local government areas spanning 31 states in Nigeria as high flood risk areas for the year 2024, from April to November 2024. These regions are characterized by erratic rainfall patterns, river basin dynamics and inadequate hydraulic infrastructure, which amplify the potential for devastating flood impacts on communities, agriculture and infrastructure.

Agricultural pests and diseases

Climate change is driving the spread of pests and diseases in Nigeria, as warmer temperatures and increased humidity create ideal conditions for infestations. This has led to higher crop losses and increased pest management costs, threatening food security and agricultural income. In May and December 2023, outbreaks of diseases like Tuta absoluta and ginger fungus, exacerbated by conventional monoculture (which can cause pathogenic bacteria to thrive) and high temperatures, caused farmers to lose over NGN 12 billion. With Nigeria already facing a deficit of 1.3 million metric tons of tomatoes, these infestations could push the shortfall to 3 million metrics tons, creating widespread uncertainty and discouraging tomato farming (Punch, 2023b). Similarly, the National Ginger Association reported that 70% of its members' plantations were wiped out by fungi, resulting in losses exceeding NGN 10 billion (ibid.).

Food/farm systems

Pre-Colonial Farming in Nigeria primarily focused on large scale subsistence agriculture to meet the needs of their large facilities as well as sell in community market and neighboring villages. Farm systems were mostly intercropping and mixed farming (a combination of crops and livestock) agriculture. This included a diverse range of crops such as yams, cassava, millet and sorghum, tailored to local climatic and soil conditions. Farmers utilized traditional farming methods, including shifting cultivation and mixed cropping (Agriculture Nigeria, 2022). These practices promoted biodiversity and soil health, as different crops were grown together to enhance resilience against pests and diseases.

With the arrival of colonization, colonial policies significantly influenced the shift to conventional monoculture farming in Nigeria by restructuring agricultural practices to align with British economic interests. The British colonial administration prioritized the production of cash crops such as cocoa, groundnuts and palm oil for export. This shift was driven by the need to supply raw materials to British industries and generate revenue for the colonial government. As a result, traditional subsistence farming practices were largely sidelined in favor of cash crop production, fundamentally altering the agricultural landscape in Nigeria (ibid.). Colonial land policies, such as the Land and Native Rights Ordinance, redefined land ownership and usage (Haruna, 2017). These policies often favored colonial interests, leading to the confiscation of land from local farmers and the establishment of plantations.

The colonial focus on cash crops resulted in the exploitation of local farmers, who were often compelled to produce surplus crops for export while neglecting their own food needs. This created a dependency on imported food and undermined traditional agricultural practices, leading to a decline in local food production and increased vulnerability to food insecurity. Conventional farming, as developed during the colonial period and beyond, relies heavily on chemical fertilizers and pesticides, which were not part of pre-colonial practices.

Conventional farming in Nigeria may have led to increased agricultural productivity but also poses challenges related to food sustainability, environmental impacts and food sovereignty. The reliance on chemical fertilizers and pesticides has contributed to soil degradation and increased greenhouse gas emissions, which exacerbate climate change (Ajayi, 2012).

Figure 10: Dynamics and challenges in the control of food production in Nigeria

Food production	Informal Traditional Small Holder Farmers 70-80%	Formal Corporate Farms 20-30%
Active Labour/Ownership	Largely Small Holder Women Farmers in Rural Areas	Balance Male-Female Ownership
Farming Systems	Subsistence farming	Commercial Farming
	Conventional Monoculture (classical persticides + fertilizers)	Conventional Monoculture
	Inter-cropping and crop rotation	Large dependence on chemical fertilizers
	Shift cultivatiion	Local Market, Manufacture + Expert
Market Reach	Local market	
Labor Pattern	Self/Family Labor (minimal external)	Contract Farmers & Direct Labourers
Irrigation	Poor irrigation (rain fed)	Fairly-Average Irrigation
Technology	Traditional Manual Implements + Poor/ No Storage	Fairly Mechanized + Limited Storage
Energy Base for Processing	Mostly Fossil Based, Traditional Biomass, Tree Felling	Fossil Based Processing and
	Challenges and Threats	
	No Access to Formal Credit & Financing: Diversion of Loans & Lack Insurance	Bureaucracy in Accessing Formal Credits
	Climate change impact - drought, flooding, erosion, storms	Climate change impacts - flooding, erosion, storms
	High cost of farm inputs (pesticides, fertilizers etc)	High Cost of Farm Inputs
	Farm insecurity, cattle Herders, Bandits, Violent conflicts, Cattle rustling, etc.	Kidnaps and bandits
	Land tenure system (traditional norms & state negligence)	
	Poor Rural Infrastructure (Access road to farms)	Poor rural infrastructure (access road to farms)

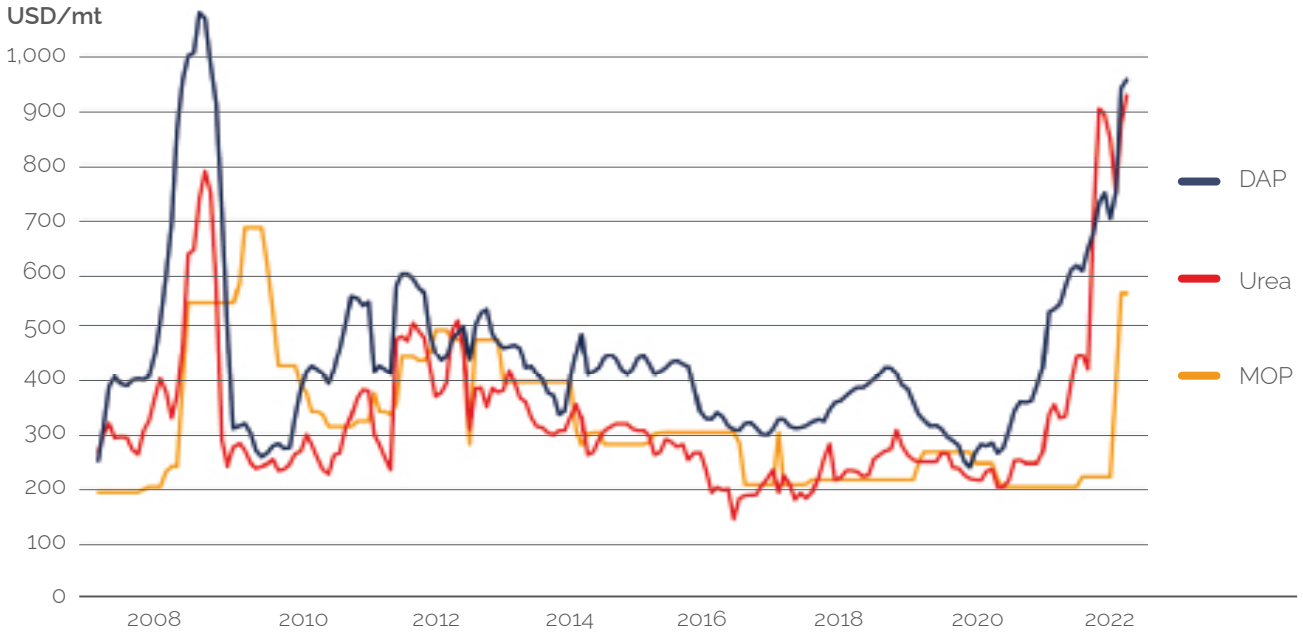
Source: Author's Analysis

Unfortunately, the legacy of colonial agricultural policies still persisted in Nigeria, where conventional farming practices continue to dominate the government food programs with heavy procurements and subsidies directed towards more dependencies on imported highly hazardous pesticides, tree felling for fuel and export, promotion of cash crop for exports, high food import dependence, speedy approvals for GMOs that indirectly facilitates the application of more hazardous pesticides (Mojeed, 2024), politicization to efforts to address insecurity, open grazing and land reform programs to ensure access lands for small holder farmers, most of whom are women.

Several other interrelated factors that compromise the country's agricultural sector and exacerbates the climate change effects include:

- **Poor land tenure system:** Insecure land tenure discourages smallholder farmers, especially women, from investing in long-term improvements like soil enhancement, irrigation, or sustainable practices like integrating trees on farms. Traditional norms, weak legal frameworks and lack of documentation often exclude women from land ownership and credit access. As a result, they may focus on short-term gains, relying on quick fixes like chemical fertilizers, which harm soil health, instead of sustainable methods that require long-term commitment.
- **Irrigation farming:** Nigeria's limited irrigation infrastructure, covering only 1% of arable land, worsens the impact of climate change on food security. With at least 90% of agriculture relying on rain-fed farming, most activities are concentrated in the rainy season, making farming highly seasonal. The lack of adequate irrigation leads to lower crop yields and limits farmers' ability to grow multiple crop cycles annually.
- **Limited access and use of efficient technology:** Nigeria's mechanization rate is only 0.027 hp/hectare, far below the FAO's recommended 1.5 hp/hectare with most farmers relying on outdated methods that reduce efficiency (NATIP, 2021). For example, 80% of locally milled rice still uses inefficient diesel-powered mills, producing low-quality output. Poor disposal of rice straw and husks emits 4.34 million and 1.1 million tons of CO2 annually (Businessamlive, 2022), while over 10 metric tons of cassava peels contribute to methane emissions, aflatoxins

Figure 11: Global Fertilizer Prices 2008 - 2022



Note: DAP=diamonium phosphate. MOP = muriate of potash. Last observation is April 2022

Source: Bloomberg: World Bank

and odors (Oghenejoboh, 2021). Additionally, available machinery is often too large and unsuitable for the specific needs of over 60% of smallholder farmers — mostly women — further limiting productivity.

- **Production costs:** High production costs translate into higher food prices, making nutritious food less accessible, especially for low-income populations. Fertilizer prices have risen nearly 250% since the start of 2022, following 2021's 80% surge. The soaring prices have been driven by a confluence of factors, including surging input costs, supply disruptions caused by sanctions (Belarus and Russia) and export restrictions (China), etc.
- **Input Distribution**: Farmers often face difficulties in accessing necessary inputs such as seeds, fertilizers and the right technological machinery, which are essential for productive farming. Often, the inputs may not be available when needed or may be of poor quality, affecting crop performance.
- **Post-Harvest Losses:** High levels of post-harvest food losses in Nigeria are due to poor storage facilities and inadequate transportation infrastructure. Nigeria loses an estimated 40% of its annual food production to postharvest waste, partly due to unreliable electricity (CBI Ministry of Foreign Affairs, 2021). The FAO estimates these losses cost Nigeria USD 9 billion (or about NGN 3.5 trillion) annually, representing 31% of the country's total land use and contributing 5% to its greenhouse gas emissions (Nigeria Health Watch, 2023).
- **Deforestation and tree felling:** In Nigeria, the deforestation rate of 5 to 6% annually (Global Forest Watch, 2023) poses significant threats to food security and livelihoods. A major contributing factor is the country's reliance on solid biomass, such as firewood and charcoal, for cooking, with approximately 56% of households nearly 30 million households or over 100 million Nigerians depending on firewood as their primary cooking fuel (Energypedia, 2021). This heavy reliance on firewood exacerbates deforestation, alongside other factors like agricultural expansion for cash crops, unsustainable logging, wide energy deficits and poor urban planning. The loss of forests leads to biodiversity loss, soil degradation and reduced agricultural productivity, while also contributing to climate change. As a result, vulnerable communities face increased poverty and food insecurity, as they struggle with diminished forest resources and declining agricultural yields (WHO, 2022).

Agricultural and climate change policies: Where is there alignment?

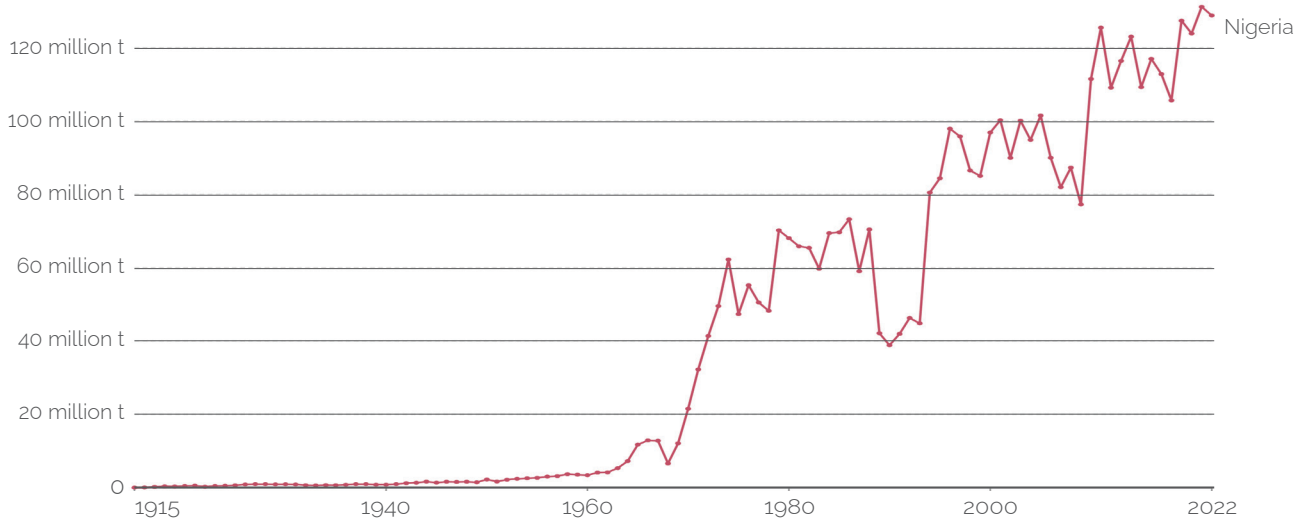
Nigeria aims for an annual real GDP growth rate of 5% to 7% over the next decade (ThisDay, 2023). This target is essential for addressing the country's macroeconomic challenges and achieving sustainable development. The government seeks to double the size of Nigeria's GDP from approximately USD 535.34 billion in 2022 to USD 1 trillion by 2030 (ibid.). Achieving this target would require an average growth rate of 6.5% annually.

In the long run, the government envisions a significant economic transformation, targeting a GDP of USD 1 trillion by 2030 and further growth towards USD 3 trillion by 2050 (Channels, 2024); crude oil, solid mineral exploration and gas expansion will play a very significant role in meeting these targets, aside from expansions in internal revenue via taxation. Hence, Nigeria's CO2 emission should not be expected to decline rapidly.

Nigeria's total emissions of greenhouse gases estimated between 2010 and 2018 ranged between 247 MtCO2e in 2010 and 347 MtCO2e in 2018 (Nigeria's NDC, 2021). In 2019, the country ranked as the 25th largest GHG emitter globally and the second-highest in Africa, following South Africa. Nigeria's emissions reached approximately 332.25 MtCO2e in 2019. In 2020, emissions saw a slight reduction to 322.34 MtCO2e, primarily due to the economic downturn caused by the COVID-19 pandemic (CarbonBrief, 2023).

In comparison to other African countries, Nigeria's emissions are substantial. For instance, South Africa, the highest emitter on the continent, had emissions of about 400 MtCO2e in 2019. Other notable emitters include Egypt and Algeria, with emissions of approximately 300 MtCO2e and 160 MtCO2e, respectively.

Figure 12: Annual Carbon dioxide (CO_2) emissions from fossil fuels and industry for Nigeria (Land-use change is not included)



Note: Fossil emissions measure the quantity of carbon dioxide (CO_2) emitted from the burning of fossil fuels and directly from industrial processes such as cement and steel production. Fossil CO_2 includes emissions from coal, oil, gas, flaring, cement, steel and other industrial partners. Fossil emissions do not include land use change, deforestation, soils or vegetation.

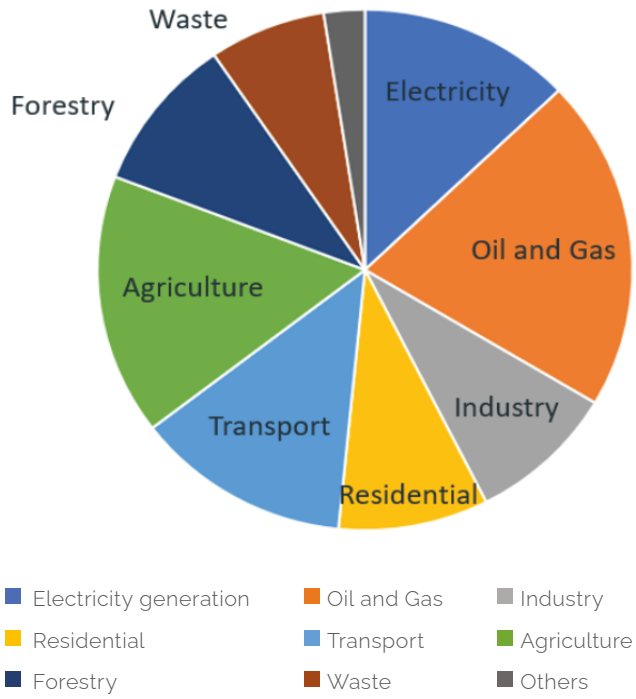
Source: Global Carbon Budget (2023). OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

The energy sector accounted for the largest share of GHG emissions, contributing 209 MtCO2e in 2018 (60% of the total emissions). Among energy sector emissions, oil and gas, make up 36% of the total energy sector emissions, followed by emissions from transportation, electricity generation and residential and industrial energy consumption. The second-largest contributor to Nigeria's overall GHG emissions is Agriculture, Forestry and Other Land Use (AFOLU), which contributed approximately 25% of national GHG emissions. Waste accounted for 9% of emissions, while Industrial Processes and Other Product Use (IPPU) contributed 5% (Federal Government of Nigeria [FGN], 2021).

Nigeria has committed to reducing its GHG emissions by 20% by 2030 compared to business-as-usual levels, with a more ambitious target of 47% contingent on international support. This commitment aligns with its goal to achieve net-zero emissions by 2060, as announced at the COP26 climate summit in 2021.

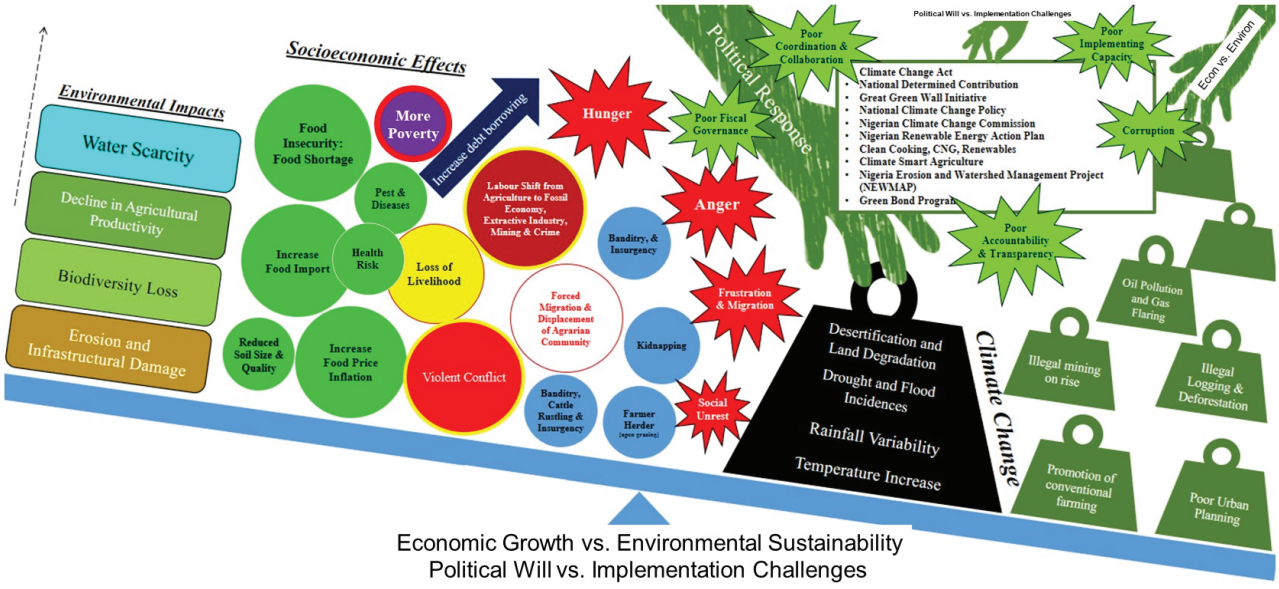
For Nigeria to achieve rapid economic growth and development, it is essential to responsibly harness and utilize its natural gas resources as a transition fuel, while

Figure 13: Major GHG Emitting Sources in the Economy of Nigeria



Source: 2050 Long-Term Low Emissions Development Strategy (LT-LEDS) for Nigeria (LTV-2050)

Figure 14: Balancing Progress: The Tug-of-War between Growth, Environmental Sustainability, and Political Will



Source: 2050 Author's Analysis2050)

steadily moving toward cleaner energy solutions. This energy transition will play a vital role in powering the economy, especially the small informal sector, boosting food security and safeguarding food sovereignty. Addressing critical challenges such as climate change and conflicts that undermine agricultural capacity is equally important.

The success of these efforts relies on balancing economic growth with environmental sustainability, which, in turn, requires strong political will, robust policy frameworks, multi-sectoral collaboration and the capacity to implement effective solutions at all levels.

Agriculture policies for food security

In line with President Tinubu's 8-Point Agenda and Priority Area, the FMAFS currently have at its core of operations, the FMAFS Road Map Strategies and Ministerial Priority Action (2023 – 2027) which seeks to boost agriculture and achieve food security through the development of commodity value chains and the provision of infrastructure support. The FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027) outlines the immediate, short, medium and long-term priorities of the Federal Ministry of Agriculture and Food Security in Nigeria to achieve its goals. The key components and objectives of the Road Map includes:

Immediate priorities:

- Focus on urgent agricultural needs and challenges.
- Address food security issues through immediate interventions.

Short-term strategies:

- Enhance agricultural productivity through improved access to inputs and technology.
- Strengthen extension services to provide farmers with necessary knowledge and skills.

Medium-term goals:

- Promote sustainable agricultural practices to ensure long-term food security.
- Foster public-private partnerships to drive investment in the agricultural sector.

Long-term vision:

- Achieve comprehensive food security and nutrition for all Nigerians.
- Develop a resilient agricultural system that can adapt to climate change and other challenges.

The NATIP is a strategic policy framework established by the Nigerian government to enhance the agricultural sector through the integration of technology and innovation. With a 6-year timeframe from 2022 to 2027, it aims to drive economic and social change through significant public and private sector investments in agriculture and rural development. It focuses on incorporating technology and innovation, intervention instruments and an implementation strategy, to fast-track increased productivity, import substitution, with particular emphasis on the reduction of rice, dairy, meat and fish imports, and increased resilience through digital and climate-smart agriculture, towards promoting agricultural value chains and investments.

The policy was developed in collaboration with stakeholders and aims to modernize the agricultural sector by aligning with global food systems and supply chains, creating job opportunities, increasing export revenue and addressing security challenges that affect agricultural land and investments.

Figure 15: Ten key intervention pillars of NATIP

1. Synergy and MDA Alignment
2. Knowledge Creation and Transfer
3. Rapid Mechanization
4. Agricultural Development Fund
5. Realization of Extension Service Delivery
6. Livestock Development
7. Strengthening Value-Chains for Priority Crops
8. Fisheries and Aquaculture Development
9. Market Development
10. Partnership for Securing Agricultural Lands and Investments (PSALI)

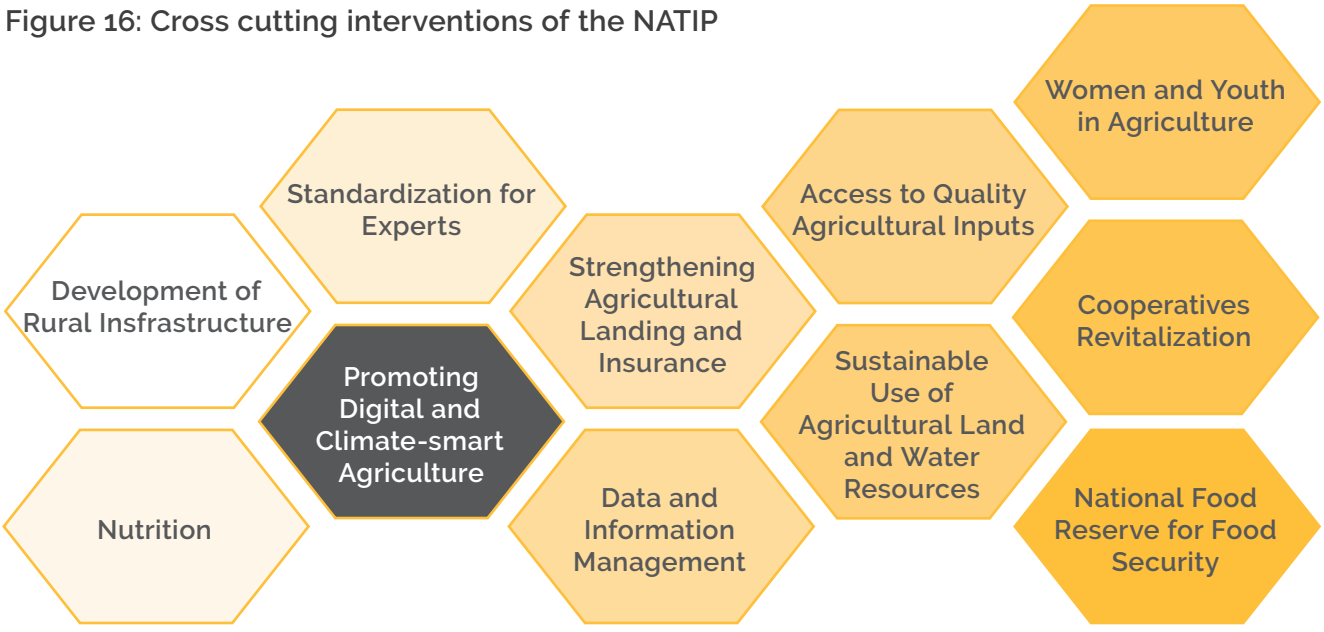
Source: FMARD/ FMAFS NATIP 2022 - 2027

Additionally, NATIP includes cross-cutting interventions to address gaps in previous policies, focusing on areas like rural infrastructure, nutrition, standardization for exports, digital and climate-smart agriculture, agricultural lending and insurance, data management, access to quality inputs, sustainable resource use and the involvement of women and youth in agriculture. The policy also emphasizes cooperative revitalization and the establishment of a national food reserve.

Alignment between NATIP (2022 - 2027) and FMAFS Road Map (2023 - 2027)

The provisions in the FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027) align closely with NATIP's objectives by focusing on enhancing agricultural productivity, promoting sustainable practices and fostering innovation through R&D. Both documents aim to address the challenges facing Nigeria's agricultural sector while ensuring that the country moves towards a more sustainable and resilient food system, delivering long-term resilience and productivity.

Figure 16: Cross cutting interventions of the NATIP



Source: FMARD/ FMAFS NATIP 2022 - 2027

The FMAFS Road Map aligns with the NATIP in several key areas:

- **Food security:** Both documents emphasize enhancing food security through increased agricultural productivity and sustainable practices.
- **R&D:** The FMAFS Road Map highlights the importance of agricultural research, which is a core component of NATIP aimed at fostering innovation and technology transfer.
- **Capacity building:** Strengthening extension services and training for farmers is a priority in both documents, ensuring that agricultural stakeholders are equipped with the necessary skills.
- **Public-private partnerships**: Both strategies recognize the need for collaboration between the public and private sectors to drive growth and investment in agriculture.
- **Sustainable practices:** The emphasis on sustainable agricultural practices in the FMAFS Road Map aligns with NATIP's focus on climate-smart agriculture and resource management.

To analyze how the FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027) supports the objectives of the NATIP, we can identify specific strategies within the FMAFS document that align with NATIP's goals.

Specific strategies in FMAFS supporting NATIP Objectives:

1. **Boosting agricultural productivity:**
   - FMAFS strategy: The roadmap emphasizes boosting agriculture to achieve food security, focusing on increasing productivity through innovative practices and technologies.
   - NATIP alignment: NATIP aims to enhance agricultural productivity through the adoption of modern farming techniques, improved seed varieties and sustainable practices, directly supporting the goal of increased output.
2. **Sustainable agricultural practices:**
   - FMAFS strategy: The roadmap identifies the need for sustainable farming techniques and resource management to ensure long-term agricultural viability.
   - NATIP alignment: NATIP promotes climate-smart agriculture and sustainable land management practices, aligning with the FMAFS's focus on sustainability.
3. **R & D:**
   - FMAFS strategy: The roadmap highlights the importance of strengthening agricultural research and development to drive innovation.
   - NATIP alignment: NATIP emphasizes the role of research and technology in agriculture, advocating for increased investment in agricultural R&D to foster innovation and improve productivity.
4. **Capacity building and extension services:**
   - FMAFS objective: Strengthening agricultural extension services is a priority to improve farmers' access to knowledge and resources.
   - NATIP commitment: NATIP also emphasizes capacity building for extension workers and farmers, ensuring they are equipped with the necessary skills to implement modern agricultural practices.
5. **PPPs:**
   - FMAFS approach: The roadmap encourages collaboration between the public and private sectors to enhance agricultural productivity and investment.
   - NATIP framework: NATIP supports the establishment of PPPs to drive investment and innovation in agriculture, reflecting a shared goal of leveraging resources for agricultural development.
6. **Infrastructure development:**
   - FMAFS priority: Enhancing infrastructure is seen as crucial for enabling agricultural growth and improving market access.

- NATIP support: NATIP recognizes the need for improved agricultural infrastructure, including transportation and storage facilities, to reduce post-harvest losses and enhance food security.

7. Food Security Initiatives:
   - FMAFS focus: The roadmap prioritizes initiatives aimed at achieving food security through improved agricultural practices and resource management.
   - NATIP alignment: NATIP's objectives include enhancing food security by increasing the availability and accessibility of food through sustainable agricultural practices.

The FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027) aligns closely with the NATIP across multiple dimensions, including boosting agricultural productivity, promoting sustainable practices, enhancing

Table 1: Areas of Alignment in the Agriculture Roadmap and the Sector Policy

Key interventional pillars of NATIP (2023 -2026)	FMAFS Road Map Strategies & Priority Action (2023 – 2027)
Great Alignment	
Synergy and MDA alignment	Stakeholders buy-in for ownership of National Livestock Transformation Plan (NLTP). Holding the National Council of Agriculture and Food Security (NCAFS) meetings. Collaboration with Federal Ministry of Water Resources (FMWater). National Framework for proper coordination and alignment. Innovative communication. Develop new intergovernmental partnership framework across government tiers.
Knowledge creation and transfer	Initiate and implement stakeholder session. Facilitation agriculture and Food security mapping. Strengthen the agriculture and food security institutions. Learning and accountability platforms. Institutionalize Nigeria Food System Dashboard. Setup world class laboratories in research institutions
Rapid mechanization	Green imperative and other mechanization program, small scale irrigation, mini-earth dams and water catchment technologies. Promote viable agriculture mechanization enterprises and services i.e. e-hailing services, tractor hire, etc.
National Agricultural Development Fund (NADF)	Reform Bank of Agriculture, Agriculture Development Fund and Nigerian agricultural insurance corporation. Fast tracking the NADF
Revitalization of extension service delivery	Working with state, local government area (LGA), private sector and development partners in the training and deployment of extension workers. Development of E-extension service. Strengthen Community of Practice (COP) across govt tiers
Livestock development	Implement National Livestock Transformation Plan (NLTP). Make significant investment in animal feed-crop, foliage and fodder estate as antidote to farmer-herder clashes.
Strengthening value chains for priority crops	Development of subnational policies for key cash crop commodities.
Fisheries and aquaculture development	Facilitate special intervention in fish production and other animal-based protein
Market development	Rapid commercialization of improved varieties and breeds of food crops and animals. Ease of doing agriculture business for women and youth.
Partnership for Securing Agricultural Land and Investment (PSALI)	Open up land to boost production for key stable food. Open up land to boost production of cash crops. Promotion and strengthening Agro-rangers and other paramilitary to assist in addressing farm insecurity.

Key interventional pillars of NATIP (2023 -2026)	FMAFS Road Map Strategies & Priority Action (2023 – 2027)
Cross-cutting areas	
Development of rural infrastructure	Development of new strategies for strengthening agricultural infrastructure
Nutrition	Boost production of traditional and nutrition commodities, promote biofortification and fortification of key staple food. Revive and promote home economics and food and nutrition in homes and school.
Standardization of export	Strengthening commodity exchange for agricultural products
Digital and climate smart agriculture	Construct and manage dry and cold storage facilities. Promotion and preparation of dry season farming. Establishment of 2 new national gene bank facilities, each for crop and animals to conserve fast eroding genetic resources and food security. joint action pal with FMWater for the irrigation potentials of River Basin Development Authorities and other flood plains to guarantee all year food production. Development of digital/ ICT mobile based agro-industry system and E-extension platforms to support farmers establish 6 agro-ecological zones in Nigeria. Technology/ITC based farming. Promotion of cold chain systems with private sector
Agricultural lending and insurance	Reform Bank of Agriculture, Agriculture Development Fund and Nigerian agricultural insurance corporation. Implementation of Agro-Pocket (AP). Use FinTech solutions and wallets for financial disbursement for farmers
Data and information management	Deploy and operationalize the Enterprise Content Management System (ECM). Implement personnel performance management system. Development of national database for planning and implementation.
Access to quality inputs	Implementation of the National Agricultural Growth Scheme and Agro Pocket (NAGS-AP). Capacity building to strengthen farm inputs regulatory function.
Sustainable resource use	Development of robust sustainable innovation ecosystem. Development and implementation of soil fertility mapping and soil information system. Development of soil health scorecards
Involvement of women and youth in agriculture	Implement programs for women and youth in agriculture and livelihood. Development of agricultural Development Centre for Women and Youth.
Cooperative revitalization	Develop and promote cooperative models for impact agriculture
Establishment of a national food reserve	Modernize and enhance food reserves to defend against food scarcity and price stabilization

Source: Author's Analysis

research and development, improving capacity building, fostering public-private partnerships and developing infrastructure. This alignment is crucial for ensuring coherent implementation and maximizing the impact of agricultural policies in Nigeria, ultimately contributing to food security and sustainable development.

The Nationally Determined Contribution (Updated 2021)

Nigeria has made notable progress in implementing its NDC specifically for the agricultural sector, focusing on climate change mitigation and adaptation strategies. The NDC outlines a commitment to reduce greenhouse gas (GHG) emissions by 20% unconditionally and by 47% conditionally by 2030, with agriculture being one of the priority sectors.

The updated NDC provides a high-level and strategic vision for climate action in Nigeria and sets out what the country commits to meet its Paris Agreement obligations. In the baseline scenario for 2030, it is estimated that Agriculture, Forestry and Other Land Use (AFOLU) will continue to be the second largest sources of GHG emissions (ibid.). The measures outlined for mitigation against GHG emissions for AFOLU in the NDC range from the adoption of climate-smart agriculture; 50% reduction in fraction of crop residues burnt in 2030; improved natural forest management; forest restoration; forest protection; reduce fuelwood harvesting and protection; and restoration of the mangrove forest ecosystem (ibid.).

The Federal Ministry of Environment (FMEnv) estimates that Nigeria will require approximately USD 142 billion over the next decade to effectively implement its NDC. This funding is essential for developing low-carbon agricultural practices and addressing the impacts of climate change on food production (World Bank, 2013).

The NDC stresses the importance of Climate Smart Agriculture (CSA) and agroecology. It notes that CSA is a vital strategy for the agricultural sector, aiming to boost productivity sustainably, increase farm incomes equitably and improve food security and development. It emphasizes that agroecological practices enhance farming system resilience, as opposed to methods like high external input farming (i.e. with synthetic chemical fertilizers and pesticides) and large-scale industrial agriculture, which worsen climate change as they depend on much tillage and conventional monoculture. The updated NDC recommends that enhanced practices like Agroecology and agroforestry not only elevate yields but also lead to better diets (nutrition), increased productivity and reinvestment in rural communities (vulnerable groups). It noted that farm systems like agroforestry, which blends trees with crops and animals, offer carbon sequestration and mulch material, reducing emissions by 158 million to 712 million tons (NDC, 2021).

National Climate Change Policy for Nigeria (2021-2030)

The National Climate Change Policy for Nigeria (2021-2030) aims to foster sustainable socio-economic development that is low-carbon, climate-resilient and gender-responsive. The policy underscores the challenge of boosting agricultural output while curbing greenhouse gas (GHG) emissions. Derived from the NDC, the policy promotes climate-smart, gender-responsive farming techniques to lower emissions and bolster the sector's resilience. For AFOLU, the policy suggests the measures detailed in Table 2..

The FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027), NATIP (2022-2027) and the Agriculture Sector NDC Strategy exhibit significant alignment across multiple dimensions, including food security, sustainable practices, research and development, capacity building, public-private partnerships, infrastructure development and innovation. This alignment is essential for creating a cohesive approach to enhancing Nigeria's agricultural sector while addressing the challenges posed by climate change and ensuring food security for the population. To identify the areas of alignment between the FMAFS Road Map Strategies and Ministerial Priority Action (2023 - 2027), the NATIP and the Agriculture Sector NDC Strategy, we focus on the key objectives and strategies of each document.

Areas of alignment

Food security enhancement:

- FMAFS road map: Prioritizes boosting agriculture to achieve food security.
- NATIP: Aims to enhance food security through sustainable agricultural practices and increased productivity.
- NDC strategy: Focuses on improving food security while addressing climate change impacts on agriculture.

Table 2: Cross-cutting areas in the Agriculture Roadmap and the Sector Policy

For Mitigation	For Adaptation
› Reduce forest loss and degradation › Increase the use of alternative domestic fuel to fuelwood in rural areas › Increase soil carbon sequestration in agricultural lands › Improve genetics in the dairy herd › Increase livestock productivity through improved grazing and feeding management and management of feed crop production › Promote wide adoption of climate-smart and ecologically resilient agricultural practices among small-holder farmers, including women and youth › Document and promote the use of appropriate indigenous knowledge and best practices for climate-resilient cropping and livestock systems › Promote agro-forestry, reforestation and afforestation, including community-based forest management and recovery › Increase the country's network of forest reserves and conservation areas › Protect forest and land tenure and resource rights as well as ensure gender-equitable, inclusive and transparent benefit sharing › Enhance public and private investment in the agriculture and forestry sector	› Promote efficient, gender-responsive, socially inclusive and climate-smart crop production, fishery and livestock development practices › Promote efficient, gender-responsive, socially inclusive and climate-smart crop production, fishery and livestock development practices › Develop and apply improved production and risk management technologies in agriculture › Increase the uptake of adaptation measures at farm and community levels › Reinvigorate extension services, capacity building and technology transfer approaches to provide support to a wider group of farmers, including women and youth › Strengthen indigenous knowledge-based adaptation measures › Facilitate an enabling environment for enhanced public and private sector participation and financial investments to achieve adaptation at scale › Increase access to adaptation finance through economic incentives and value chain initiatives › Strengthen regulatory and institutional capacity to implement and disseminate technical solutions in adaptation to agriculture.

Adaptation - Forestry Policy Measures
› Treat forests as resources that must be properly accounted for. › Strengthen the management of forests and expand tree cover through gender responsive, socially and environmentally responsible reforestation and restoration initiatives › Facilitate sustainable regulatory frameworks and incentives, as well as financial mechanisms for the implementation of the REDD+ Strategy and the Great Green Wall Initiative › Mainstream climate change adaptation into forest management › Enhance forest capacity for adaptation by reducing ecosystem vulnerability and also reducing exposure of the ecosystems to extreme events

Source: FMEnv NDC Updated 2021

Sustainable agricultural practices:

- FMAFS road map: Emphasizes the need for sustainable farming techniques.
- NATIP: Promotes climate-smart agriculture and sustainable land management.
- NDC strategy: Supports sustainable agricultural practices to mitigate greenhouse gas emissions.

Research and development:

- FMAFS road map: Highlights the importance of strengthening agricultural research and development.
- NATIP: Focuses on enhancing agricultural research capabilities and technology adoption.
- NDC strategy: Encourages research into climate-resilient crops and sustainable practices.

Capacity building and extension services:

- FMAFS road map: Aims to strengthen extension services for farmers.
- NATIP: Emphasizes capacity building for extension workers and farmers.
- NDC strategy: Supports training programs to enhance farmers' resilience to climate impacts.

PPPs:

- FMAFS road map: Encourages collaboration between public and private sectors.
- NATIP: Supports the establishment of PPPs to drive innovation and investment in agriculture.
- NDC strategy: Promotes partnerships to enhance agricultural sustainability and resilience.

Infrastructure development:

- FMAFS road map: Identifies infrastructure enhancement as crucial for agricultural growth.
- NATIP: Recognizes the need for improved agricultural infrastructure.
- NDC strategy: Supports infrastructure investments that facilitate climate adaptation in agriculture.

Innovation and technology adoption:

- FMAFS road map: Promotes the adoption of innovative agricultural technologies.
- NATIP: Focuses on integrating technology and innovation into agricultural practices.
- NDC strategy: Encourages the use of technology for climate-smart agriculture.

How the Agriculture Policy NATIP mainstreams climate action?

The NATIP 2022-2027 addresses climate change in agriculture through several strategic measures aimed at promoting sustainable and resilient practices. Below are the common ways in which NATIP mainstreams climate action:

- **Integration of climate-smart agricultural practices:** NATIP emphasizes the adoption of climate-smart agricultural practices that enhance resilience to climate variability. This includes promoting organic farming, agroforestry and sustainable land management techniques that improve soil health and productivity.
- **Digital agriculture and sustainable technologies**: The policy encourages the use of digital technologies to optimize agricultural practices. This includes precision farming, data analytics and mobile applications that provide farmers with real-time information on weather patterns, pest management and resource allocation.
- **Use of climate-resilient varieties:** The policy encourages the development and dissemination of climate-resilient seed varieties that are drought-resistant, heat-tolerant and pest-resistant. This aims to improve crop yields under adverse weather conditions.
- **Soil management practices**: NATIP promotes better soil management practices to maintain soil health and fertility, which is crucial for sustaining agricultural productivity in the face of climate variability.

- **Access to drought-resistant inputs**: The policy aims to increase farmers' access to drought-resistant seeds and livestock feeds, which are essential for maintaining productivity during periods of water scarcity.
- **Early warning systems:** Implementation of early warning systems and meteorological forecasts will provide farmers with timely information about weather changes, helping them make informed decisions about planting and harvesting.
- **Collaboration with private sector:** NATIP encourages private sector participation in the production and distribution of agricultural inputs, including climate-resilient seeds and fertilizers, to ensure that farmers have access to the necessary resources.
- **Data management and research**: The policy emphasizes the importance of data management and research in understanding climate impacts on agriculture. This includes monitoring climate trends and developing strategies to mitigate their effects.
- **Efficient water management**: NATIP focuses on improving water management practices to enhance agricultural productivity. This includes promoting irrigation techniques that conserve water and reduce dependency on rainfall, thereby mitigating the impacts of droughts.
- **Strengthening surveillance systems:** The policy aims to enhance surveillance systems for monitoring animal and aquatic diseases, which are increasingly affected by climate change. This proactive approach helps in the early detection and management of potential outbreaks that could threaten food security.
- **Access to agricultural finance and insurance:** NATIP seeks to improve access to agricultural finance and insurance products that are tailored to address climate risks. It recommends the establishment of the NADF. This financial support is crucial for farmers to invest in climate-resilient technologies and practices.
- **Development of high-priority value chains**: By supporting the development of high-priority value chains, NATIP aims to increase competitiveness in international markets while ensuring that these chains are resilient to climate impacts. This includes focusing on crops and livestock that can thrive under changing climatic conditions.
- **Nutritional security and malnutrition reduction**: The policy includes objectives aimed at reducing malnutrition and improving nutritional security. By promoting diverse and climate-resilient crops, NATIP contributes to a more secure food environment that can withstand climate challenges.
- **Secure environment for agricultural investment:** NATIP aims to create a more secure environment for agricultural investments by promoting sustainable practices that align with climate action goals. This encourages both local and foreign investments in the agricultural sector.
- **Capacity building and training:** The government, through the Ministry of Agriculture and Rural Development, is enhancing local capacities by providing training to extension workers and local farmers. This initiative aims to disseminate knowledge on sustainable agricultural practices and improve community resilience to climate impacts.

NATIP aligns with broader climate action goals, promoting sustainable agricultural practices that enhance adaptation and mitigation measures. This approach fosters a resilient agricultural sector capable of effectively responding to the challenges posed by climate change, ultimately contributing to food security and economic stability in Nigeria.

NATIP vs. agricultural sector budget, actuals and alignment with NDC Climate Action Plan

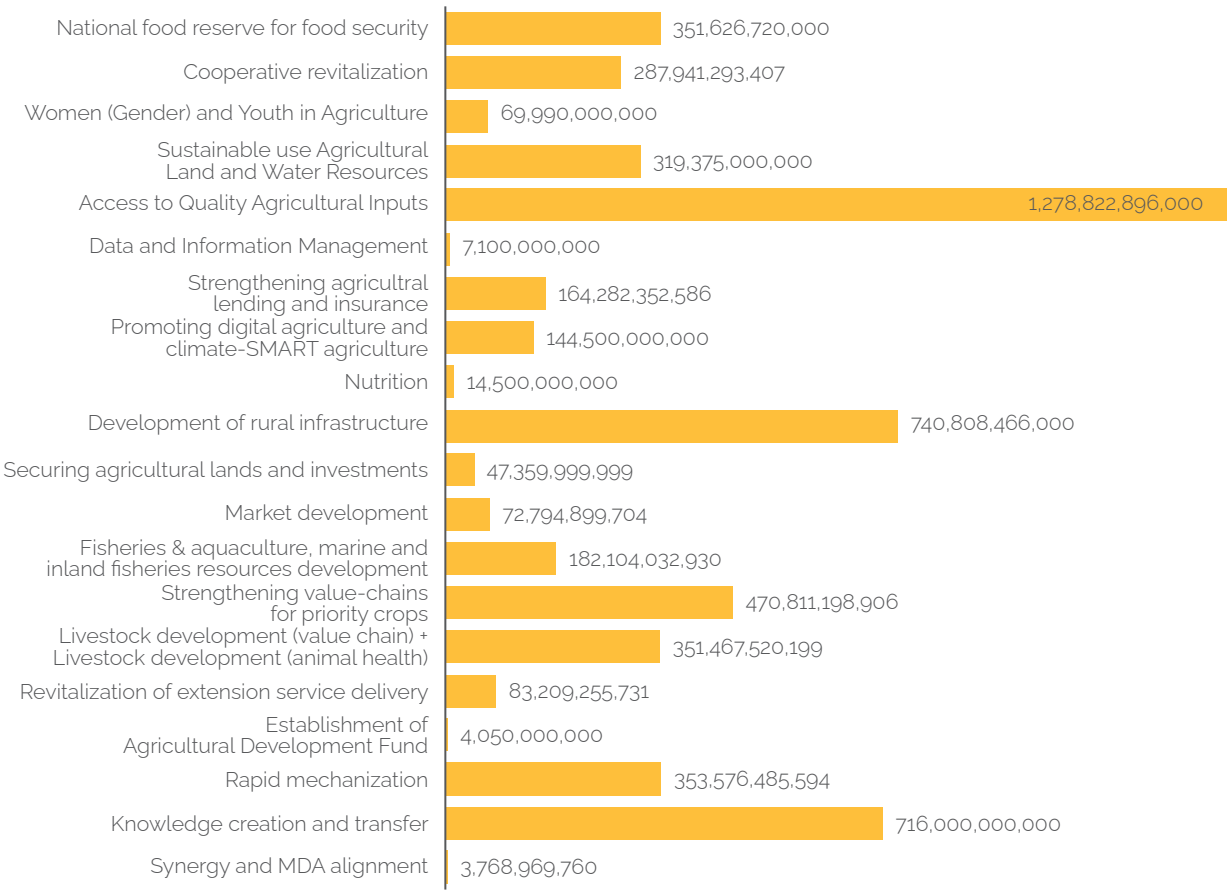
The success of NATIP in mainstreaming climate actions and delivering food security, hinges on the effective execution of its strategies, which require sufficient and quality funding and implementation. Without proper budgeting and quality implementation, the ambitious goals of the policy, such as enhancing agricultural productivity and food security in a climate sensitive way, will never be realized.

Proper budgeting is essential to facilitate its implementation and achieve its overarching goals of enhancing food security and economic growth in the agricultural sector. Without adequate funding, even the best-designed policies cannot be effectively implemented. Unfortunately, Nigeria's agricultural budget has consistently fallen short of the recommended 10% allocation of the national budget as stipulated by the Maputo Declaration.[2] For instance, the budget for agriculture represented only 2.5% in 2022, 2% in 2023 and 3.5% in 2024 of the total national budget; these are significantly below the recommended target of 10% (ActionAid Nigeria, 2024).

The NATIP Action Plan and Monitoring and Evaluation Framework (2022–2027) estimates a total of NGN 5,664,079,090,817 (USD 3,654,951,982) for implementing its various components over six years, averaging NGN 944,013,181,803 (USD 609,158,664) annually (NATIP, 2022). The financial requirements for transforming the agricultural sector are based on the understanding that agricultural funding is not solely the government's responsibility. Securing the necessary resources requires ongoing collaboration and dialogue between the public and private sectors, as well as strong partnerships with donors and alignment across relevant MDAs. Despite this, a significant portion of NATIP's funding is expected to come from the national budget, particularly from allocations to the FMAFS.

The chart below provides a breakdown of the estimated costs for NATIP components, with access to quality agricultural inputs receiving the largest allocation, followed by rural infrastructure development, knowledge creation and transfer, crop and livestock value chains and rapid mechanization.

Figure 17: Summary of financial estimates for NATIP implementation



Source: NATIP Implementation Framework 2022 – 2027 by FMARD/FMAFS 2023

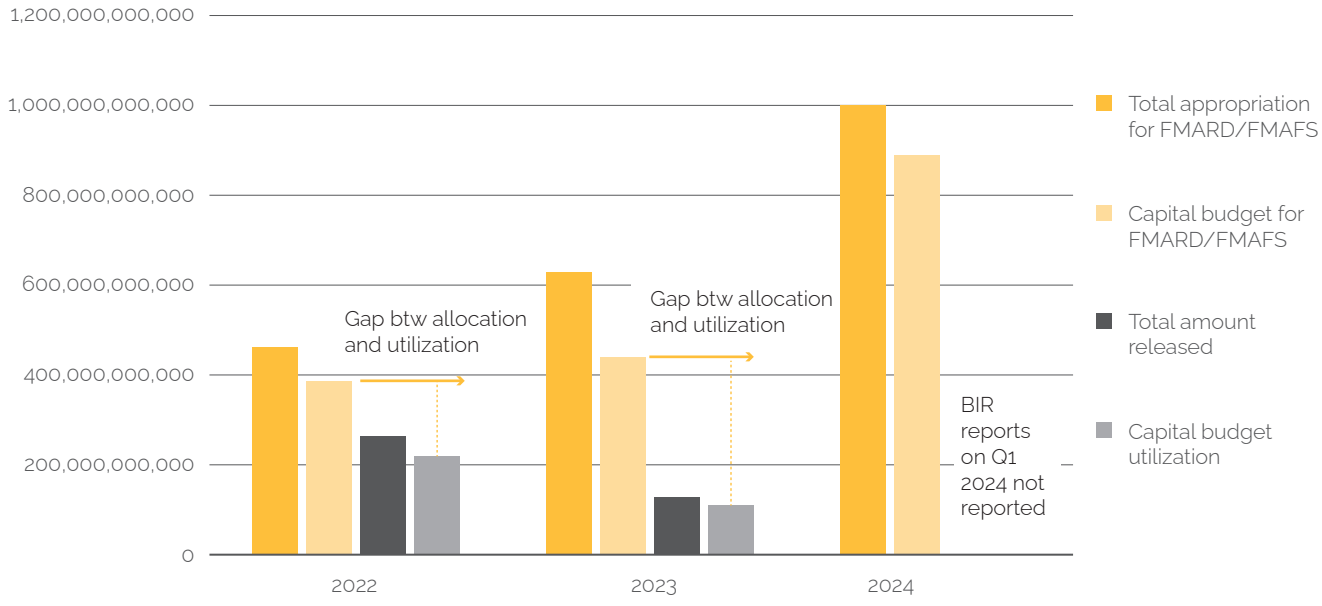
In Nigeria's approved 2024 budget, NGN 107.3 billion (USD 0.07 billion) was allocated to the NADF, representing about 10.8% of the total agricultural sector budget. Of this amount, NGN 106.8 billion is earmarked for capital expenditure, with NGN 100 billion specifically allocated to the Agricultural Development Fund (ADF) to support various agricultural initiatives.

Despite the overall limited budget for agriculture, the capital budget utilization rate of the MDAs within the sector has been consistently poor at the federal level. Even with extensions to capital budget implementation periods, such as the 2022 budget being extended to June 2023 and the 2023 capital appropriation to December 2024, there has been no significant improvement in the utilization rate. These extensions have also disrupted standard budget reporting and accounting processes without yielding better capital budget performance.

To assess the alignment between NATIP and the budget allocation for the FMAFS, the annual average estimate for NATIP of NGN 944 billion (USD (0.6 billion) was compared to the budgeted allocations for the agriculture sector and actual expenditures for 2022, 2023 and 2024. In 2022, NGN 462 billion (USD 0.3 billion) was allocated to the sector, representing just 48.96% of NATIP's annual target. For 2023, the allocation increased to NGN 626.99 billion (USD 0.4 billion), covering 66.42% of the NATIP goal. By 2024, the budget reached NGN 996.90 billion (USD 0.64 billion), surpassing NATIP's yearly average by NGN 52.88 billion (USD 0.034 billion).

Over the first three years of NATIP implementation, the Ministry's budget met an average of 73.66% of the total NATIP estimate, with a shortfall of approximately NGN 248.65 billion (USD 0.16 billion). Given that the NATIP Action Plan and Monitoring and Evaluation Framework (2022–2027) highlights that funding will come from sources beyond the annual budget, achieving over 70% of the NATIP target through the ministry's budget is commendable.

Figure 18: Annual budget allocation, capital expenditure, releases and utilization for agriculture sector from 2022 - 2024



Note: 2022 Q1 - no MDA Breakdown
Note: 2022 Q3 - Not Available
Note: 2023 q1 - Did not report MDA Capital expenditure breakdown

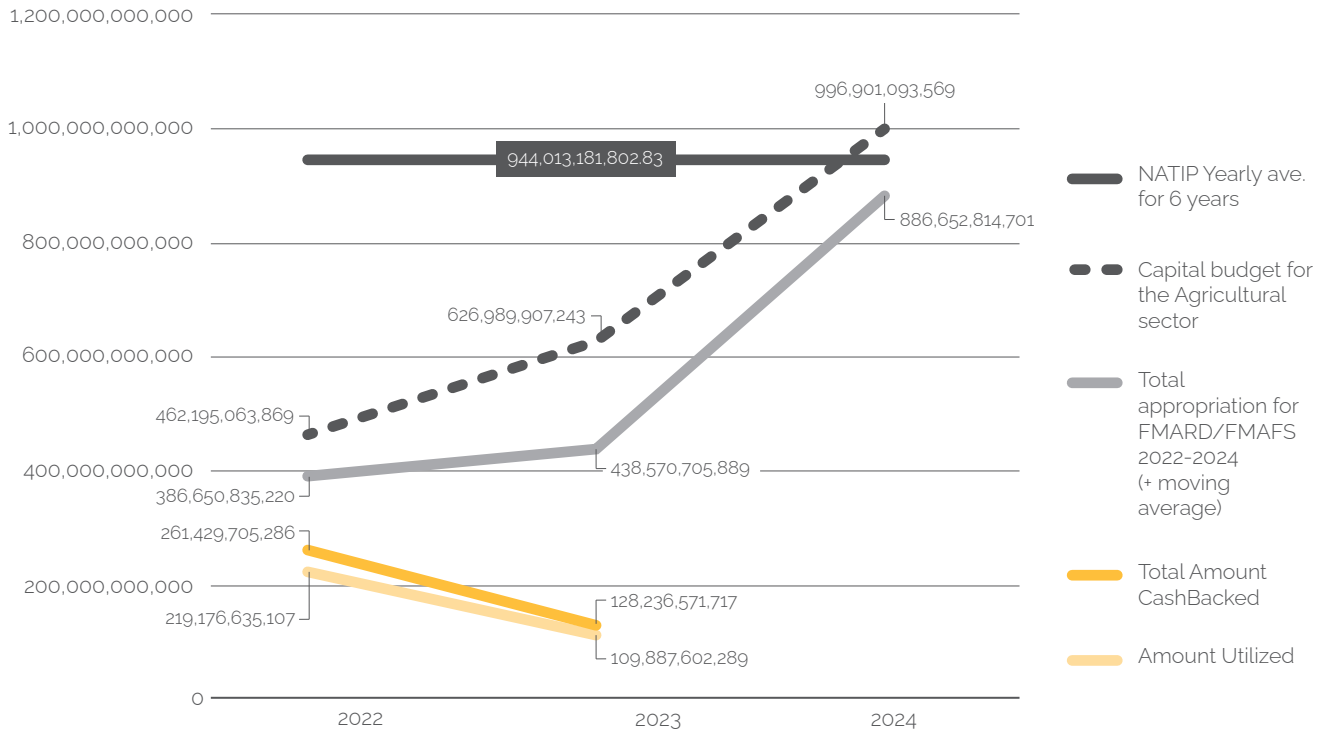
Additionally, the strong alignment between NATIP and Nigeria's NDC Action Plan further underscores the significance of these budgetary allocations. By directing resources to agricultural development that also addresses climate adaptation and mitigation strategies outlined in the NDC, the country is not only enhancing food security but also fulfilling its climate commitments. This alignment reinforces the importance of sustainable agricultural practices and underscores the need for continuous investments to achieve both economic and environmental goals.

Since the capital budget accounts for 70-88% of the Ministry's total budget, its allocation compared to the NATIP estimate performed moderately, reaching 60% of the policy's target.

However, the focus should not be solely on allocation but also on actual spending and how effectively the funds were used. Due to the poor capital budget utilization within the agricultural MDAs, only an average of 17% of the NATIP target was achieved in terms of actual spending between 2022 and 2024.

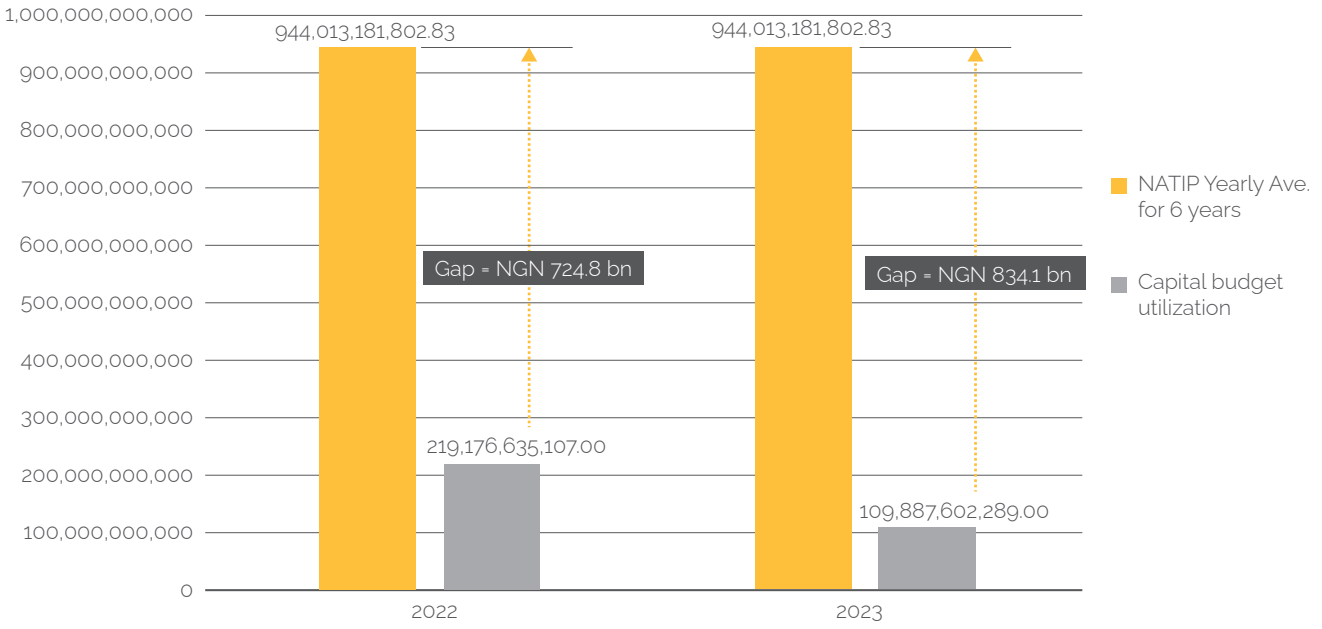
Given that NATIP is closely aligned with Nigeria's NDC commitments for the agricultural sector, it can be concluded that the sector's implementation of food sustainability and climate-resilient projects faces severe challenges. These include both significant budget shortfalls and poor implementation rates, which hinder the achievement of the country's agricultural and climate goals.

Figure 19: Comparison of the NATIP estimated targets, budget allocation and actual spending for a climate sensitive agriculture sector



Source: Authors Estimation from BOF and NATIP Implementation Plan Data

Figure 20: NATIP Annual Target vs Actual Expenditure on Real Infrastructure for a climate Sensitive Agriculture Sector for Nigeria 2022 and 2023



Source: Authors Estimation from BOF and NATIP Implementation Plan Data

Promoting digital and climate-smart agriculture

This cross-cutting component of NATIP focuses on enhancing the skills of various stakeholders in precision agriculture and e-agriculture by leveraging digital technologies to improve food systems. Key technologies such as remote sensing, yield mapping, GPS guidance systems, food blockchain, artificial intelligence (AI), e-extension services and tractor rental applications will be emphasized. E-agriculture fosters climate-smart practices that enhance biodiversity, enrich soils, improve watersheds, promote organic farming and bolster ecosystem services. The goal is to increase productivity and lower greenhouse gas emissions, benefiting approximately 50,000 graduates and over 150,000 non-graduates by providing them with the necessary skills, technology and technical support for sustainable agricultural practices. The Agricultural Land and Climate Change Management Services (ALCCMS) within the Federal Ministry of Agriculture and Rural Development (FMARD) will lead and advocate for digital and climate-smart agriculture.

Policy support programs & actions (PSPAs) to achieve goals of promoting digital and climate-smart agriculture

- **Encouraging digital technology adoption:** Promote the on-farm and off-farm utilization of digital technologies and innovation platforms.
- **Creating a digital agriculture ecosystem:** Develop a comprehensive digital agriculture platform that serves all farmers across nigeria.
- **Supporting digital agriculture programs:** Enhance all agricultural initiatives with digital capabilities to foster sustainable business models and opportunities.
- **Boosting agricultural productivity:** Aim to improve productivity, minimize food waste and mitigate the impacts of climate change.

- **Facilitating access to financial services:** Enable farmers to access financial services, register land and livestock online, obtain detailed geographic and soil information, reduce fraud and enhance the efficiency of goods and services delivery, while assisting governments in better targeting agricultural support.
- **Digitizing agricultural research:** Compile and digitize relevant agricultural research content, conducting joint research on productivity and export needs.
- **Promoting open data**: Make research findings accessible to farmers, agricultural value chain participants and start-ups through digital platforms to stimulate innovation.
- **Utilizing extension workers:** Encourage the use of extension workers to gather information and develop content for digital agriculture platforms.
- **Sustainable land and water management:** Advocate for sustainable practices in land and water management.
- **Providing timely weather information:** Ensure farmers receive timely weather and climate data for crops, fisheries and livestock production.
- **Training on water harvesting techniques:** Build farmers' capacity in sustainable water harvesting methods for supplementary irrigation.
- **Encouraging greenhouse and vegetable production:** Promote the cultivation of greenhouse crops and vegetables.
- **Setting organic standards:** Establish minimum standards for organic crop, fishery and livestock production in the country.
- **Supporting meteorological stations:** Facilitate the establishment of meteorological stations in all fmard state offices to ensure reliable data for forecasting.

Financial Estimates

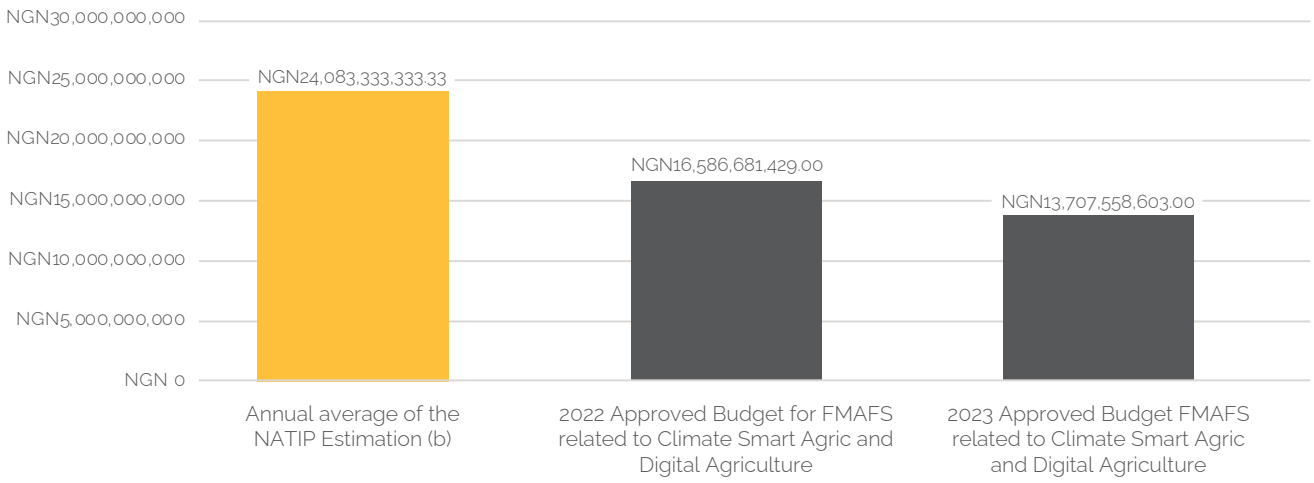
The implementation plan for NATIP allocates NGN 144,500,000,000 (USD 93,243,854) for Digital Agriculture and Climate-Smart Agriculture over the six-year period from 2022 to 2027, averaging NGN 24,083,333,333 (USD 15,540,642) annually.

The budget allocation for the promotion of digital agriculture and climate-smart agriculture in comparison to the NATIP estimation vis-à-vis the NDC climate commitment for the sector has a short fall of over NGN 17.8 billion (USD 0.011 billion). (Note that the sector already suffers severe underbudgeting and poor capital budget utilization of an average of 17% only). (See Appendix 2).

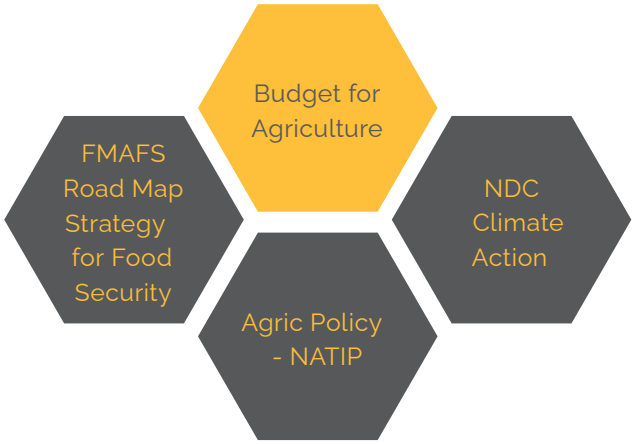
Table 3: Budget allocation for promotion of digital agriculture and climate smart agriculture

Components	Promoting digital agriculture and climate SMART agriculture (NGN)
Estimated funds required for the Planning Period 2022-2027 (a)	144,500,000,000.00
Annual average of the NATIP estimation (b)	24,083,333,333.33
2022 approved budget for FMAFS related to climate-smart agriculture and digital agriculture	16,586,681,429.00
Variation between the NATIP annual average and 2022 budget	7,496,651,904.33
2023 approved budget FMAFS related to climate-smart agriculture and digital agriculture	13,707,558,603.00
Variation between the NATIP annual average and 2023 budget	10,375,774,730.33

Figure 21: NATIP Estimate for Promotion of Digital and Climate Smart Agriculture vs Annual budget allocations related to Climate Smart Agriculture in Nigeria 2022 and 2023



Source: Authors Estimation from BOF and NATIP Implementation Plan Data



In reviewing the appropriated budgets for the period 2022–2024, it is evident that there is a critical need for a more intentional and innovative approach to budget preparation and allocation within the agricultural sector. The NATIP emphasizes the importance of integrating climate action into agricultural practices, yet the current budget allocations do not adequately reflect this alignment.

For example, while NATIP advocates for the adoption of innovative technologies — such as artificial intelligence, drone technology and clean energy solutions, like solar dryers and irrigation systems — the budget line items lack significant investment in these areas. This oversight suggests a missed opportunity for the Ministry to collaborate with innovative agripreneurs who are already advancing these technologies.

The establishment of the NADF offers a promising avenue for directing investments toward these innovative technologies. However, mechanization efforts must extend beyond the provision of large tractors that often fail to reach smallholder farmers. Initiatives such as installing solar lights and community boreholes, while beneficial, do not directly contribute to agricultural mechanization or enhance crop value chains.

Moreover, the budget reflects an excessive focus on rural development projects that do not directly enhance agricultural productivity or food security. Throughout 2022–2024, the Ministry's capital budget has been heavily weighted with infrastructure projects — such as road construction, solar street light installation and public facility development — that fall outside its primary mandate. Other government entities are better suited to handle these infrastructural needs, allowing the FMAFS to concentrate on its core mission of enhancing food security and promoting sustainable agricultural practices.

In summary implementing agricultural policies, programs and projects under Nigeria's NDC faces several significant challenges that hinder progress toward achieving climate resilience and sustainability. The main challenges include:

Financial constraints

- Limited funding: There is a substantial gap in financing for agricultural projects, with the government estimating a need for approximately USD 142 billion over the next decade. The lack of adequate financial resources hampers the implementation of climate-smart agricultural practices and infrastructure development.
- Access to green financing and climate fund: Private sector engagement remains low due to insufficient access to green financing. Many potential investors are unaware of the opportunities presented by climate action, leading to a disconnect between available funds and project needs.
- Public spending inefficiencies: Public spending within the agricultural sector is plagued by inefficiencies, characterized by inadequate funding, delayed disbursements, poor budget utilization and suboptimal reporting. The lack of transparency and accountability in budget management further exacerbates these issues, allowing corruption to thrive and diminishing the effectiveness of agricultural investments. This is a critical concern, especially in the context of climate action, as inefficient spending can hinder the implementation of sustainable agricultural practices needed to adapt to and mitigate climate change impacts. Without substantial improvements in funding and spending efficiency, the goals of the NATIP and climate action initiatives are unlikely to be realized.

Institutional and policy challenges

- Policy conflicts: Conflicts between existing policies, such as those governing fossil fuels and renewable energy, complicate the implementation of the NDC. The lack of a cohesive policy framework can deter investment and create uncertainty for stakeholders.
- Poor coordination: There is often inadequate coordination among various government agencies and stakeholders involved in NDC implementation. This fragmentation can lead to overlapping responsibilities and inefficiencies in project execution.

Capacity and technical limitations

- Limited human resources: The agricultural sector suffers from a lack of trained personnel and expertise necessary for implementing advanced agricultural practices and technologies. This skills gap limits the effectiveness of adaptation and mitigation strategies.
- Insufficient monitoring and evaluation: There is a lack of robust systems for monitoring, reporting and verifying progress on NDC targets. This deficiency makes it difficult to assess the effectiveness of implemented projects and adapt strategies accordingly.

Environmental and social factors

- Vulnerability to climate change: Nigeria's agricultural sector is highly vulnerable to climate impacts, such as flooding and droughts. The recent severe flooding has exacerbated existing vulnerabilities and led to significant losses in agricultural productivity, further complicating NDC implementation efforts.
- Inclusion issues: The exclusion of key stakeholders, including women, local communities and civil society organizations, from decision-making processes limits the effectiveness and inclusivity of climate actions. This lack of engagement can result in projects that do not adequately address local needs and conditions.

Infrastructure deficiencies

- **Inadequate rural infrastructure**: Poor infrastructure in rural areas, including roads, storage facilities and irrigation systems, hampers agricultural productivity and access to markets. This inadequacy poses a significant barrier to the successful implementation of agricultural projects under the NDC.

With the recent rebranding of the FMARD to the FMAFS, there is an expectation for a sharper focus on food production and preservation in the 2025 budget. This shift should prioritize climate-resilient agricultural practices that align with the NATIP's objectives and contribute to Nigeria's broader climate goals.

Policies and strategies conflict or overlap with agricultural policies and climate action

It is important to recognize that numerous international NGOs, development partnership programs and initiatives, along with allocations from other relevant MDAs such as the Ministries of Power, Water Resources, Environment, Trade and Investment, Health, Women and Humanitarian Affairs and Science and Technology, as well as agencies like the REA and the Central Bank of Nigeria, have traditionally supported and implemented projects aimed at enhancing food security and advancing climate resilience in agriculture. However, these MDAs may also have policies, strategies, actions and gaps that could undermine the broader goals of sustainable food security and climate resilience in the sector and the environment.

Table 4 presents an analysis of how various MDAs in Nigeria have policies and strategies that conflict or overlap with agricultural policies, particularly focusing on climate action plans. This analysis highlights the need for better policy coordination among various MDAs to ensure that agricultural policies align with climate action plans and other relevant strategies. By addressing overlaps and conflicts, stakeholders can work towards a more cohesive and effective approach to agricultural development and climate resilience in Nigeria.

Climate finance for agriculture sector climate action

Nigeria plans to issue USD 250 million (NGN 387 billion) in green bonds in September 2024 to fund climate change mitigation and adaptation projects. The Nigerian government issued the first sovereign green bond in Africa in 2017 and a second green bond series in 2019. In doing so, the country raised NGN 10.69 billion (USD 6.9 million) and NGN 15 billion (USD 9.7 million) in 2017 and 2019 respectively to finance energy and land use projects, among others. The proceeds from the first green bond series were mostly allocated to three key project categories - Energizing Education, Afforestation Program and Renewable Energy Micro-Utilities in 45 Communities. All the selected projects were fully budgeted for in the 2017 national budget (see Table 5).

The proceeds from the second green bond series were allocated to seven projects and programs in various sectors, including Energizing Education & RE Micro-Utilities, Afforestation Program, 10MW Katsina Wind Farm, Solar Powered Tricycles, Abuja Rail Mass Transit, National Irrigation Program and Agroforestry. All the selected projects were fully budgeted for in the 2019 National Budget (see Table 5).

Table 4: Analysis of various MDA policies that conflict or overlap with agricultural policies

MDA	Sector Strategy/ Policy	Relevance to agriculture	Overlap with agricultural policies	Conflict with agricultural policies
Federal Ministry of Environment (FMEnv)	National Climate Change Policy	Focuses on climate adaptation and mitigation strategies that impact land use and agriculture.	Overlaps with agricultural climate resilience efforts by promoting sustainable practices.	Potential conflicts with land use policies if agricultural expansion is prioritized over conservation.
Federal Ministry of Power (FMP)	National Renewable Energy Action Plan (NREAP). National Renewable Energy and Energy Efficiency Policy. Vision 30:30-30	Encourages the adoption of renewable energy sources which can support sustainable agricultural practices.	Supports energy-efficient agricultural practices and renewable energy integration.	Conflicts may arise if energy policies overlook the specific energy needs of rural and agricultural communities. i.e. energy access does not address rural productive livelihood, energy tariff in agrarian communities unaffordable.
Federal Ministry of Water Resources (FMWR)	National Water Resources Policy	Impacts water availability for irrigation and agricultural activities.	Overlaps by promoting water conservation and management practices essential for agriculture.	Conflicts may occur if water allocation prioritizes industrial or urban use over agricultural needs.
Federal Ministry of Finance (FMF)	National Budget Allocation, Fiscal Policy Framework Public Finance Management Reform	Influences funding availability for agricultural and climate projects.	Financial support for climate-resilient agricultural practices can align with national budget priorities.	Conflicts may arise if budget allocations favor other sectors or fail to adequately support agricultural climate initiatives. Tax regimes are not favorable to rural poor and small informal farmers and fiscal and monetary incentives do not get the farmers directly.
Federal Ministry of Trade and Investment (FMTI)	National Trade Policy National Investment Policy	Impacts agricultural value chains and trade policies.	Overlaps by supporting agricultural product value addition and export promotion.	Conflicts if industrial policies undermine local agricultural production or lead to unsustainable practices i.e. push hard for large scale conventional monoculture, land grabbing, etc. Drive agricultural focus towards cash crops for export, neglecting local nutritional and food needs.

MDA	Sector Strategy/ Policy	Relevance to agriculture	Overlap with agricultural policies	Conflict with agricultural policies
Federal Ministry of Health (FMH)	National Health Policy Health Sector Reform Program	Affects public health related to climate impacts on agriculture. Integrate nutrition and health initiatives into agricultural policies	Overlaps in promoting health interventions related to climate-induced agricultural changes.	Conflicts may occur if health policies do not consider the impact of agricultural practices on health. Gaps in heath data can promote the continued practice of unsafe and unsustainable farm practices.
Federal Ministry of Education (FME)	National Policy on Education Technical and Vocational Education and Training (TVET) Policy	Enhance agricultural education and training. Promote skill development in agricultural practices	Overlaps by supporting educational programs on climate-smart agriculture.	Conflicts may arise if educational policies do not integrate agricultural climate resilience and sustainability.
Federal Ministry of Defense (FMD)	National Defense Policy Counter insurgency Strategy Security Sector Reform	Impacts security and stability in agricultural regions.	Overlaps by ensuring protection of agricultural zones from insurgent threats and promoting peace in farming areas.	Conflicts may arise if military actions or counterinsurgency operations disrupt agricultural activities or land use. i.e. bombing and clearing of forest, tress and target localities causing environmental destructions, pollution and migration.
Federal Ministry of Interior (FMI)	National Security Strategy and Internal Security Policy Immigration Policy	Affects security measures that can impact agricultural regions and rural communities.	Overlaps by providing security that can protect agricultural activities and infrastructure.	Conflicts might occur if security policies lead to restrictions or disruptions in agricultural land or practices.
Federal Ministry of Mines and Steel Development (FMMSD)	National Minerals and Metals Policy. Mining Sector Roadmap	Impacts land use and environmental management in agricultural areas.	Overlaps by potentially supporting sustainable mining practices that minimize environmental impact on agriculture.	Conflicts may arise if mining operations lead to land degradation, deforestation, or pollution affecting agricultural productivity, or violent conflicts that displace communities. Increased and unsupervised mining activities are threats to food security and climate risk in Nigeria.
Mining Cadastral Office (MCO)	Mining Cadastral System and Land Use Policy	Influences land allocation and usage for mining versus agriculture.	Overlaps by ensuring land use regulations that can balance mining and agricultural interests.	Conflicts may arise if mining leases encroach on prime agricultural land or disrupt farming activities.

MDA	Sector Strategy/ Policy	Relevance to agriculture	Overlap with agricultural policies	Conflict with agricultural policies
The Ministry of Environment and National Environmental Standards and Regulations Enforcement Agency (NESREA)	National Environmental Standards and Regulations Policy	Ensures compliance with environmental standards that affect agricultural areas.	Overlaps by enforcing regulations that protect agricultural land from pollution and environmental harm.	Conflicts may arise if regulatory enforcement is inadequate, allowing mining, chemical waste, poor ESIA execution activities to degrade agricultural environments.

Table 5: Use of green bonds proceeds in 2017 and 2019

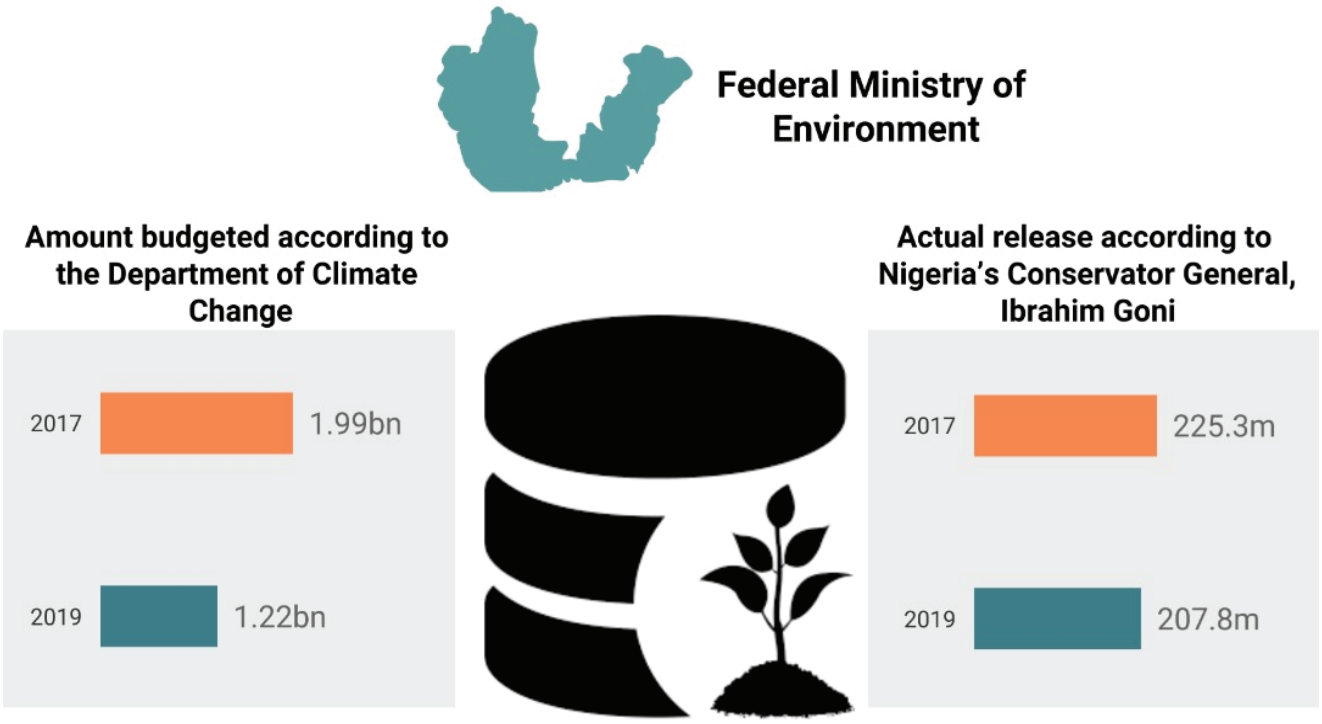
Project	Implementing Ministry/Agency	Project Objective	Climate Action Taxonomy	Cost (NGN)
		2017		
Afforestation program	Environment	To increase forest coverage through plantation of seedlings to cover 131,000 hectares of land	Mitigation Land Use: Forestry	1,990,000,000
		2019		
Agroforestry	Agriculture		Mitigation Land Use: Agriculture	NGN 600,000,000
Afforestation program	Environment		Mitigation Land Use: Forestry	NGN 1,220,877,357
National Irrigation Program	Water Resources		Adaptation & Mitigation	NGN 405,000,000

Unfortunately, independent reports on the environmental, social and economic performance of financed and implemented NDC-aligned projects have been unavailable from the government. The implementation and effects of most human and infrastructure development projects in Nigeria remain obscure due to a lack of transparency and accountability, low community inclusion and the flagrant absence of sustainability checks and scalability mechanisms.

For instance, an investigation[3] into Nigeria's green bond-funded afforestation projects has revealed significant failures in implementation, leading to poor outcomes in the targeted communities. Despite the government's claims of success, the projects suffered from inadequate community engagement, poor planning and execution by contractors lacking afforestation experience. In particular, issues arose in Aking village where tree planting occurred without proper consent from landowners, resulting in community backlash that hindered project success. Observations at various sites indicated that many seedlings did not survive due to late planting, lack of maintenance and environmental challenges such as drought and fire outbreaks.

The findings underscore critical lessons for future initiatives, emphasizing the importance of thorough community consultation and involvement in project planning. Effective implementation requires not only technical expertise in afforestation but also a bottom-up approach that incorporates local knowledge and needs.

Figure 22: Budget Allocation for Afforestation vis Green Bond vs Actual Releases



Source: Premium Times (2022)

Innovative agricultural practices in Community-led initiatives in Nigeria

Community-led initiatives in Nigeria are increasingly adopting innovative agricultural practices to enhance productivity, sustainability and resilience against climate change. The success of these community-led initiatives in Nigeria stems from their adaptability, local engagement and resource optimization, making them essential components in addressing climate change effectively. Strategies that prioritize these grassroots efforts can lead to more sustainable and impactful climate action across the country. Projects outlined in Appendix 1 illustrate how community-led initiatives can effectively address agricultural challenges while promoting sustainability and resilience against climate change.

Generally, community-led initiatives in Nigeria are thriving and often outperform state-led climate actions due to several key factors. Firstly, these initiatives leverage local knowledge and cultural understanding, allowing communities to identify specific vulnerabilities and develop tailored adaptation strategies. This grassroots approach fosters greater engagement and ownership among community members, leading to more effective implementation compared to top-down state efforts, which may lack local relevance. Additionally, community-led projects are typically more flexible and adaptable, enabling them to respond swiftly to changing environmental conditions and emerging challenges.

Moreover, management issues often hinder state-led initiatives, such as bureaucratic inefficiencies, lack of coordination among agencies and insufficient funding. In contrast, community-led efforts tend to optimize local

resources, minimizing costs and maximizing impact through collaboration and shared responsibility. These initiatives also promote social cohesion, strengthening community ties that are essential for sustained climate action.

Strategies should be built around community-led initiatives because they demonstrate a sustainable model for addressing climate change. They not only empower marginalized groups but also provide valuable insights that can inform national policies and frameworks, such as the NASPA-CCN. By integrating local experiences into broader strategies, policymakers can enhance the effectiveness of climate actions across the country, ensuring that they are both relevant and impactful.

Appendix 2 presents snapshots of on-going efforts, projects and initiatives geared towards improving food security and mainstreaming climate actions in the process. It should be noted that the list of projects and initiatives are a sample of current efforts collated within the time frame of developing this brief.

Voices from the field

A well-structured survey questionnaire was filled by stakeholders from the government ministry, precisely by officers from the Federal Ministries of Agriculture and Environment, the National Council on Climate Change (NCCC) and the Agricultural Research Council of Nigeria. Of the participants, 31.3% were from the government. Civil Society Organizations (CSOs) focusing on climate change and agriculture constituted 34.3% of the sample population. Researchers made up 10.4% of the sample, while 10.5% were private regenerative farmers and practitioners. Academicians accounted for 6% and students represented 3% of participants. A total of 67 response were collected in the survey. For the age distribution, 34.3% of the sample participants were between the ages of 31 – 40 years, while 35.8% were between 41 and 50 years. Additionally, 22.4% are above 50 years, while 7.5% are university students. Regarding gender, 53.7% of the sample were male, while 46.3% were female. (See Fig 1-3, Appendix 3).

Perception of climate change mainstreaming in government initiatives and assessment of government institutions' capacity:

40.3% of the sampled target believe that the FMAFS has incorporated climate change into their long-term agricultural policy moderately. 28.4% stated that the incorporation of climate change has been considered, but only slightly. Only 4.5% believe that there was full consideration of climate change in the sector's policy plans.

54.4% of the sampled population stated that the Ministry of Agriculture has not adequately communicated and educated stakeholders on the importance of climate adaptation and resilient food systems. 33.8% indicated such awareness and educational efforts have been only moderate. Only 11.7% of the total sample reported that the Ministry's efforts to communicate and educate stakeholders on climate adaptation for the sector have been adequate.

Figure 23: Profession demography of sampled respondent

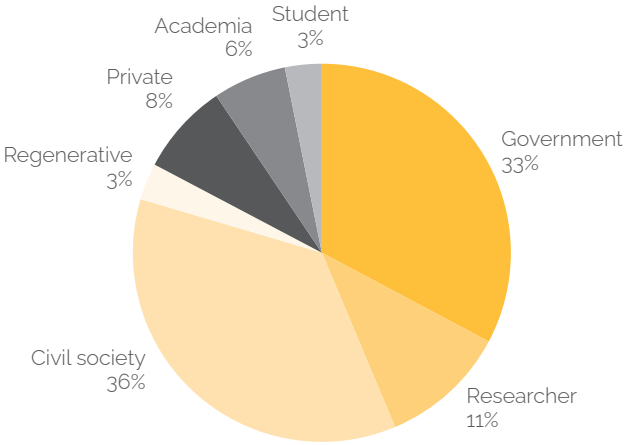
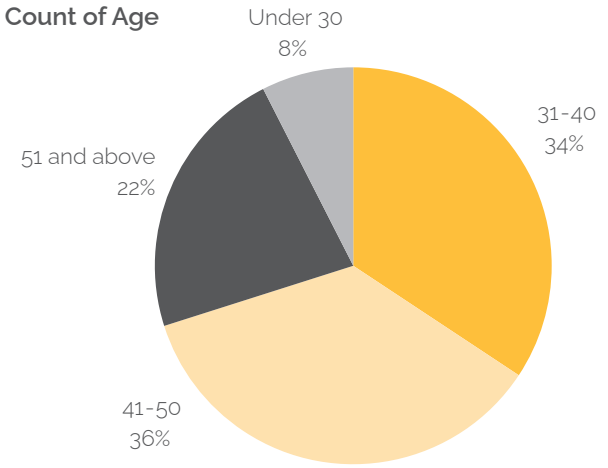


Figure 24: Age and gender demography of the sampled respondent



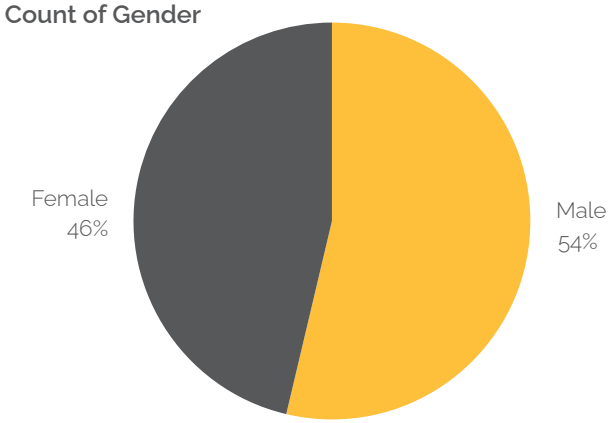


Figure 25: How well has MOA incorporated climate change into its long-term agricultural policy?

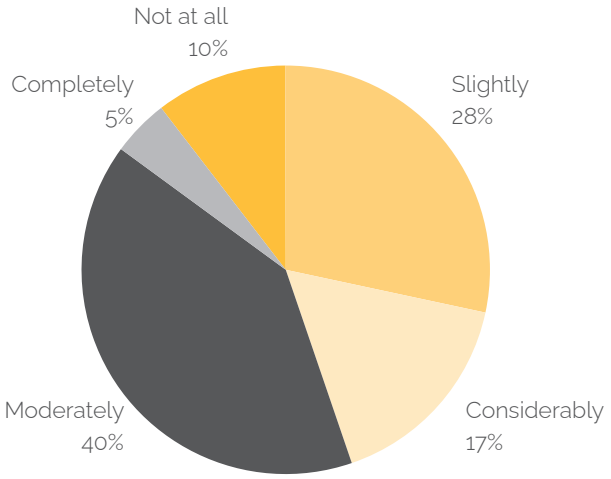


Figure 26: How adequately does MOA communicate the importance of climate change adaptation in agriculture?

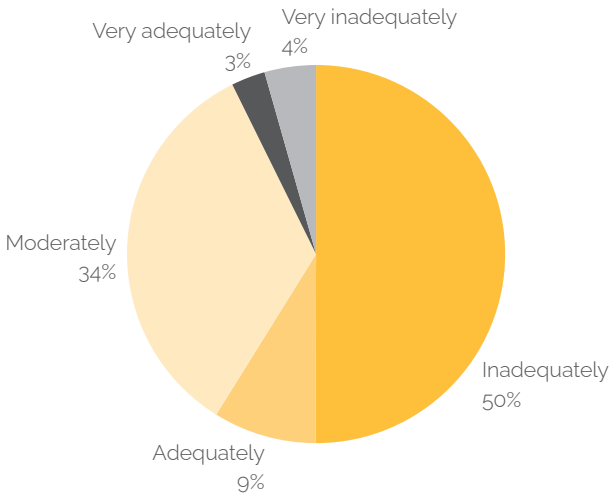


Figure 27: How effective are MOA's efforts to mainstream climate change in its initiatives?

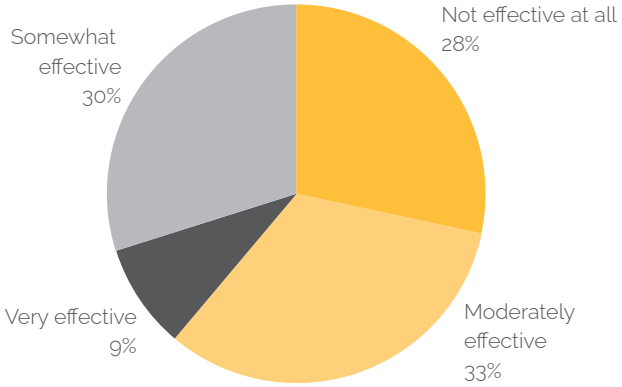
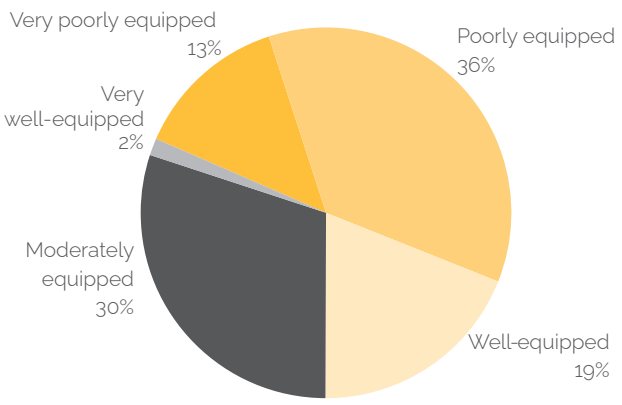
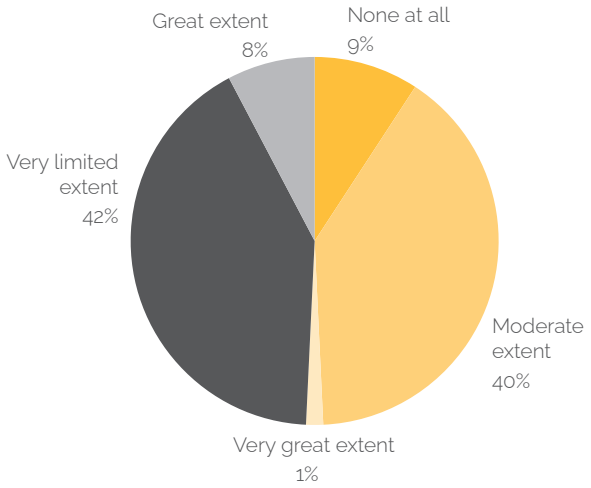


Figure 28: How well equipped are MOA to effectively address climate change?



Although a significant majority of the sampled group believe the Ministry of Agriculture has not done enough in terms of communicating and educating stakeholders on climate adaptation and resilient food systems, a little over 70% believe the Ministry has done at least moderately well in mainstreaming climate change into the sector's initiatives. Conversely, 28.4% of the sample do not agree that the Ministry of Agriculture has effectively mainstreamed climate change into the sector's initiatives.

Figure 29: To what extent has MOA established effective mechanisms for coordinating climate change adaptation efforts?



50% of the sampled respondents believe that the Ministry is not well equipped in terms of human and technical expertise to effectively address climate change challenges in the sector. 19.7% stated that the Ministry is well and very well equipped, while 30.3% reported that the Ministry has only average levels of human and technical expertise. Regarding coordinating mechanisms, 50.7% of respondents indicated that the Nigerian government lacks proper mechanisms to ensure an integrated climate change planning across ministries. The remaining portion of the sample believes that the Nigerian government has such mechanisms in place to ensure proper coordination among the MDAs with regards to climate actions.

The top five factors identified by the sampled population as the major institutional barriers hindering the Ministry of Agriculture's capacity to effectively mainstream climate action in the sector are: limited coordination between other government MDAs, insufficient technical expertise, corruption - lack of accountability and transparency, poor funding and political interference in decision making processes.

Regarding poor funding, 69.2% of the sampled population rated the budget allocation by the Nigerian government towards building resilience to climate change in the agriculture sector to be low. 23.1% rated public investment for a climate-resilient agriculture sector as moderate, while only 7.7% rated the budget allocation to the sector as high. Upon interviewing the respondents, they noted that while fund allocation to the sector may be low, it is often not fully utilized within the appropriating year.

Figure 31: How would you rate the level of government resource allocation towards building resilience to climate change impacts?

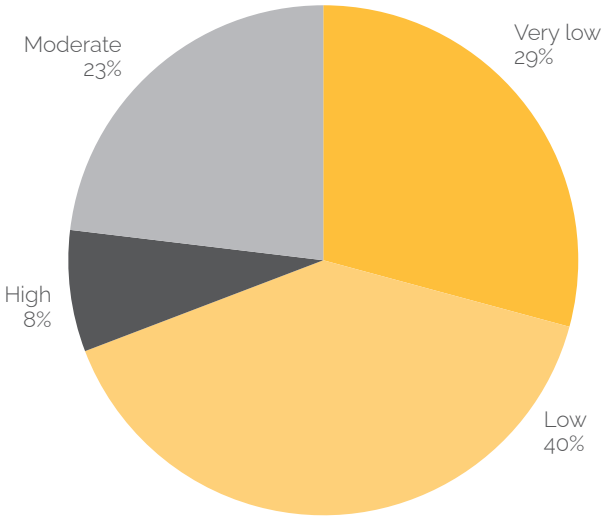


Figure 30: What are major institutional barriers hindering MOA capacity to effectively mainstream climate change in agriculture?

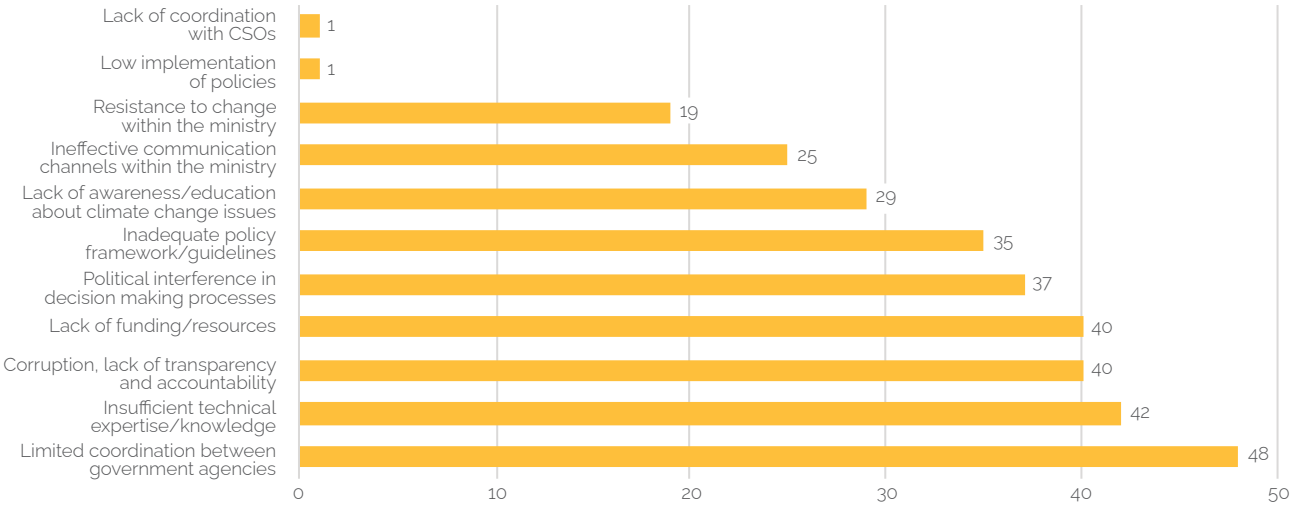
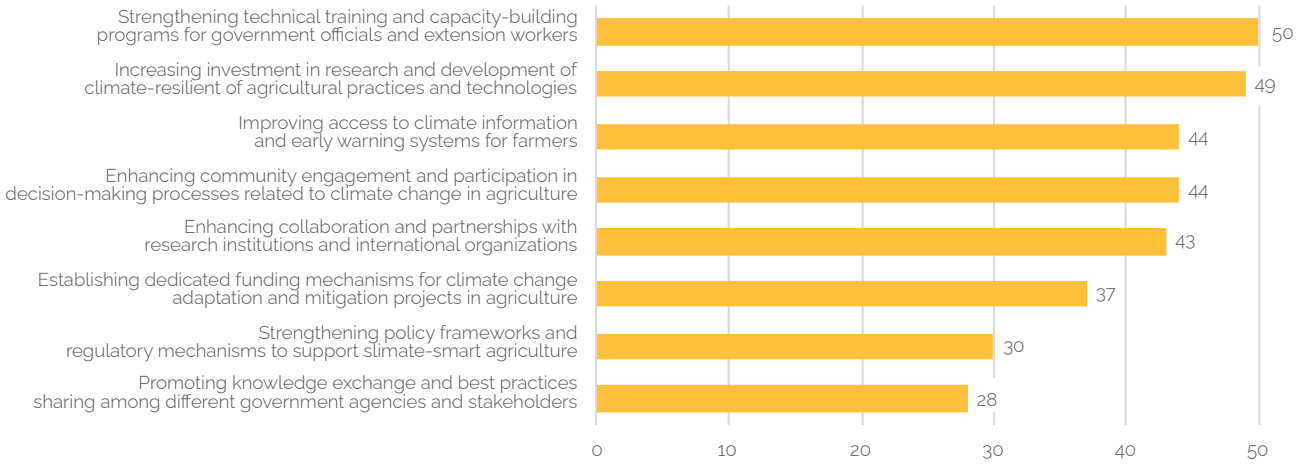


Figure 32: What five measures could be implemented to enhance capacity of Nigerian government in mainstreaming climate change in agriculture?



When asked about the top five measures they would recommend for implementation to enhance the capacity of government institutions in Nigeria, specifically the Ministry of Agriculture, to better mainstream climate change actions in agriculture and food security, the majority asked for: strengthening the capacity of government officials and farm extension workers, increasing funding for research and resilient farm practices, involving communities in planning and implementing climate actions, improving access to climate information and early warning systems for farmers and enhancing collaboration and partnerships with research institutions and development partners.

Collaboration across ministries, agencies, sub-national and partnerships with the private sector, CSOs and communities:

In assessing the level of collaboration across the government's MDAs at the Federal level, only 15% of the sampled population rated the collaboration as effective or very effective. 44.8% rated the level of collaboration among stakeholders as just average. Interview responses with a similarly optimistic position cited various inter-ministerial committees set up across various thematic areas that bring ministries together, such as the Zero Food Rejection Committee and the National Chemicals Management Committee. However, they noted that though these committees exist, they also confront challenges of continuity, sustainability and manpower commitment or consistency. They also noted that civil society platforms and working groups have served as additional platforms for MDAs to collaborate. One successful CSO network mentioned is the Nigerian Clean Cooking Alliance and its Clean Cooking Forum Committee. This group promotes advocacy and policy development for the National Clean Cooking Policy in collaboration with the FMEnv, NCCCC and other relevant MDAs and private sector. Nevertheless, 40.3% of the sampled population rated the level of collaboration among MDAs as ineffective.

Figure 33: How effective is collaboration among different government ministries and agencies in addressing climate change?

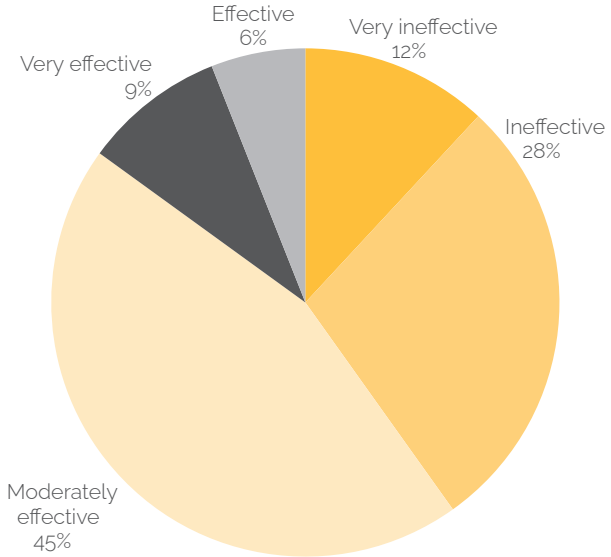
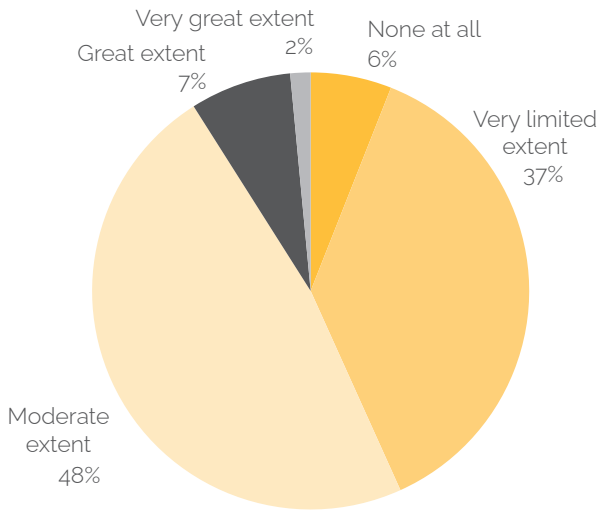


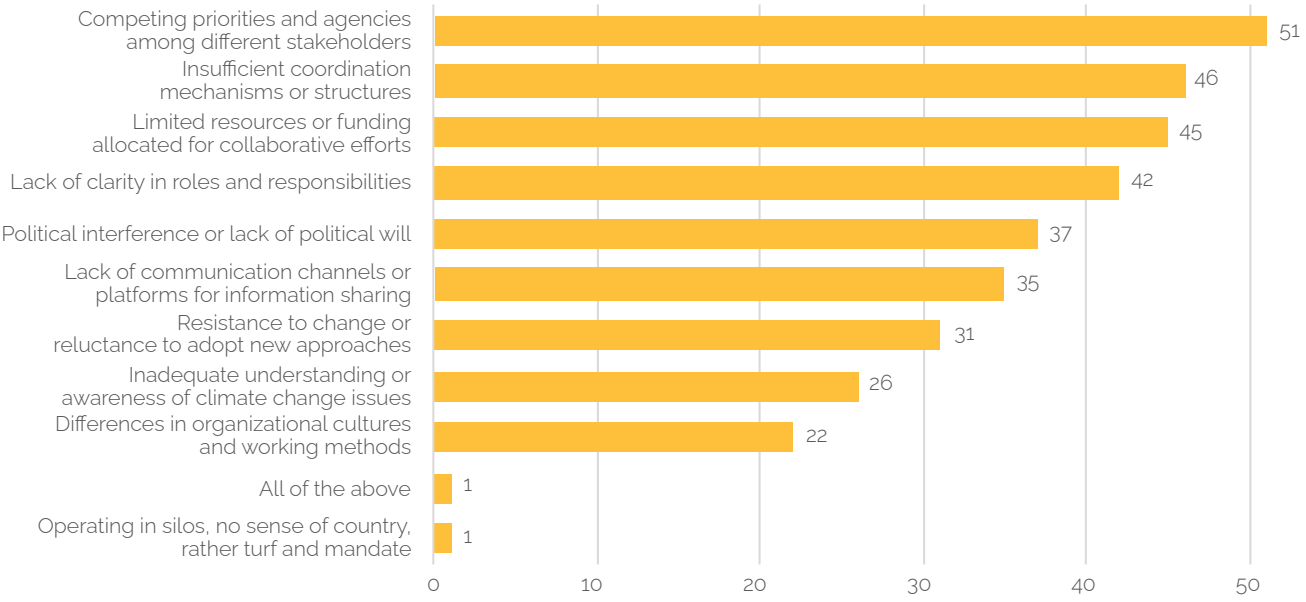
Figure 34: To what extent is there effective collaoration between MOA and sub-national governments?



The top five factors identified as hindering effective collaboration among MDAs and other stakeholders in addressing climate change in the agricultural sector include: competing priorities and agendas among different stakeholders, insufficient coordination mechanisms, limited resources to drive collaboration, lack of clarity in roles and responsibilities and political interference or lack of political will to ensure effective collaboration among stakeholders.

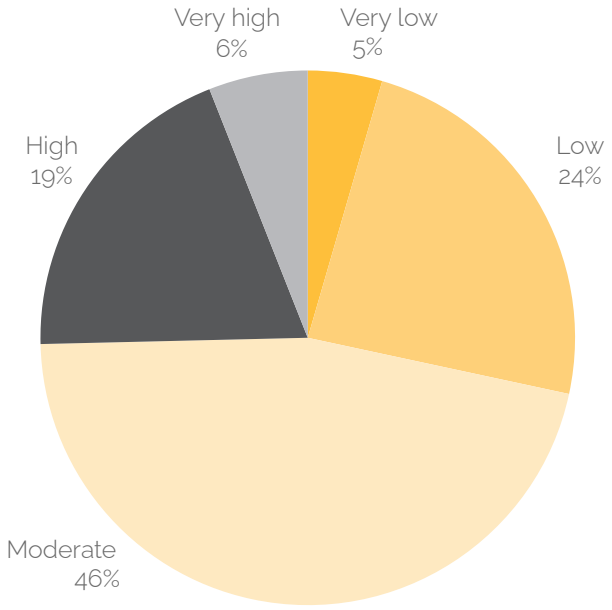
71.7% of the sampled population rated the involvement and engagement of NGOs and CSOs in driving climate change actions in the agricultural sector as above average. Conversely, 28.4% rated the engagement and involvement of NGOs and CSOs in the sector's climate change actions as low.

Figure 35: What are the 5 factors that hinder effective collaboration between the Nigerian MOA and other relevant government ministries, agencies, and stakeholders in addressing climate change in agriculture?



In recommending strategies to enhance collaboration and partnership among stakeholders in climate change, agriculture and food security in Nigeria, the sampled population proffered the following: facilitate knowledge sharing and capacity building initiatives; establish multi-stakeholder platforms/forums for regular dialogues and coordination; develop clear frameworks and guidelines for collaboration and partnerships; create incentives and funds to support collaborative projects; conduct regular evaluations of collaborative initiatives; encourage the participation of marginalized groups in decision-making; strengthen institutional capacities to drive and manage collaboration and partnerships; promote use of ICT for communication and collaboration; and foster a culture of trust, transparency and mutual respect among stakeholders.

Figure 36: How do you rate the level of engagement of NGOs and CSOs in supporting climate change adaptation?



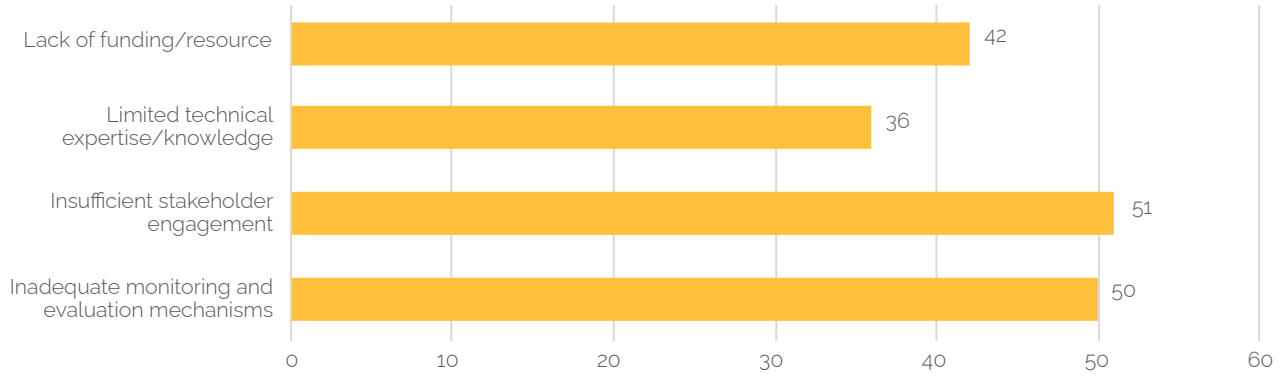
Experts perception of government implemented projects

When asked about the main strengths of successful government-implemented projects are in addressing climate change impacts in the agricultural sector, most of the sampled population identified the following: capacity building and farmer empowerment, multi-stakeholder collaboration and engagement, integration of scientific research and local knowledge, effective monitoring and evaluation mechanisms, community ownership and participation, sustainable and adaptive technologies and practices, climate-resilient infrastructure development and policy coherence and support.

The top five challenges or obstacles observed in the implementation of government-led climate change initiatives in the sector include: insufficient stakeholder engagement, inadequate monitoring and evaluation mechanisms, lack of funding/resources, policy inconsistencies or gaps, and corruption and bureaucracy.

Figure 37: What are main strengths of successful government-implemented projects in addressing climate change impacts in the agricultural sector?

Figure 38: What challenges or obstacles have been observed in the implementation of government-led initiatives aimed at addressing climate change impacts in agriculture?



Inclusion of communities and level of awareness on climate efforts

A good majority of the sampled population (63.2%) indicated that the government is not taking enough cognizance and advantage of the perspectives and knowledge available in local communities in the design and implementation of climate change adaptation projects in the sector. For instance, the engagement of communities in the implementation of Green Bond projects in Nigeria and the Great Green Wall projects, has been a mixed experience. While there are instances of community involvement, significant gaps remain in transparency, accountability and community inclusion (Adeojo, 2022; Mojeed, 2021).

When respondents were asked if they were aware of existing climate adaptation efforts, projects and initiatives in the agricultural sector, 48.5% responded affirmatively, 33.8% said no and 17.6% were unsure. In follow-up interviews, some respondents noted that they could not distinguish which projects were implemented by the Federal Ministry of Agriculture or the Ministry of Environment.

Figure 39: To what extent do you believe local communities' knowledge does the MOA in designing climate change adaptation projects?

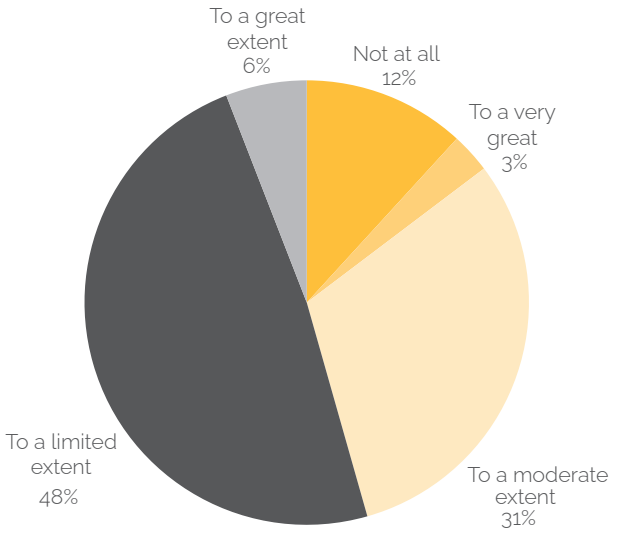
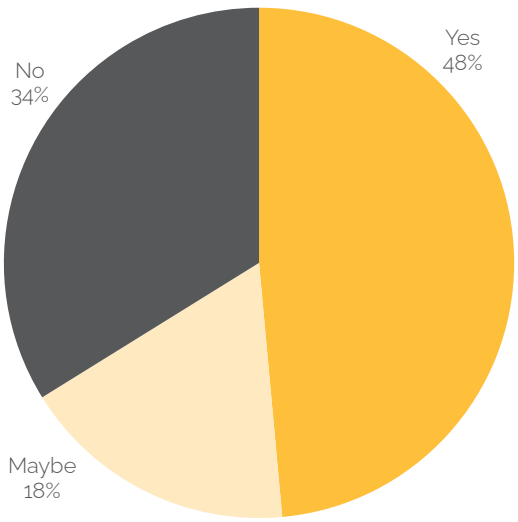


Figure 40: Are you aware of an existing climate adaptation efforts, projects and initiatives for the agricultural sector in Nigeria?



Case studies on climate action for food security

Case study 1: Addressing food security and climate change vulnerability through increasing knowledge for agroecology and agroforestry

Be The Help Foundation (BTH) launched an agroforestry project in 2019 to establish a productive training center for agroforestry and rural development in Kwali Area Council, Abuja. This initiative aims to demonstrate the economic and environmental sustainability of agroforestry in Nigeria. The Foundation's agroforestry project utilizes two systems: the Modernized Brazilian System and the Vetri (Indian) System. The Brazilian system operates without irrigation, while the Vetri system is irrigated. Each system employs distinct planting patterns, plant varieties and plant population densities.

The primary objective of this project is to validate the feasibility of these agricultural methods in Nigeria, encouraging farmers, particularly smallholder farmers (SHFs), to adopt sustainable and regenerative practices. This adoption has led to increased income for farmers, while also positively impacting the environment, as the farm does not use any external inputs such as GMOs or hazardous pesticides.

Following the proof-of-concept phase in the first three years of operation, the farm has now established a world class training center for agroecology and agroforestry, a seed bank and plant nursery and a bank for fodder and feeds. The project is also building awareness and reaching out to farming communities, development partners and state governments through collaborations with organizations active in rural Nigeria.

Start Time: March 2019
Initial Project budget: 1,250,000 USD.
Resources: 20 hectares of land, 20 permanent staff, 200+ casual staff, a light tractor, etc.
Achievement so far: Increased resilience and improved yields

- Successfully designed and implemented two dense multi-cropping systems of agroforestry that covered stable crops, fodder system and fruit bearing and non-bearing economic trees on 13 hectares between 2019 and 2023.
- Setting up pastureland development on 30 hectares for Nassarawa and Plateau States (NLTP), over 1 million super Napier grasses and 20,000 fodder trees planted for each state respectively.
- Planted over 75,000 trees on 13 hectares of land.
- Pool of trained technical staff that are reliable in skills and implementation of RA.
- Functional knowledge/training center with 13 ha demonstration farm.

Start of the BHF project, June 2019

Same project, December 2023. © Be The Help Foundation

- Development of a Basic curricula for training agroforestry. Good collaboration with over 20 organizations, CSOs, NGOs, embassies, etc.
- Over 700 farmers and individuals trained from 2022-to-2023.
- Two new private projects to be implemented this year (Taraba and Kano States).
- Newly built seedbank and storage facility.
- Seed bank with about 2 tons of seeds (with 25 varieties of seeds).
- 40 women (SWOFON) trained on natural pest control methods from 21 states in Nigeria.
- 2 pastoralists projects with government institutions in Nassarawa and Plateau States.
- 1 ha demo-plot/seed bank at Dama-Kusa village.

Climate action and environmental impact of the project

The Be-The-Help Foundation's agroforestry project has shown improvements in several biodiversity indicators:

- **Increased plant diversity:** The project has introduced a diverse range of crops and trees, including eucalyptus, moringa, shea butter trees and others, which has increased plant diversity in the area. This diversity enhances ecosystem services such as pollination, pest control and soil health.
- **Enhanced soil quality**: The agroforestry system has improved soil quality by increasing organic matter, reducing soil erosion and enhancing soil structure. This has led to healthier soil, which supports plant growth and biodiversity.
- **Increased biodiversity**: The project has increased biodiversity by providing habitat for various species, including insects, birds and other animals. This biodiversity is critical for maintaining ecosystem services and supporting agricultural productivity.

- **Reduced desertification**: The agroforestry system has mitigated desertification by providing shade, reducing soil temperature and increasing soil moisture. These factors have improved the overall resilience of the ecosystem and reduced the risk of desertification.
- **Improved livelihoods:** The project has improved local farmers' livelihoods by providing them with sustainable agricultural practices, enhancing their income and improving their overall well-being. This has led to increased food security and reduced poverty.
- **Community engagement:** The project has engaged local communities in sustainable agricultural practices, promoting a sense of ownership and responsibility for the environment. This engagement has increased community involvement in conservation efforts and improved environmental stewardship.

Case Study 2: Community-based adaptation in Nigeria - Putting the community at the heart of agroforestry in Nigeria

Overview of the community-led project

In response to challenges such as soil erosion, drought and desertification, Aerobic Agroforestry is working to reverse these trends through agroforestry. The organization's key approach is partnering with the community to bring its vision to life and restore the vitality of the landscapes. With support from a low-interest loan provided by TerraFund for AFR100 - an initiative of World Resources Institute, One Tree Planted and Realize Impact that finances Africa's top restoration enterprises and projects - Aerobic Agroforestry is engaging more farmers to regenerate degraded ecosystems in Nigeria. The organization is currently working to restore an additional 10,000 hectares of land and plant more trees, expanding its efforts to reforest a degraded forest reserve in Ondo State.

Highlighting successful approaches and innovations

The project has restored 12,000 hectares of degraded land in Ondo State, Nigeria and has planted 450,000 trees across 350 hectares. It has also created green jobs and improved access to clean water for local communities. Aerobic Agroforestry has partnered with TerraFund for AFR100 - an initiative of World Resources Institute, One Tree Planted and Realize Impact - to finance its restoration efforts.

© Aerobic Agroforestry

Case Study 3: Mainstreaming solar-powered cold storage to curb agricultural wastage for food security and climate action by ColdHubs Nigeria

The problem

In Nigeria, approximately 40% of fresh food and vegetable production is wasted annually due to the lack of suitable cold storage facilities, further exacerbating climate change. The FAO estimates that 25.3 million Nigerians are likely to face acute food insecurity between June and August 2023, partly due to food wastage. Food wastage contributes to climate change by releasing methane and carbon dioxide - potent greenhouse gases - as food decomposes in landfills.

The solution

ColdHubs is a "plug and play" modular, 100% solar-powered walk-in cold room, offering 24-hour off-grid solar cold storage containers for the preservation of perishable foods. It effectively addresses the issue of post-harvest losses in fruits, vegetables and other perishable foods. ColdHubs are installed in major food production and consumption centers (markets and farms), where farmers place their produce in clean plastic crates, which are then stacked inside the cold room. ColdHubs extend the shelf life of perishable food from 2 days to 21 days, reducing post-harvest loss by 80%. This reduction allows smallholder farmers to sell more of their harvest, potentially increasing their annual income by 25%. The initiative primarily targets women for managing operations and revenue collection at ColdHubs stations. A solar-powered cold room is also economically more efficient compared to traditional generator-powered cold rooms. For example, a typical cold room for meat and fish consumes an average of 20-30 liters of diesel per day to power traditional cold rooms.ColdHubs offers a flexible pay-as-you-store subscription model for farmers. In preparation for storage, farmers transfer their perishable foods into our reusable crates, which fit neatly onto the shelves. Farmers pay a daily flat fee for each crate of food they store.

Impact

ColdHubs has scaled up its growth and expanded its operations from 21 to 28 states in Nigeria, with significant expansion in both southern and northern regions of the country. The company is taking over the cold-chain industry in Nigeria, with 58 operational cold storage facilities and another 14 under construction in various parts of the country. The company is doing everything in its power to cut post-harvest loss in fruits, vegetables, meat, fish, milk and dairy products.

Financial and non-financial instruments received

ColdHubs has received support from various grants and donors, to seed investment and technical support from various organizations such as the Catalyst Fund, Fledge, Factore, Husk, GIZ, Heifer International, USAID, Feed the Future, AYuTe Africa, EDP – Portugal, Basel Agency for Sustainable Energy (BASE) and EMPA. The government of Japan and the International Food Policy Research Institute (IFPRI) have also extended financial support to ColdHubs in the deployment of ColdHubs stores. Financial advisory support has also been enjoyed by PWC, while Aston University, through funding from the Global Challenges Research, has supported ColdHubs in research and development. ColdHubs has also won several international and local awards that have also supported their innovative work in reducing post-harvest losses.

Challenges faced

- Low awareness: There is a need to increase awareness among farmers and secure sustainable support and recognition from more state governments.
- Limited funding to scale up: Additional investment funding is needed to reach more agrarian communities and urban markets is needed.
- Lack of integration: ColdHubs needs better integration with government programs focused on climate change and food security.
- Access challenges: Gaining authorization to access rural farms and urban space is hindered by government bureaucracy.
- Operational challenges: Government regulations, labor shortages, climate change, the cost of equipment, poor transport systems and import charges are among the enormous issues encountered in the business.

Conclusions and recommendations for integrating climate action into Nigeria's agricultural policy

Integrating climate action into Nigeria's agricultural policy is crucial for addressing the dual challenges of food security and climate change. Community-led initiatives have emerged as effective models for adaptation and resilience, demonstrating the potential for localized solutions to complement national strategies. Aligning the FMAFS Roadmap and Strategy with the NATIP and Nigeria's NDC Action Plan emphasizes the need for sustainable agricultural development that prioritizes both climate adaptation and mitigation.

Despite the alignment of NATIP with national climate goals, significant gaps in budget allocations and execution hinder progress. For instance, while capital allocations for the Ministry of Agriculture have been substantial, actual spending has fallen short of targets, limiting the effectiveness of both agricultural and climate objectives. Key findings indicate that inefficiencies such as poor budget utilization, weak coordination among agencies and insufficient exploration of local adaptation initiatives impede progress. Furthermore, an overemphasis on rural infrastructure without integrating climate-resilient practices restricts the sector's potential to enhance food security and contribute to climate goals.

To effectively mainstream climate action into agricultural policy, several recommendations are proposed. First, increasing funding for agriculture is essential, prioritizing projects that enhance climate resilience through sustainable practices. Second, establishing community-based learning platforms, such as farmer field schools, can foster peer-to-peer knowledge sharing among smallholders. Third, budget allocations should be reprioritized to support climate-smart agriculture initiatives, including renewable energy adoption and community-managed irrigation systems.

Additionally, developing affordable agricultural insurance schemes can mitigate risks associated with climate-related losses, encouraging farmers to adopt innovative practices. Enhanced coordination among MDAs is necessary to align agricultural policies with climate action plans effectively. Building capacity at both institutional and community levels to access international climate finance will also be vital in mobilizing resources for climate-resilient projects.

Promoting organic agriculture, agroecology and afforestation should be prioritized through increased budgetary support for local adaptation projects that improve soil health and biodiversity. Strengthening local research and development focused on climate-smart techniques will facilitate knowledge transfer between research institutions and farming communities. Establishing community-based agroecology networks can drive innovation and resource sharing while empowering marginalized groups.

Finally, enhancing transparency and accountability in fund allocation processes will ensure effective utilization of resources dedicated to climate-resilient agriculture. By adopting these recommendations, Nigeria can integrate community-led initiatives into its agricultural policy framework, ultimately fostering a sustainable and resilient future for its agricultural sector while addressing pressing food security challenges.

Recommendations for mainstreaming climate action into agricultural policy:

Based on the provided recommendations and insights from community-led initiatives in Nigeria, here are fifteen recommendations to consider when integrating climate action into agricultural policy:

- **Increase agricultural and climate action funding: S**ignificantly raise budgetary allocations for agriculture to meet the 10% target set by the Maputo Declaration. Funds should prioritize projects that enhance climate resilience, such as sustainable farming practices, water management systems and renewable energy solutions for agriculture. Additionally, establish dedicated funds at the local level for community-led adaptation projects through partnerships with governmental and NGOs.
- **Community-based learning:** Establish farmer field schools where smallholders can learn from each other about successful adaptation techniques. This fosters peer-to-peer learning and strengthens community ties. Develop leadership programs for local leaders to facilitate community engagement and effective project implementation, empowering them to guide adaptation efforts effectively.
- **Reprioritize budget allocations for climate-smart agriculture:** The Ministry of Agriculture should focus its spending on initiatives that directly address food security and climate action, such as promoting climate-smart agriculture, agroforestry and renewable energy adoption in farming.
- **Agricultural insurance schemes**: Develop affordable insurance products to protect farmers against climate-related losses, encouraging farmers to adopt riskier but potentially more productive practices without the fear of total loss.
- **Enhance coordination for climate-resilient agriculture:** Strengthen policy coordination among MDAs to align agricultural policies with climate action plans. Establish an inter-agency task force and promote digital platforms for data sharing. Engage policymakers to advocate for the integration of successful community-led initiatives into national climate policies to ensure that local experiences inform broader strategies.
- **Build capacity to access climate finance:** Enhance both institutional and community-level capacity to access international climate finance effectively through training programs focused on proposal writing and fund management.
- **Support mechanization with climate-friendly technologies**: Promote the adoption of solar-powered irrigation systems, bio-digesters and energy-efficient processing tools to boost productivity while minimizing carbon emissions.
- **Promote organic agriculture, agroecology and afforestation:** Expand support for organic farming and agroecology by increasing budgetary allocations for local adaptation projects that improve soil health and biodiversity.
- **Strengthen local R&D:** Invest in R&D focused on climate-smart farming techniques suited to Nigeria's diverse agro-ecological zones through partnerships between research institutions and farming communities.
- **Promote community-based agroecology networks**: Facilitate local agroecology networks that promote collaboration among farmers, NGOs, research institutions and government agencies to drive innovation and resource sharing.
- **Enhance transparency and accountability:** Establish robust reporting mechanisms to ensure effective utilization of funds allocated to climate-resilient agriculture, promoting transparency in budget processes.
- **Strengthen security for farmers:** Collaborate with local communities to create community policing frameworks that safeguard farmers and establish local conflict resolution mechanisms for disputes between farmers and herders.

- **Strengthen monitoring and evaluation for climate action:** Enhance monitoring systems to assess the impact of climate-related agricultural interventions, ensuring projects achieve their intended outcomes in food security and climate resilience.
- **Facilitate knowledge exchange platforms:** Create forums or digital platforms where farmers can share experiences, challenges and successes related to climate adaptation practices, fostering a culture of continuous learning.
- **Encourage PPPs:** Promote collaborations between government agencies, private sector actors and local communities to leverage resources, expertise and technology in implementing climate-resilient agricultural practices.

By adopting these recommendations, Nigeria can effectively mainstream climate action into its agricultural policy, improve access to climate finance and secure a sustainable and resilient future for the country's agricultural sector.

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Appendix 1: Community-led Initiatives in Nigeria with innovative agricultural practices

UNDP-GEF Food Security Project[4]

In communities in Benue (including communities such as Buruku, Obi LGA, Mbajor, Adiko and Mbaatindi), farmers have been trained in sustainable practices, such as using biofertilizers and improved seed varieties. Training on climate-smart agricultural practices and other sustainable farming techniques such as dry season farming with irrigation systems, compost production for organic fertilization, improved planting techniques to maximize land use, use of bio-fertilizers and organic compost, agroforestry practices incorporating tree planting, pest management using bio-pesticides and contour farming and ridge construction to combat soil erosion. The project established 170 demonstration plots in 10 communities to showcase effective farming techniques. High-yielding seed varieties, such as Faro 44 rice, Samnut groundnuts and TGX1448-2E soybeans, were also distributed to farmers.

Farmers reported significant increases in their harvests and income. The project has helped communities improve their resilience against climate change impacts, thereby contributing to food security. Farmers have adopted organic farming methods, reducing reliance on chemical fertilizers and pesticides, which has led to better soil health and biodiversity preservation. The initiative has fostered cooperation among farmers through cooperatives and training networks led by extension agents, enhancing local knowledge sharing and support. The overall impact has been transformative for many participants, leading to improved livelihoods, increased agricultural productivity and a shift towards more sustainable farming practices that are better suited to cope with climate challenges.

Climate action and impact of Songhai Agricultural Initiative

Songhai Farms exemplifies a successful model of integrating sustainable agricultural practices with community engagement in Nigeria. Its focus on training local farmers and promoting eco-friendly methods not only addresses immediate agricultural needs but also contributes significantly to long-term climate action goals. As revitalization efforts continue, the potential for broader impact on food security and economic stability in the region remains promising. This integrated agricultural model focuses on sustainability and community engagement, significantly contributing to climate action.

Climate Action Initiatives

i. Zero-Waste agriculture: The Songhai model promotes a zero-waste approach, which mimics natural ecosystems. This method ensures that all by-products from farming activities are reused, minimizing waste and enhancing resource efficiency. For instance, organic waste from livestock and crop production is converted into organic fertilizers, supporting soil health.
ii. Integrated farming systems: Songhai Farms employs an integrated production system that combines crop cultivation, livestock rearing, aquaculture and agro-industrial activities. This diversification not only improves productivity but also enhances resilience to climate impacts by creating synergies between different agricultural practices.
iii. Training and capacity building: The farm offers training programs for local farmers, focusing on sustainable agricultural practices. These programs empower farmers with knowledge about climate-smart techniques, enhancing their ability to adapt to changing environmental conditions.

Impact on local farmers and communities

i. **Economic empowerment:** By providing training and resources, Songhai Farms has empowered local farmers to adopt sustainable practices that increase their yields and income. For example, training in organic farming techniques has enabled farmers to reduce costs associated with chemical fertilizers.
ii. **Job creation:** The farm has historically created employment opportunities for local residents. At its peak, the Rivers Songhai Farm employed over 100 individuals, contributing to local economic development.
iii. **Community resilience**: Through its initiatives, Songhai Farms has enhanced the capacity of local communities to adapt to climate change. Farmers trained under the Songhai model have reported improved agricultural productivity and resilience against climate-related challenges.
iv. **Partnerships for revitalization**: Recent efforts by the Rivers State government to revitalize the farm indicate a commitment to restoring its potential as an agricultural hub. The government aims to leverage the Songhai model to diversify the state's economy and enhance food security.
v. **Sustainable practices adoption**: Local farmers have begun implementing practices learned from Songhai Farms, such as biogas production from agricultural waste, which contributes to energy sustainability and reduces reliance on firewood.

Strategic partnerships for Agroecology and Climate Justice in West Africa (SPAC-West Africa)

Funded by ActionAid International (AAI), Nigeria's Transformative Impact Fund is a three year project designed to improve food and nutrition security and enhance agroecological skills of 120,000 smallholder women farmers (SHWF) and young people by facilitating access to early maturing seeds, seedlings, livestock and poultry, thus supporting agroecological practices, indigenous seeds and biodiversity preservation for increased farm yields.

Through agroecology budget monitoring, tracking and advocacy towards the expansion of the fiscal spaces, rights holders will significantly benefit from budget increases and allocations in agriculture. Agroecological model farms will also be set up and scaled by smallholder women farmers to increase the adoption of agroecological practices. The project is being implemented in Ondo, Delta, Ebonyi, Jigawa and the FCT and National Level. ActionAid Nigeria has made significant strides in empowering women through agroecological practices, particularly under the Sustainable Participatory Agriculture (SPA) II program.

i. Empowerment of smallholder farmers
   - Training programs: ActionAid has trained 120,000 farmers in agroecological practices, focusing on sustainable farming techniques that improve productivity while being environmentally friendly.
   - Women empowerment: A significant emphasis is placed on empowering women farmers, who are crucial for food production. This has led to increased confidence and leadership roles among women in agricultural communities.
ii. Increased agricultural productivity
   - Improved crop yields: Farmers who participated in training reported substantial increases in their crop yields. For instance, women farmers have adopted organic farming methods that have led to better harvests and improved family nutrition.
   - Diverse crop production: The training has encouraged farmers to diversify their crops, reducing dependency on single crops and enhancing food security at the household level.

iii. Economic benefits
- Increased income: Empowered farmers have reported higher sales and profits from their agricultural activities, allowing them to reinvest in their farms and support their families.
- Access to markets: Through advocacy and training, farmers gained better access to markets, enabling them to sell their produce at fair prices.

iv. Community resilience
- Collective action: The initiatives have fostered a sense of community among farmers, encouraging collaboration and knowledge sharing. This collective effort has strengthened community resilience against climate change impacts.
- Support networks: Women farmers have formed support groups that facilitate ongoing education and advocacy for better agricultural policies.

The success stories emerging from ActionAid Nigeria's agroecology initiative highlight the transformative impact of empowering women farmers through sustainable community led practices. By providing training, resources and a supportive community, ActionAid is helping women improve their livelihoods while contributing to food security in their regions.

Other Community-Led Agricultural Projects include:

Building Nigeria's response to Climate Change (BNRCC)

Location: Nigeria (Sahel, Savanna, Coastal/Rainforest regions)

Focus: Community-based adaptation to climate change

Objective: To understand the impacts of climate change on agriculture and test adaptation strategies in vulnerable communities.

Impacts: Enhanced community resilience to climate change; improved agricultural practices; increased awareness of climate-related challenges.

Strategies:
- Participatory needs assessments to identify vulnerabilities.
- Implementation of adaptation measures such as trials of improved crop varieties and water supply enhancements.
- Capacity building through training local community members and leaders.

Catholic Archdiocesan Rural and Urban Development Program (CARUDEP)

Location: Nigeria

Focus: Sustainable agricultural practices and community development

Objective: To empower rural communities through sustainable agricultural techniques and improve food security.

Impacts: Increased food production, improved livelihoods for farmers and enhanced community cohesion.

Strategies:
- Training sessions on sustainable farming techniques.
- Formation of farmer groups to facilitate knowledge sharing.
- Provision of resources such as seeds and tools to support agricultural activities.

Centre for Education, Research and Conservation of Primates and Nature (CERCOPAN)

Location: Nigeria
Focus: Conservation agriculture
Objective: To integrate conservation efforts with agricultural practices to benefit both the environment and local communities.
Impacts: Improved biodiversity conservation alongside agricultural productivity; enhanced community engagement in conservation efforts.
Strategies:

- Promotion of agroforestry practices that support both agriculture and wildlife conservation.
- Community education programs emphasizing the importance of biodiversity.
- Collaboration with local farmers to implement sustainable land-use practices.

Greenwatch Initiative

Location: Nigeria
Focus: Environmental sustainability in agriculture
Objective: To promote sustainable agricultural practices that mitigate environmental degradation.
Impacts: Reduction in soil erosion, improved soil fertility and increased awareness about environmental issues among farmers.
Strategies:

- Workshops on soil management and erosion control techniques.
- Implementation of community-led reforestation projects to restore degraded lands.
- Advocacy for policies supporting sustainable agriculture at local government levels.

Appendix 2: Analyses of existing initiatives

Table 1: Analysis of existing efforts, projects and initiatives on food security and climate action: Challenges and opportunities

Program, projects, initiative & impacts	Challenges	Opportunities
The National Agricultural Development Fund (NADF)		
Nigerian government as established the NADF's with a vision to provide the agricultural sector towards economic prosperity, sustainable transformation, self-sufficiency and food security by 2030. In the 2024 Appropriated Budget, the sum of NGN 107.3billion was put into the NADF. The Fund's key objectives include financial inclusion, agricultural transformation, technical assistance to farmers, promoting green growth and smart technology in agriculture. NADF can provide finance through financial institutions, including microfinance banks, cooperative societies, organizations, farmer groups and institutions to individual farmers as well as corporate bodies, on appropriate soft terms. The NADF is funded through a mix of sources, including a take-off grant from the Federal Government, 0.5% of the Natural Resource Development Fund, 5% of profit after tax of each commercial bank in Nigeria, 5% of petroleum profit tax, 50% of the duty levied on imported rice, wheat, sugar and milk and monies appropriated by the National Assembly. Impact: NADF signed a Memorandum of Understanding (MoU) with the African Fertilizer and Agribusiness Partnership (AFAP) to enhance agricultural resilience in Nigeria by improving the availability, affordability and quality of agricultural inputs for farmers. NADF provided support for National Ginger Seed Roadmap, to revitalize the ginger industry, addressing the devastating impact of the blight disease on 12,000 farmers, while also enhancing production efficiency and implementing measures to prevent future fungal attacks on ginger farms.	**Limited role of state/sub governments:** Over stretch of central government resources and role in food security **Funding challenges**: Securing sustainable and sufficient funding from the channels to meet the sector needs is going to be a challenge, considering limited tools for accountability, transparency and openness. **Inefficient use of funds and corruption:** This requires robust monitoring and evaluation mechanisms to track the use of funds and ensure accountability. **Capacity building, collaboration and coordination are needed among all stakeholders –** farmers, extension workers, private sector, research institutions, financial institutions, etc. **Farm inputs provided in the program** such as NPK Fertilizers, pesticides and herbicides, promote conventional agriculture and are detrimental to the environment, allowing more release of GHG and encouraging poor farm practices that are not climate friendly.	The NADF can leverage private sector engagement to provide access to long term finance, pension funds and efficient technology for farmers, enhancing the overall impact of the program. The NADF can collaborate with international organizations and development partners to leverage expertise and resources for achieving food security and agricultural development goals. The NADF can support climate change mitigation efforts by promoting the adoption of climate-resilient agricultural practices such as agroecology and supporting research initiatives aimed at improving agricultural productivity and sustainability in the face of climate change.

Program, projects, initiative & impacts	Challenges	Opportunities
The National Livestock Transformation Plan (NLTP) 2019 - 2029		
The NLTP provides a strategic direction to transform Nigeria's livestock sector, aiming to eliminate farmer-herder conflicts by promoting intensive livestock production systems. It focuses on five key pillars: conflict resolution, access to justice, addressing the needs of affected populations, human capital development and cross-cutting issues like gender and youth. The NLTP incorporates lessons from previous unsuccessful ranching attempts, addressing issues such as lack of land titles, inadequate animal feeds and limited skilled manpower. It proposes business-oriented ranching models supported by technical and socio-economic services. The NLTP is expected to create over 500,000 jobs within the first three years and potentially 2 million jobs by the end of the plan period in 2028, contributing to economic growth and stability. The plan aims to link pastoralists to market-led value chains, enhancing their access to markets and improving the quality of livestock products. By promoting modern ranching practices and providing training, the NLTP seeks to enhance livestock productivity and reduce reliance on traditional grazing methods. **Impact:** Presidency proposes the establishment of a Livestock Commission in 2025.	The implementation of the NLTP has faced criticism for potentially excluding pastoralists from ranch development. The NLTP's success depends on collaboration among multiple stakeholders, including various government ministries and non-state actors. Coordinating these efforts can be challenging. Transitioning from traditional herding practices to business-oriented ranching requires significant changes in mindset, which may encounter resistance from pastoralists accustomed to nomadic lifestyles. Adequate infrastructure for ranching, such as water supply and access roads, is often lacking, hindering effective implementation. Additionally, financial resources for initial investments are needed. Ongoing farmer-herder conflicts and security challenges pose significant obstacles to the successful implementation of the NLTP. Sustained political commitment is necessary for the successful implementation of the NLTP. Changes in political leadership or priorities have disrupted ongoing initiatives and funding.	There is potential for significant investment in sustainable livestock practices, which can enhance resilience and productivity in the sector. Collaborations between the government, civil society and the private sector can enhance agricultural productivity and food distribution. Addressing gender disparities and empowering young people in agriculture can lead to better resource management and increased productivity. Improving post-harvest handling and storage systems can significantly reduce food waste and enhance economic viability for smallholder farmers.

Program, projects, initiative & impacts	Challenges	Opportunities
Agricultural Mechanization Program (Tractorization Program)		
Launched in February 2023 by FMARD in partnership with the Bank of Agriculture (BOA), the program aims to promote mechanized farming, improve food security and create jobs. The program provides loans and grants for mechanized equipment. Nigerian farmers were expected to make a 40 per cent down payment while the balance of 60 per cent is spread over three years. Impact: The ministry has acquired 10,000 units of tractors with implements and 50,000 units of assorted equipment to kick-start the program. The Hello Tractor initiative, which is closely related to the Tractorization Program, has created 312 direct jobs for tractor operators and booking agents. Additionally, it has generated 784 indirect jobs across communities involved in the program.	The program faces challenges such as limited funding, high costs of mechanization, inadequate training on mechanized practices and market inefficiencies that hinder the adoption of mechanization in agriculture. The programs also suffer from a high rate of loan defaults. There is poor mechanization underutilization, as large machines are less preferred, accessed and usable by women. The programs promote diesel-powered machinery, which is not environmentally friendly or climate conscious. The initiative faces challenges in terms of limited infrastructure, including roads, storage facilities and market access.	Nigeria can leverage climate-smart energy solutions to reduce its reliance on fossil fuels and mitigate the impacts of climate change. Nigeria can implement enabling policies and incentives to encourage private sector investment in renewable energy, energy efficiency and climate-smart agriculture. Engaging the private sector can help mobilize resources and scale-up climate solutions in this regard. Nigeria can also increase advocate for more climate finance from developed countries to support its energy transition to cleaner agricultural technologies that are gender-sensitive.
The Growth Enhancement Support Scheme (GESS)		
A government initiative aimed at enhancing agricultural productivity by providing farmers with subsidized farm inputs, such as seeds, fertilizers and pesticides and supporting agro-processing and irrigation to increase crop yields and improve agricultural output. Farmer Registration: GESS aimed to register 20 million farmers over four years, targeting 5 million farmers each year. This was critical for creating a national database of farmers, which had not existed prior to GESS. GESS was rebranded and transitioned into the NAGS-AP. Impact: A study utilizing a bivariate probit model indicated that participation in GESS significantly increased rural farmers' access to and usage of fertilizers (Uduji et al., 2019). The impact was quantified as a notable improvement in fertilizer application among registered farmers compared to non-participants.	**Inadequate Supply of Inputs:** One of the major challenges facing GESS is the inadequate supply of farm inputs, particularly fertilizers and seeds, which can lead to delays in the distribution of inputs to farmers. **Politicization, Fraud and Corruption:** There have been reports of fraud and corruption in the implementation of GESS, which can lead to the misappropriation of funds and the diversion of inputs meant for farmers. **Climate Change**: Climate change poses significant challenges to the success of GESS, as it leads to changes in weather patterns, soil degradation and increased pest and disease pressure, which negatively impact agricultural productivity. **Insufficient agricultural extension services** limited support for farmers.	GESS could leverage private sector engagement to attract investment and expertise in the agricultural sector, which could help to improve agricultural productivity and promote food security. GESS could benefit from carbon pricing mechanisms, such as carbon taxes or cap-and-trade systems, to generate revenue for agricultural development and promote sustainable agricultural practices. GESS could benefit from international cooperation and coordination to share knowledge, expertise and resources for agricultural development, which could help to improve agricultural productivity and promote food security.

Program, projects, initiative & impacts	Challenges	Opportunities
National Agricultural Growth Scheme and AgroPocket (NAGS-AP) project - FMAFS Dry Season Farming Initiative 2023/2024 and Guidelines for Dry Season Farming		
This is a strategic initiative by the Federal Government of Nigeria, implemented through the FMARD/FMAFS aimed at enhancing agricultural productivity and food security in the country. The project focuses on supporting small-scale farmers by providing them with relevant farm inputs to cultivate key crops like wheat, rice, maize, sorghum and soybean during both wet and dry seasons. The project leverages an ICT-based delivery platform to ensure transparency, accountability and effective monitoring of the input distribution process. Additionally, NAGS-AP aims to attract private sector investments in agriculture, reduce post-harvest losses, add value to local agricultural produce, develop rural infrastructure and enhance access to financial services and markets for farmers and other value chain actors. **Impact**: The 2023/2024 dry season framing initiative implemented via the NAGS-AP project focused on four major crops, wheat, rice, maize and cassava. As of December 21, 2023, the NAGS-AP achieved a 96.47% input redemption rate, with 118,657 hectares redeemed out of a targeted 123,000 hectares under the 2023/2024 National Wheat Development Program. An estimated 472,000 metric tons of wheat product, at an average yield of 4 metric tons per hectare, will be realized by 2024 60,000 smallholder farmers across 26 local government areas in five states (Niger, Kebbi, Jigawa, Kano and Sokoto) have been provided essential farm inputs like fertilizers and seeds.	Communication network interruptions, poor or non-availability of network or limited release of SMS messages thereby keeping farmers redundant for certain periods of time among others. Farmers' inability to pay for the component of input costs. The project relies heavily on wheat imports due to limitations in the country's seed system, which can impact the quality and availability of local wheat varieties. The farm support inputs seem to promote the dependence of farmers on conventional monoculture farming and promotion of agrochemicals usages, which contributes negatively to climate change and pollution. The project aims to reduce post-harvest losses, but this remains a significant challenge in the agricultural sector, particularly in Nigeria. The project requires the development of rural infrastructure, including storage facilities, roads and markets, which can be a significant challenge in many rural areas. The success of the NAGS-AP program heavily relies on favorable weather conditions. Adverse weather events can significantly impact crop yields and overall program success, indicating a need for more robust risk management strategies	NAGS-AP can establish farmer field schools or cooperatives that encourage peer-to-peer learning, allowing farmers to share experiences and best practices. Incorporating agricultural insurance into NAGS-AP is a significant step toward mitigating climate-related risks. This integration aims to protect farmers from losses due to extreme weather events like floods and droughts, thereby enhancing the resilience of local food systems. NAGS-AP can promote climate-smart agricultural practices that improve productivity while reducing greenhouse gas emissions. Training programs can be developed to educate farmers on sustainable practices, such as crop rotation, intercropping, agroecology and efficient water management. NAGS-AP can advocate for investments in rural infrastructure that support climate resilience, such as improved irrigation systems and storage facilities that reduce post-harvest losses. The implementation of an ICT-based delivery platform allows for real-time communication between farmers and extension services. This can help bridge the gap caused by the lack of farm extension officers by providing farmers with immediate access to agricultural advice and resources.

Program, projects, initiative & impacts	Challenges	Opportunities
The Great Green Wall Initiative (GGWI)		
Acomprehensive program aimed at combating land degradation and desertification, enhancing food security and promoting sustainable livelihoods in the country. The initiative is part of the broader African Union's (AU) GGWI, which seeks to create an 8,000 km long greenbelt across the Sahara Desert to halt and reverse land degradation, prevent biodiversity loss, ensure ecosystems are resilient to climate change and contribute to human welfare and poverty eradication by 2025. **Impact**: In Nigeria, the GGWI is working to prevent or reverse the degradation of ecosystems while improving the living conditions of communities by enhancing the provision of ecosystem services. One of the key components of Nigeria's GGWI is the establishment of a 1,359 km contiguous shelterbelt from Kebbi State in the northwest to Borno State in the northeast, which serves as a windbreak. Key results in Nigeria include: 7.6 million plants and seedlings produced 2,801 hectares of reforested lands created 373 hectares of multipurpose gardens created 709km of windbreaks 1,205 people trained in food and energy security as well as in biodiversity maintenance 1,396 jobs created	**Funding**: The initiative faces significant funding challenges, with only 15% of funds allocated to Nigeria's Ecological Fund committed to the GGWI. The program relies on funding from various sources, including the African Development Bank and other international organizations. **Capacity Building**: Capacity building is a significant challenge, especially in rural areas where access to education and training is mostly limited. **Land Conflicts:** The initiative has faced challenges related to land conflicts between herders and farmers, which need to be addressed through effective conflict resolution mechanisms. **Infrastructure and Logistics:** The program may face challenges in terms of infrastructure and logistics, particularly in rural areas where access to roads, storage facilities and other essential services may be limited. **Poor inclusion of locals (community ownerships),** **Scalability and sustainability gaps** **Poor monitoring and evaluation.**	Nigeria has the opportunity to adopt Locally Led Adaptation approaches that are inclusive, gender responsive and consider synergies with other development agendas. The GGWI can be integrated with REDD+ (Reducing Emissions from Deforestation and Forest Degradation) activities to enhance its climate change mitigation and adaptation outcomes. The GGWI can benefit from private sector engagement and investment to enhance its scale and impact. Nigeria can explore innovative financing mechanisms like green bonds, carbon markets and blended finance to mobilize private sector investment in climate actions like the GGW, CSA, etc.
The Assisted Nigeria Climate Adaptation-Erosion and Watershed Project (NEWMAP-EIB)		
USD 900 million World Bank program launched in 2013 and operated across 23 southern Nigerian states aims to address land degradation and erosion in Nigeria. It includes measures to improve watershed management and promote sustainable agriculture. **Impact**: NEWMAP is implemented by the Federal Ministry of Environment. NEWMAP has addressed over 70 active gully erosion sites across the country. As of December 2019, the project had reclaimed 1,722.41 hectares of degraded lands, reducing the loss of lives and infrastructure. The project has successfully implemented 42 climate resilient and low-carbon investments.	Destruction of vegetation by grazing animals and wildfires pose a challenge to the successful implementation of Farmer Managed Natural Regeneration (FMNR) practices. Ensuring the sustainability of the project's objectives beyond its lifespan is a key concern for stakeholders.	Promoting sustainable land management practices and protecting biodiversity can help Nigeria access climate finance and carbon markets. Nigeria can share its experiences in addressing climate-related disasters like floods and droughts through early warning systems and community-based adaptation. The country can advocate for increased support for adaptation and resilience-building in vulnerable communities and sectors.

Program, projects, initiative & impacts	Challenges	Opportunities
Climate-Smart Agriculture (CSA)		
The Ministry of Agriculture promotes CSA practices to increase productivity, enhance resilience and reduce greenhouse gas emissions. This includes agroforestry, improved crop varieties and sustainable land management techniques. In the 2024 budget, over NGN 1.18 billion (USD 772,226) was budgeted for climate resilient sustainable agriculture. Impact: Adoption of climate-resilient agricultural practices such as drought-tolerant crop varieties, conservation agriculture and integrated soil fertility management Improved agricultural water management through practices like rainwater harvesting and storage Livelihood diversification projects that enhance resilience to climatic shocks Increased awareness and capacity building on CSA among farmers and extension workers	Inadequate funding and limited access to financial resources for CSA implementation. Low literacy levels among farmers making it difficult to adopt new practices. Lack of support and few opportunities for local CSA practitioners to engage in policy decisions. High costs of executing CSA practices and insufficient training on the practices. Weak institutional capacity and poor stakeholder engagement. Gaps in monitoring and evaluation; and a lack of machineries to ensure transparency, accountability and sustainability.	Promote climate-smart innovations that address challenges and sustain opportunities for safe agricultural production. Increase budgetary allocation to the agricultural sector in line with the Maputo declaration. Develop frameworks to help governments make informed decisions for sustainable agricultural development through CSA. Expand rural job opportunities and support community resilience to climate change impacts. Leverage partnerships and international support for scaling up CSA practices.

Program, projects, initiative & impacts	Challenges	Opportunities
The Value Chain Development Program (VCDP)		
A holistic and demand-driven approach to addressing constraints along the cassava and rice value chains using an inclusive strategy to strengthen capacity of actors along the chain (producers, processors, public and private institutions, service providers, policy-makers and regulators).. The programme strongly emphasizes the development of commodity-specific Value Chain Action Plans at the local government level, which serves as the basis for rolling out sustainable activities to reduce poverty and accelerate economic growth. The objective is to sustainably enhance rural incomes and food security. The target groups include 15,000 smallholder farming households, 1,680 processors and 800 traders. It is a USD 334.022 millon program from 2012 to 2026 working in rural farming communities in nine states. (Anambra, Benue, Ebonyi, Ogun, Niger and Taraba. Kogi, Nasarawa and Enugu) . 35% of the matching grants provided by the programme are to be earmarked for women, to enable upgrades to production and processing technologies and capacities. In addition, the programme is applying the Gender Action Learning System, a community-led methodology for rural livelihood development and gender equality. The VCDP aims to achieve these objectives by enhancing the profitability of smallholder farmers and small/medium-scale agro-processors through improved access to markets and capacity to add value to raw materials. Impact: The VCDP has reached approximately 100,000 farmers The program has conducted numerous training sessions aimed at enhancing the skills of farmers in rice and cassava production. In Taraba State, a study showed farmers had an increase in rice yield to 6.02 tons per hectare from 1.92 tons per hectare as a result of joining the VCDP,	Persistent farmer-pastoral conflicts and corruption are major problems militating against the VCDP in some states like Taraba State. Access to suitable financing and credit options is a significant challenge for beneficiaries across all value chain nodes. Cultural norms restricting interaction between men and women in Niger State, weak governance of participating farmer organizations, high levels of corruption and security concerns that limit mobility and access to remote areas are especially challenging.	VCDP can promote climate-resilient agricultural practices such as conservation agriculture, agroforestry and integrated pest management to enhance the resilience of farmers to climate-related shocks. VCDP can mainstream climate action and enhance the resilience of farmers to climate-related shocks, ultimately contributing to sustainable agricultural development and food security in Nigeria. The program has adopted a comprehensive gender strategy that promotes facilitating women's access to assets, strengthening women-only and mixed-gender groups, easing their workload and improving their overall well-being. By enhancing the collective efficacy of farmer organizations, the VCDP can facilitate better resource sharing and knowledge exchange regarding climate adaptation strategies. Empowered organizations can advocate for policies that support climate resilience at local and national levels.

Program, projects, initiative & impacts	Challenges	Opportunities
Green Climate Fund Projects		
Nigeria has received support from the Green Climate Fund for projects like the Renewable Energy Performance Platform (REPP 2), KawiSafi II and the Infrastructure Climate Resilient Fund (ICRF). **Impact**: The Development Bank of Nigeria (DBN) secured accreditation from the GCF, enabling it to access between USD 50 million and USD 250 million for climate change projects. This accreditation allows DBN to provide loans and manage projects aimed at climate mitigation and adaptation.	Low project submission from Nigeria and the need for technical support when applications are made to the fund. These projects seem to focus more on promoting renewable energy, enhancing climate resilience in infrastructure and supporting sustainable development initiatives. Exchange rate volatility makes dollar-based lending expensive.	Over 15 projects have been funded by the Green Climate Fund, with an equivalent USD 4.0 million in readiness support approved and USD 2.2 million already disbursed. More opportunities exit for more projects to be enrolled and funded by the GCF.
Nigeria Environmental and Climate Change Adaptation Project		
Yobe State Government initiated the Integrated Climate Change Action Plan (ECCAP) to mitigate the impact of climate change and desertification on the people of Yobe State and restore the forest landscape in the region. The project is part of the Yobe State campaign to help meet the country's AFR100 goal of restoring 4 million hectares of land degraded due to climate change. The project involves reforesting the selected locations with 20,000,000 nursed seedlings of Gum Arabic (Acacia senegalensis), Neem (Azadirachta indica), Prosopis (Prosopis juliflora) and other assorted fruit trees like Date palm (Phoenix dactylifera), Doum palm (Hyphaene thebaica), Kenaf (Hibiscus cannabinus), Mango (Mangifera indica) and Tamarind (Tamarindus indica) at 11 locations, summing to 40.5 ha of land. **Impact**: No report on implementation	Nigeria faces challenges such as lack of climate financing, inadequate infrastructure and inequality that worsen the impacts of climate change. Poor infrastructure, limited financing schemes, natural resource depletion or scarcity, poverty and inequalities, make a clean transition difficult. Limited Collaboration: Collaboration between ministries and government agencies with different roles in climate change administration is limited and science-based targets are not yet mainstream enough to inform planning and legislation.	Nigeria and Yobe State can secure funding from international organizations like the Green Climate Fund, the Global Environment Facility and the Climate Investment Fund to support its climate change adaptation efforts. Collaborate with International Partners: Nigeria can collaborate with international partners to share knowledge, expertise and resources in climate change adaptation and mitigation. Participate in International Initiatives: Nigeria can participate in international initiatives like the Africa Adaptation Acceleration Program (AAAP) and the Global Center on Adaptation (GCA) to access technical support and funding

Source: Author's analysis

Table 2: A sample of foreign-run agricultural programs

Program	Description
The UK government is currently running several agricultural programs in Nigeria to support sustainable agriculture and forestry, enhance food security and address climate change. These include: • **Propcom+**: This is a £95 million climate program in Nigeria aimed at supporting sustainable agriculture and forestry. It targets more than 4 million individuals, with a particular emphasis on empowering women, to adopt and scale sustainable agricultural practices that enhance productivity, climate resilience and ecosystem preservation. • **LINKS Program:** This is a £12m UK government-funded program designed to support the development of a vibrant, inclusive and diversified economy in three northern Nigerian states (Kano, Kaduna and Jigawa). The program aims to develop high-potential pro-poor value chains by supporting them to be productive, competitive and attractive for investment at every level. It has had two main areas of activity: supporting the growth of climate-smart agriculture. • **Systems of Rice Intensification (SRI):** This is a climate-smart practice that increases rice productivity and reduces methane emissions. It uses a cultivation system of alternate wetting and drying to create aerobic soil conditions that reduce methane production. The practice uses less seeds and less water whilst significantly increasing yields and as such, it can increase farmer incomes whilst reducing GHG emissions. • **£55 million contract**: This is a contract signed as part of the £95 million Propcom+ program announced at COP27. The contract aims to support the transformation of Nigeria's rural economy and is focused on sustainable agriculture and forestry. • **£2.89 million grant:** This grant is part of the Propcom+ program and aims to support more than 4 million people across Nigeria to adopt and scale up sustainable agricultural practices. This includes improving the health of animals, making crops more resilient and introducing cleaner cooking practices.	
UNDP Regional Stabilization Facility for Lake Chad	Established in 2019, this facility is undertaking a project strengthening food security and resilience for conflict-affected communities in the North East.
Agro-Climatic Resilience in Semi-Arid Landscapes (ACReSAL) project	A USD 700 million 6-year program which started in 2022 and is aimed at addressing the challenges of land degradation and climate change in the 19 states of Northern Nigeria and the federal capital.
Agro-Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) project:	A World Bank-funded project in close partnership with FMARD. This USD 200m credit funded project started in 2017 and reported a closure date of September 2023.
Feed the Future (FTF) Nigeria Agricultural Policy Project (NAPP):	USAID's flagship agricultural livelihoods program in Nigeria, part of the US Government's Global Hunger and Food Security Initiative. It had a budget of USD 12.5 million between 2015 and 2021, covering 11 states.
Feed the Future Innovation Labs	In October 2023, USAID announced a USD 29 million investment for two Feed the Future Innovation Labs to work in selected countries, including Nigeria.

Source: Author's compilation

Appendix 3: Climate-related projects in the appropriated FGN budget

For 2022

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP20175048	Land and climate change management for sustainable agriculture	New	1,661,639,390
ERGP30174874	Irrigation agriculture and crop development for all year-round farming	New	1,709,162,659
ERGP30174893	Implementation of the Green Imperative Projects (GIP) nationwide	New	450,000,000
ERGP30174924	NATIP domestication	New	146,183,848
ERGP5105208	National Grazing Reserves Development	Ongoing	1,000,420,650
ERGP5179229	Construction of open market stores with borehole, toilet facilities and erosion control in 3 communities in Edo State	New	250,000,000
ERGP5180322	Multilateral/bilateral project-tied loans – Agricultural Transformation Agenda (ATAPS)	New	8,203,000,000
ERGP30153302	Human capacity development on post-harvest storage technologies	New	28,500,000
ERGP202202156	Training and empowerment for youth in modern post-harvest techniques in Ning/Warji Federal Constituency, Bauchi State	New	42,500,000
ERGP28168470	Construction of water stanchion & water reservoir facilities at HQ & regional centers	New	14,250,000
ERGP29132349	Digitalization of agricultural info services for rural development	Ongoing	4,750,000
ERGP30132308	Human capital development for managing post-harvest activities for Nigerian farmers	Ongoing	4,750,000
ERGP30155115	Development of capacity for soilless agriculture for youths at the headquarters	Ongoing	14,250,000
ERGP30155131	Capacity building in green house farming for women and youth in 6 geo-political zone	Ongoing	7,125,000
ERGP202200395	Capacity building in post-harvest and seed preservation for farmers in Kebbi State	New	40,800,000
ERGP202201665	Extension management training for preservation of harvest and seed multiplication for micro farmers in Obi/Oju lga, Benue state	New	8,500,000
ERGP30171113	Research into genetic and varietal improvement of Stevia Crop	New	15,068,925
ERGP30104608	Development of seed system for ginger/turmeric, potato/sweet potato and cocoyam/yam	Ongoing	42,335,170
ERGP30104640	Development of new varieties of cassava, sweet potato/potato and cocoyam/yam suitable for all agro-ecological zones in Nigeria for processing and export	Ongoing	41,940,646
ERGP30174506	Dry season production of root and tuber crops with irrigation	New	24,077,562
ERGP30174516	Development and production of pre-basic seed of yam using the aeroponics system	New	19,818,484
RGP30176386	Genomic evaluation of Nigerian indigenous breeds of domestic animals (cattle, small ruminant, swine, donkeys, shikabrownâ® chickens, rabbits and horses, camel)	New	28,179,900
ERGP30176390	Genetic improvement of livestock through selection and cross breeding	New	15,399,450
ERGP30176408	Develop livestock with high performance in meat production by preweaning selection through DNA extraction technology and breeding	New	18,270,678

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30176416	Develop livestock with high performance in milk production by preweaning selection through DNA extraction technology and breeding	New	28,069,670
ERGP30176419	Improvement in survivability of and improvement in twinning, growth and milk rate of our indigenous sheep and goats	New	19,130,240
ERGP30176420	To develop a new swine breed from the crosses of the five breeds in the farm that can breed-through as NAPRI product/breed	New	18,373,500
ERGP30176429	Genetic improvement of on-going poultry breeding	New	10,000,000
ERGP30176435	Production of pasture breeder seeds for further expansion using modern techniques and machineries	New	28,400,500
ERGP30176438	Identification and description of herdsmen by activities, conflict and evaluation of existing mitigation measures	New	21,250,900
ERGP30110937	Development of high yielding wilt tolerant tomato and pepper varieties adaptable to Nigeria agro ecologies	Ongoing	19,802,156
ERGP30110953	Germplasm enhancement, variety development and breeder seed increase for leafy greens, onion, okra, eggplant and exotics for farmers production and profitability	Ongoing	7,545,045
ERGP30110958	Horticultural genetic resources expansion for varietal improvement and conservation	Ongoing	14,011,335
ERGP30110978	Development and strengthening of citrus and mango value chains through improved sustainable production technologies	Ongoing	19,514,562
ERGP30171114	Minimizing post-harvest losses through value addition to selected horticultural crops of significant economic and medicinal potentials	New	10,637,649
ERGP30171135	Development and promotion of improved propagation techniques for some indigenous crops (Parkia biglobossa, Tetrapleura tetraptera and Ocimum basilicum, Irvingia).	New	7,089,639
ERGP30171140	Improvement and development of production techniques for roses, carnations, chrysanthemum, hydrangea and marigold for sustainable economic development and improved livelihood	New	8,352,552
RGP30111969	Improvement of new hybrid cocoa varieties and associated production/ production technologies	Ongoing	56,620,306
ERGP30112359	Improvement of cashew genotype and associated production/production technologies	Ongoing	17,100,000
ERGP30112365	Improvement of tea varieties and associated production/production technologies	Ongoing	17,100,000
ERGP30153637	Integrated farming systems for sustainable cocoa coffee kola cashew and tea production in the emerging climatic change	Ongoing	7,125,000
ERGP30153673	Value addition and quality control of cocoa. Kola, cashew. Coffee and tea developed products	Ongoing	5,106,279
ERGP30153791	Climate smart agriculture in cocoa production	Ongoing	14,250,000
ERGP27174977	Construction of hydroponic research and development facility	New	20,385,718
ERGP30154626	Development of new fishing technologies and improvement on indigenous clupeids (freshwater sardines) exploitation for fish meal production in the country	Ongoing	10,988,880
ERGP30154647	Studies into the biological productivity and environmental status of freshwater bodies in selected freshwater ecosystems in the six geo-political zones of Nigeria	Ongoing	10,248,811
ERGP30107021	Promotion of modern and commercial agriculture in model and adopted villages in Nigeria	Ongoing	38,756,105

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30107027	Packaging and dissemination of improved agricultural innovations to end users/farmers in Nigeria	Ongoing	11,986,253
ERGP202203198	Supply of inputs and irrigation equipment for dry season farming for youths in Kwara North	New	42,500,000
ERGP202200822	Training of youths and women in modern farming techniques and food preservation in Sabon Gari lga Kaduna State	New	42,500,000
ERGP202202572	Supply of inputs and irrigation equipment for dry season vegetable production for youths in Katsina South senatorial district.	New	85,000,000
RGP23175497	Development of agribusiness hub for maize, cassava, yam and green house crops with provision for tillage, planting, irrigation, value addition and packaging	New	20,000,545
ERGP23175529	Cultivation of new and rehabilitation of old forestry plantations with provision for timber processing	New	14,400,000
ERGP202201766	Training and provision for sustainable agricultural practices for youths and women in Afikpo north/south federal constituency	New	212,500,000
ERGP202201935	Training and empowerment of youths and women in organic fish farming, using organic methods to produce healthy fish to table size in Abadam / Guza mala kukawa / Mobbar Federal Constituency, Borno State	Ongoing	72,250,000
RGP202203663	Development and training of farmers in agriculture post-harvest management and lost control and the use of smoking kiln in Ekiti Central Senatorial district	New	42,500,000
ERGP5122540	Development of pasture and fodder feeds in grazing reserves and pasture corridors	Ongoing	14,725,000
ERGP30154932	Enlightenment program on climate-smart agricultural practices for farmers and extension agents	Ongoing	43,200,000
ERGP30170408	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in North-Central	New	37,800,000
ERGP30170416	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in North-East	New	32,400,000
ERGP30170420	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in North-West	New	37,800,000
ERGP30170444	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in South-East	New	27,000,000
ERGP30170448	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in South-South	New	32,400,000
ERGP30170451	Purchase of soil test kits and distribution to soil extension agents and organized farmer groups in South-West	New	32,400,000
ERGP30170473	Capacity building on the protection and management of soil resources for farmers and extension agents in North-Central	New	25,200,000
ERGP30170502	Capacity building on the protection and management of soil resources for farmers and extension agents in North-East	New	21,600,000
ERGP30170505	Capacity building on the protection and management of soil resources for farmers and extension agents in North-West	New	25,200,000
ERGP30170507	Capacity building on the protection and management of soil resources for farmers and extension agents in South-East	New	18,000,000
ERGP30170509	Capacity building on the protection and management of soil resources for farmers and extension agents in South-South	New	21,600,000

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30170512	Capacity building on the protection and management of soil resources for farmers and extension agents in South-West	New	21,600,000
ERGP30170515	Capacity building of registered soil scientists on new innovations and advances in the profession	New	43,200,000
ERGP30170680	Promotion of crop-site specific fertilizers in the fertilizer sector in Nigeria	New	27,944,393
ERGP30111244	Bio-active plants as substitute for synthetic pesticides in the control of pest of stored products	Ongoing	36,890,900
ERGP30172468	Development of solar powered technologies for prevention of postharvest losses	New	32,950,000
ERGP30172521	Application of nano technologies for mitigation of postharvest losses in grain and fruits and vegetable	New	53,790,000
ERGP30172601	Training of rural women and youths on appropriate postharvest management of grains in the North	New	10,200,200
ERGP30172619	Impact assessment studies on improved postharvest technologies among rural women and youths in Nigeria.	New	34,239,900
ERGP30178367	Supply of bio-safety certified high yield seedlings for improved techniques for crop farming in some soil erosion prone communities in Edo State	Ongoing	4,000,000
ERGP30178368	Skills development and empowerment program in modern techniques for growing grains and economic tree-crops in soil erosion prone communities in Edo State.	Ongoing	5,000,000
ERGP202204046	Training and empowerment of women and youths on irrigated dry season vegetable and arable crop production in Anambra North Senatorial District	New	75,154,712
ERGP202204047	Capacity building on greenhouse farming techniques plus start-ups in Anambra North Senatorial District	New	75,154,712
ERGP202204050	Erosion control in Agba Dam resort off Forest Street Babatunde Alade Close, Ilorin South, Kwara Central Senatorial District	New	8,500,000
ERGP202202154	Provision of post-harvest storage facilities in Manawaci Ashaka Funakaye lga in Gombe, Kwami and Funakaye Federal Constituency of Gombe State	New	42,500,000
ERGP202203733	Provision of greenhouse units for farmers in some selected farming communities of Northeast	New	212,500,000
ERGP30155161	Accreditation and certification of organic farms for safe export	Ongoing	21,850,000
ERGP30155164	Breeding/ranching program for sustainable donkey hide export	Ongoing	79,800,000
ERGP30155165	Biopesticide and integrated pest management	Ongoing	33,250,000
RGP202200167	Utilization of horticultural waste for income generation and environmental sustainability in Ogun State	New	144,500,000
ERGP202300559	Training on greenhouse/hydroponix farming in Ahoada West / Ogba / Egbema / Ndoni Federal Constituency, Rivers State	New	17,000,000
ERGP202300567	Training on greenhouse /hydroponix farming in Port Harcourt Federal Constituency 1, Rivers State	New	17,000,000
ERGP202301148	Establishment of greenhouse with solar powered borehole water supply including related training of women and youth in Mbasombo, Gwer-East lga, Benue State	New	106,250,000
ERGP1111384	Completion of the equipping of the greenhouse and biotechnology laboratory	Ongoing	8,531,816
ERGP30155814	Investigation and improvement of constraints of production of popular agricultural food crops and integration of livestock, tree crops and agro-forestry into the production system in collaboration with ADPS in the zone	Ongoing	21,471,737

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30155823	Development of high yielding heat tolerant and good quality varieties of wheat and barley and availability of improve seed to farmers	Ongoing	141,077,129
ERGP30155824	Development of early maturing of millet with high yielding, good processing quality and availability of improve seed to farmers	Ongoing	59,829,359
ERGP30155825	Promoting the adoption of improved technologies of the institute's mandate crops through socio-economic research, effective dissemination of results and capacity building of researchers as well as enhanced information and documentations	Ongoing	25,737,645
ERGP5110977	Development of high yielding heat tolerant and good quality varieties of wheat and barley and development of early maturing and high yielding millet varieties with good processing quality and development of the capacity of scientists, farmers and extensionists in wheat and millet production, processing and storage	Ongoing	90,786,983
ERGP5111316	Extension of improved millet, wheat and barley technologies to farmers, development of the capacity of scientists, farmers and extensionists in wheat and millet production, processing and storage	Ongoing	22,228,936
TOTAL			**16,586,681,429**

For 2023

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP1175022	Livelihood improvement family enterprise program nationwide (establishment of cottage industries)	Ongoing	477,444,437
ERGP20175048	Land and climate change management for sustainable agriculture	Ongoing	618,484,782
ERGP30105248	Contribution to international organizations	Ongoing	230,844,962
RGP30159116	Counterpart funding of agricultural projects with donor agencies	Ongoing	1,310,855,700
ERGP30174871	Development of ruminants animals' production and value addition	Ongoing	33,433,971
ERGP30174874	Irrigation agriculture and crop development for all year-round farming	Ongoing	606,173,810
ERGP30174893	Implementation of the GIP nationwide	Ongoing	167,496,179
ERGP30174924	NATIP domestication	Ongoing	54,411,636
ERGP30174941	Promotion of honeybee pollination services in fruits, vegetables and flowering crops for increased productivity	Ongoing	42,385,730
ERGP5105208	National grazing reserves development	Ongoing	372,370,303
ERGP8195108	Multilateral/bilateral tied loans - ATAPS	Ongoing	8,711,400,000
ERGP8195312	Construction of open market stores with borehole, toilet facilities and erosion control in Jattu, Edo State	New	250,000,000
ERGP30193175	Provision of research aids on climate-smart agricultural practices to promote food security in Nigeria	New	25,750,000
ERGP30170515	Provision of enhanced aids to promote interest in the study and practices of soil science to ensure better soil fertility management in Nigeria	Ongoing	27,900,000
ERGP30170680	Promotion of crop-site specific fertilizers in the fertilizer sector in Nigeria	Ongoing	31,240,000
ERGP30193173	Research program on the protection and management of soil resources to promote healthy soils in Nigeria	New	40,050,000
ERGP30155115	Skill acquisition for soilless agriculture for youths at the headquarter	Ongoing	6,250,000

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30155131	Enhancement of skill in green house farming for women and youth in 6 geo-political zone	Ongoing	5,500,000
ERGP30151024	Biotechnological research into all mandate crops	New	13,000,000
ERGP30151033	Research into genetic and varietal improvement of rice, castor and benniseed crops	New	35,000,000
ERGP30171113	Research into genetic and varietal improvement of stevia, soybeans, sugarcane and acha crops	New	50,508,461
ERGP30176435	Production of pasture breeder seeds for further expansion using modern techniques and machineries	Ongoing	60,000,000
ERGP202304147	Grants to assist youths and women in cattle and goats rearing in selected BKR communities in katsina	New	100,000,000
ERGP30110882	Utilization of horticultural waste for income generation and environmental sustainability	Ongoing	1,643,857
ERGP30110937	Development of high yielding wilt tolerant tomato and pepper varieties adaptable to Nigeria agro ecologies	Ongoing	3,394,547
ERGP30110953	Germplasm enhancement, variety development and breeder seed increase for leafy greens, onion, okra, eggplant and exotics for farmers production and profitability	Ongoing	1,293,395
ERGP30110958	Horticultural genetic resources expansion for varietal improvement and conservation	Ongoing	2,401,867
ERGP30110978	Development and strengthening of citrus and mango value chains through improved sustainable production technologies	Ongoing	3,345,247
RGP30110995	Provision of irrigation facilities	Ongoing	4,485,075
ERGP30111054	Sustainable management of pests and diseases of horticultural crops in different agro ecological zones of Nigeria	Ongoing	2,172,752
ERGP30171114	Minimizing post-harvest losses through value addition to selected horticultural crops of significant economic and medicinal potentials	Ongoing	1,823,539
ERGP30171135	Development and promotion of improved propagation techniques for some indigenous crops (Parkia biglobossa, Tetrapleura tetraptera and Ocimum basilicum, Irvingia).	Ongoing	1,215,328
ERGP30153637	Integrated farming systems for sustainable cocoa coffee kola cashew and tea production in the emerging climatic change	Ongoing	4,000,000
ERGP30153791	Climate smart agriculture in cocoa production	Ongoing	7,000,000
ERGP27142757	Renovation of green/screen houses in Ibadan diagnostic center	Ongoing	10,000,000
ERGP30155161	Accreditation and certification of organic farms for safe export	Ongoing	20,000,000
ERGP30155165	Biopesticide and integrated pest management	Ongoing	20,000,000
ERGP30155165	Biopesticide and integrated pest management	Ongoing	20,000,000
RGP30124767	Enhancing the role of "orphan crops" and Founa i.e. neglected or relegated local cultivators, land races, small ruminants, giant African snails, insects etc., as well as native knowledge and technologies	Ongoing	12,760,241
ERGP30155814	Investigation and improvement of constraints of production of popular agricultural food crops and integration of livestock, tree crops and agro-forestry into the production system in collaboration with ADPS in the zone	Ongoing	12,998,755
ERGP30155823	Development of high yielding heat tolerant and good quality varieties of wheat and barley and availability of improve seed to farmers	Ongoing	60,977,775
ERGP30155824	Development of early maturing of millet with high yielding, good processing quality and availability of improve seed to farmers	Ongoing	20,431,510

CODE	PROJECT NAME	TYPE	AMOUNT (NGN)
ERGP30155825	Promoting the adoption of improved technologies of the institute's mandate crops through socio-economic research, effective dissemination of results and capacity building of researchers as well as enhanced information and documentations	Ongoing	10,387,664
ERGP5110977	Development of high yielding heat tolerant and good quality varieties of wheat and barley and development of early maturing and high yielding millet varieties with good processing quality and development of the capacity of scientists, farmers and extensionists in wheat and millet production, processing and storage.	Ongoing	33,304,293
ERGP5111316	Extension of improved millet, wheat and barley technologies to farmers, development of the capacity of scientists, farmers and extensionists in wheat and millet production, processing and storage.	Ongoing	13,422,787
ERGP202301996	Farm harvest and loss prevention techniques and management in selected rural areas of Apa, West.	New	170,000,000
Total			**13,707,558,603.00**

Endnotes

1 Link to website: https://www.trade.gov/country-commercial-guides/nigeria-agriculture-sector#:~:text=Nigeria%20relies%20on%20%2410%20billion,major%20sources%20for%20agricultural%20imports.

2 The Maputo Declaration, made during the 2003 African Union Summit, saw African leaders commit to allocating 10% of national budgets to agriculture and achieving 6% annual agricultural growth to drive rural development and economic growth. It also led to the establishment of the Comprehensive Africa Agriculture Development Program (CAADP) to guide agricultural transformation and poverty alleviation. However, many countries have struggled to meet the 10% budget target, hindering progress in agricultural development and food security across the continent.

3 Premium Times (2 October 2024): INVESTIGATION: How Nigeria's N400 million green bond-financed afforestation projects failed. https://www.premiumtimesng.com/business/business-news/556973-investigation-how-nigerias-n400-million-green-bond-financed-afforestation-projects-failed.html?tztc=1

4 Resilient Food System (25 July 2022): Farmers in Nigeria improve productivity through sustainable farming methods. https://resilientfoodsystems.co/news/farmers-in-nigeria-improve-productivity-through-sustainable-farming-methods

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